DÜZCE TIP FAKÜLTESİ DERGİSİ
DUZCE MEDICAL JOURNAL

e-ISSN: 1307-671X

Yıl Year 2021 Cilt Volume 23 Sayı Issue S1

Duzce Medical Journal (Duzce Med J) / Düzce Tıp Fakültesi Dergisi (Düzce Tıp Fak Derg)
e-ISSN: 1307-671X

2021;23(S1)

Special Issue
for CONCOVID (12-14 June 2020) and ICOMEP (5-6 Dec 2020) Conferences

"Global Imbalances, Social Changes, Health Economics and Health Management in Pre and Post Pandemic Period"

The aim of this special issue is to compile the qualified research articles on the global imbalances, economic and social changes, as well as health management and health policy with the interdisciplinary perspective during and after the COVID-19 pandemic period.

CONTENT / İÇİNDEKİLER

From the Editors

Throughout the history of humanity, the most important reasons for the incredible transformations and breakdowns have been great disasters, crises and depressions. There is no doubt that the 20th Century and the 21st Century, whose almost a quarter of it is completed in the blink of an eye, have been engraved in our memories as the years when the time-lapse version of the horrendous disasters in the known history... Especially last few years, besides wars, fires, earthquakes and floods, passed by struggling with devastating problems such as hunger and drought. The fact that the COVID-19 pandemic swiftly spread worldwide at the beginning of 2020 has been the most brutal link of the chain of disasters that have come one after another in recent years...

A virus, which we did not know just a year ago, shook the whole world deeply… We could not see this enemy with our eyes, continued to gnaw and destroy our whole selves, from education to health, from trade to finance, from social life to our private lives. The virus "started in Wuhan, China ...", but could not be destroyed. The virus threw us far away from our loved ones, our friends, our work and our social life. Many people lost their mothers, fathers, siblings, relatives, friends in their office, young and old, and had to send off to eternity ... Disgracefully, as human beings, we all had trusted ourselves as the master of the earth ... The remarkable changes and developments in the internet and information technologies, the perfect solutions in medicine for many diseases that seem difficult or even impossible, the development of alternative energy sources, the search for life outside of the world ... Unfortunately, despite all these technological and scientific developments that flattered our pride, we, as the humanity, kneeled against an invisible virus... Then, the vaccination race has begun among countries. Some countries initiated vaccinating their citizens, but the vaccination of the whole world will perhaps take years. Regrettably, the virus, which has spread from China to developed countries and developing countries, is currently threatening the miserable people of the least developed countries. Ibn Khaldun's phrase "geography is destiny" came true again after many years... Because developed countries with better macroeconomic conditions and larger budgets that need to be allocated to health services gave priority to their citizens in vaccination and other health services, "vaccination ethics" has been spoken out loud on a global scale. While the countries that have managed to vaccinate almost all of their citizens, underdeveloped countries where desperate children, young people and the elderly are left to their fates… The dirty race between countries on vaccination has gradually led to the concept of "vaccine economy" is more pronounced.

Because of all these tragic developments, the COVID-19 pandemic is far from being a simple health problem that only the health sector and healthcare professionals can handle and solve the problems alone. It emerges as a complex problem that many disciplines and

Editörlerden

Tüm insanlık tarihi boyunca yaşanan büyük dönüşüm ve kırılımların en önemli nedenleri, büyük felaketler, krizler ve bunalımlar olmuştur. Hiç kuşku yok ki 20. Yüzyıl ve neredeyse çeyreğini göz açıp kapayana kadar tamamladığımız 21. Yüzyıl, bilinen tarih boyunca yaşanmış en büyük felaketlerin hızlandırılmış versiyonunun dehşetle izlendiği yıllar olarak hafızalarımıza kazındı… Bilhassa son birkaç yıl, savaşlar, yangınlar, depremler ve sel baskınları yanında, açlık, kuraklık gibi büyük sorunlarla mücadele ile geçti. COVID-19 pandemisinin 2020 yılı başında hızla tüm dünyayı sarması ise son yıllarda peş peşe gelen felaketler zincirinin en ağır ve acımasız halkası oldu…

Sadece bir yıl önce ne olduğunu bilmediğimiz bir virüs, tüm dünyayı derinden sarstı… Gözle göremediğimiz bu düşman, eğitimden sağlığa, ticaretten finansa, sosyal hayattan özel hayatımıza kadar tüm benliğimizi kemirmeye ve yok etmeye devam etti. Artık ezbere bildiğimiz "Çin'in Wuhan kentinde başlayan…", ama bir türlü yok edilemeyen o mel'un virüs, bizleri en sevdiklerimizden, arkadaşlarımızdan, işimizden, sosyal hayatımızdan çok uzaklara attı. Kaçımızın annesi, babası, kardeşi, uzak-yakın akrabası, ofisindeki arkadaşı genç-yaşlı demeden birkaç gün içinde kollarımızın arasından kaydı gitti, sonsuzluğa uğurlandı… Oysa insanlık olarak kendimize ne kadar çok güvenmeye başlamıştık… İnternet ve bilgi teknolojilerinde yaşanan baş döndürücü değişim ve gelişimler, tedavisi güç hatta imkânsız gibi görünen birçok hastalığa yönelik tıpta çığır açan çözümler, alternatif enerji kaynaklarının gelişimi, dünyanın dışında yaşam arayışları… Ne hazin ki gururumuzu okşayan bütün bu teknolojik ve bilimsel gelişmelere rağmen, gözle görünmeyen bir virüse karşı tüm insanlık olarak diz çöktük… Meğer ne kadar acizmişiz… Derken ülkeler arasında aşı yarışı başladı. Bazı ülkeler kendi ürettikleri aşıyı vatandaşlarına uygulamaya başladılar, ancak tüm dünyanın aşılanması belki de yılları alacak. Daha da üzücü olanı, Çin'den gelişmiş ülkelere, oradan da gelişmekte olan ülkelere sirayet eden virüs, şu anda en az gelişmiş ülkelerin biçare insanlarını tehdit ediyor. İbn-i Haldun'un "coğrafya kaderdir" sözü adeta yeniden vücut buldu… Zira makroekonomik koşulları daha iyi, sağlık hizmetlerine ayrılması gereken bütçeleri daha geniş olan gelişmiş ülkeler, aşı ve diğer sağlık hizmetleri konusunda önceliği kendi vatandaşlarına verince, küresel ölçekte "aşı etiği" konusu gündeme geldi. Bir yandan vatandaşlarının neredeyse tamamını aşılamayı başarmış ülkeler, diğer yanda tamamen korumasız çaresiz çocukların, gençlerin, yaşlıların kaderlerine terk edildiği geri kalmış ülkeler… Aşı üzerinden ülkeler arasında başlayan kirli yarış giderek "aşı ekonomisi" kavramının daha fazla dillendirilmeye başlanmasına yol açtı.

İşte tüm bu trajik gelişmeler nedeniyle COVID-19 pandemisi, sadece sağlık sektörünün ve sağlık çalışanlarının tek başına ele alıp çözümleyebilecekleri basit bir sağlık sorunu olmanın çok ötesinde, ekonomi, finans, küresel ticaret, siyaset, uluslararası ilişkiler, eğitim, psikoloji, sosyoloji ve ilahiyat gibi birçok disiplin ve bilim alanının farklı boyutları ile ele alması gereken oldukça girift bir sorun olarak karşımıza çıkmaktadır. Zira COVID-19 pandemisi, koronavirus isimli basit bir virüsün sebep olduğu, bilhassa

fields of science have to deal with from different dimensions. Therefore, COVID-19 pandemic should be handled as a disaster that affects all aspects of life. Beyond being a disease that threatens the elderly, it points a new era in which nothing will ever be the same after it. Therefore, since the impacts of the COVID-19 pandemic are still substantial on a global scale, as scholars from different fields, we need to put forward alternative policy recommendations for policymakers, bureaucrats, administrators and decision-makers from all relevant fields, from economy to trade, from education to health, from hospital management to health policies. It will be the most critical contribution that scientists from different disciplines can make in this challenging test of humanity.

Based on the online International Congress of Management, Economy, and Policy (ICOMEP) which was held on 05-06 December 2020 in the shadow of the pandemic, this special issue is published as the ICOMEP special issue of Duzce Medical Journal, which does not spare its valuable contributions as the scientific partner. The special issue owes to the esteemed and distinguished researchers due to their valuable contributions and precious papers. The issue has wide coverage with comprehensive and complementary integrity, from vaccination policies to social life during the pandemic period, from healthcare practices of different countries to alternative policy recommendations on health management during the pandemic process.

The writing and publishing of this special issue were finalized under the precious contributions and auspices of the esteemed Rector of Düzce University, Prof. Dr. Nigar DEMİRCAN ÇAKAR. By taking the multidimensional aspects of the pandemic into account, Prof. Dr. İdris ŞAHİN, the Dean of Faculty of Medicine and the Vice-Rector of Düzce University, supported us in the publication of our special issue on the social sciences and health management. Besides, we kindly express our gratitude to Prof. Dr. Mehmet Akif ÖNCÜ, the Vice-Rector of Düzce University, for his outstanding support to us in the publication process. In addition, we would like to send our special thanks to Düzce Medical Journal Editor-in-Chief, Dr. Mehmet Ali SUNGUR, not only for his patience and politeness but also for his endless energy to support us. And of course, we are grateful to our colleagues whom it would not be possible for this valuable special issue to come out without them. We also owe our thanks to our reviewers who did their best to have quality papers and to all our dear colleagues who have contributed to us.

This precious special issue is dedicated to our loved ones and dear colleagues who passed away due to the COVID-19 pandemic ... May their souls rest in peace, their places are in heaven, and their degrees are martyrdom...

yaşlıları tehdit eden bir hastalık olmanın ötesinde, yaşamın tüm boyutlarını etkileyen ve kendinden sonra hiçbir şeyin asla eskisi gibi olmayacağı yeni bir dönemi işaret eden bir felaket olarak ele alınmalıdır. O halde, COVID-19 pandemisinin etkisinin halen en güçlü şekilde küresel ölçekte devam ettiği bu dönemde, ekonomiden ticarete, eğitimden sağlığa, hastane yönetiminden sağlık politikalarına kadar politika yapıcılara, bürokratlara, yöneticilere ve tüm ilgili alanlardan karar vericilere yönelik olarak alternatif politika önerileri ortaya koymak biz farklı disiplinlerden bilim insanlarının insanlığın bu ağır imtihanında kendi nokta-i nazarından yapabileceği en önemli katkı olacaktır.

Pandeminin gölgesinde, online olarak 05-06 Aralık 2020 tarihleri arasında organize edilen International Congress of Management, Economy, and Policy (ICOMEP) kongresinin bilimsel paydaşı olarak kıymetli katkılarını esirgemeyen Düzce Tıp Fakültesi Dergisi'nin ICOMEP özel sayısı olarak çıkardığımız bu eser, içeriğine dahil olan yurt içi ve yurt dışından güzide bilim insanlarının kıymetli katkıları ile tam da bu değerli amaç ve katkı için bir araya gelmiştir. Özel sayımıza dahil olan eserler, aşı politikalarından pandemi döneminde sosyal hayata, farklı ülkelerin sağlık hizmetleri uygulamalarından pandemi sürecinde sağlık yönetimi konusunda alternatif politika önerilerine kadar geniş yelpazede ve birbirini tamamlayan bir bütünlük içinde oldukça ayrıntılı düşünülerek hazırlanmıştır.

Bu değerli eserin yazılması ve yayınlanması Düzce Üniversitesi'nin Saygıdeğer Rektörü Prof. Dr. Nigar DEMİRCAN ÇAKAR hocamızın kıymetli katkıları ve himayelerinde gerçekleşmiştir. Özel sayımızın yayınlanmasında pandeminin çok boyutlu yönlerini dikkate alarak tıp dışında farklı bir alanda özel sayı çıkarılması konusunda verdikleri destek dolayısıyla Düzce Üniversitesi Rektör Yardımcısı ve Tıp Fakültesi Dekanı Sayın Prof. Dr. İdris ŞAHİN hocamıza ve özel sayının yayınlanma sürecinde bizlere tüm samimiyeti ile yardımlarını esirgemeyen Düzce Üniversitesi Rektör Yardımcısı Sayın Prof. Dr. Mehmet Akif ÖNCÜ hocamıza şükranlarımızı arz ederiz. Ayrıca, eserin hazırlanma ve yayınlanma süreçlerinde nezaketi ve çalışkanlığı ile gece-gündüz her daim olağanüstü destekleri ile bizi asla yalnız bırakmayan, Düzce Tıp Fakültesi Dergisi Baş Editörü Dr. Öğr. Üyesi Mehmet Ali SUNGUR hocamıza teşekkürlerimizi borç biliriz. Ve elbette, olmasalardı bu eserin ortaya çıkmasının mümkün olmayacağı, özel sayımızda yazar olarak yer alan yurt içi ve yurt dışından bütün değerli bilim insanlarına, yerinde ve yapıcı eleştirileri ile eserin en güzel şekilde tamamlanması için çabalayan hakemlerimize, emeği geçen ve adını zikredemediğimiz tüm değerli meslektaşlarımıza katkılarından dolayı can-ı gönülden şükranlarımızı arz ederiz.

Bu kıymetli eser, COVID-19 pandemisi nedeniyle ebediyyete irtihal etmiş sevdiklerimize ve değerli meslektaşlarımıza ithaf olunur… Ruhları şad, mekanları cennet, makamları şehadetlik mertebesi olsun…

Prof. Dr. Ayfer GEDİKLİ
Prof. Dr. Seyfettin ERDOĞAN
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Invited Review / Davetli Derleme
doi: 10.18678/dtfd.890089

Duzce Med J, 2021;23(S1):1-23
Düzce Tıp Fak Derg, 2021;23(S1):1-23

A Review of the Progress of COVID-19 Vaccine Development

COVID-19 Aşısı Geliştirme Süreci Üzerine Bir Değerlendirme

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 14.02.2021
Available Online /
Çevrimiçi Yayın Tarihi : 02.03.2021

ABSTRACT

A coronavirus disease pandemic (COVID-19) is still a global problem with not sufficient evidence of a declining pattern caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It is generally accepted that normal life is impeded by securing a reliable vaccine strategy. Many countries have accelerated the process of clinical trials to create effective treatment with COVID-19. More than 200 candidate vaccines have been started for SARS-CoV-2 testing. This review attempts to provide an overview of the currently emerging COVID-19 vaccine types, address the theoretical and practical challenges of vaccines for COVID-19 and discuss possible strategies to help vaccine design succeed. The first move was to take out papers using the initial keyword “pandemics, vaccines and vaccine types”. A total of 63,538 results (including 1,200 journals; 16,875 books; and 12,871 web pages), with the initial keyword, searched for in the Scopus database. Further improvements were searched on keywords such as "pandemic and vaccine types" (711 newspapers and 5,053 webpages). This review attempts to overview the historical and important basic information about the pandemics viz. history, virological characteristics, structure, origin and physio-chemical properties. The second phase includes the vaccination types and strategies in depth. It includes the diagnosis, virology and pathogenesis of SARS-CoV-2 and SARS-COV-2/COVID-19 vaccines. The development, planning strategies, types, cost and current scenarios of COVID-19 vaccines are depicted in detail. The pandemic COVID-19 as it continues, is a global problem. Vaccination seems to be an efficient and economical way to mitigate and control the epidemic. This requires a mass production of successful COVID-19 vaccines.
Keywords: SARS-CoV; COVID-19; vaccines; vaccine types; assessments and implications.

ÖZ

Koronavirüs hastalığı (coronavirus disease 2019, COVID-19) pandemisi, şiddetli akut solunum yolu sendromu koronavirüsü 2 (severe acute respiratory syndrome coronavirus 2, SARS-CoV-2)’nin neden olduğu ve henüz hastalığın olumsuz etkilerinin azalmasına yönelik yeterli kanıtın bulunmadığı küresel bir sorundur. Güvenilir bir aşı stratejisinin geliştirilmesiyle normal yaşama dönüleceğine dair genel bir fikir birliği oluşmuştur. Birçok ülke, COVID-19’a karşı etkin tedavi geliştirmek için klinik araştırma sürecini hızlandırmıştır. SARS-CoV-2 için 200'den fazla aday aşı test edilmeye başlanmıştır. Bu çalışmada, güncel COVID-19 aşı türleri genel olarak gözden geçirilecek, COVID-19 aşılarının teorik ve pratik zorlukları incelenecek ve aşı tasarımının başarılı olmasına yardımcı olacak olası stratejiler tartışılacaktır. Çalışmanın ilk bölümünde, anahtar kelimeler olarak “pandemiler, aşılar ve aşı türleri” kullanılarak literatürde yer alan makaleler incelenmiştir. Scopus veritabanında başlangıç anahtar kelimeleri ile toplam 63.538 sonuç (1.200 dergi, 16.875 kitap ve 12.871 web sayfası) incelenmiştir. Daha sonra "pandemi ve aşı türleri" gibi anahtar kelimeler ile daha ayrıntılı arama yapılmıştır (711 gazete ve 5.053 web sayfası). Bu çalışmada ayrıca, pandemilerle ilgili tarihsel arka plan, virolojik özellikleri, yapısı, kökeni ve fizyo-kimyasal özellikleri de incelenmiştir. İkinci bölümde, aşılama türleri ve stratejileri derinlemesine araştırılmıştır. Bu bölümde, SARS-CoV-2 ve SARS-COV-2/COVID-19 aşılarının teşhisi, virolojisi ve patogenezi üzerinde durulmuştur. COVID-19 aşılarının geliştirilmesi, planlama stratejileri, türleri, maliyeti ve güncel senaryoları ayrıntılı olarak açıklanmıştır. COVID-19 pandemisi var olduğu sürece küresel bir sorun olmaya devam edecektir. Aşılama, bu salgını hafifletmek ve kontrol altına almak için etkili ve ekonomik bir yol olarak görünmektedir. Bu hedefe ulaşmak için, etkin COVID-19 aşılarının seri üretimi en başarılı yol olacaktır.
Anahtar kelimeler: SARS-CoV; COVID-19; aşılar; aşı tipleri; değerlendirme ve çıkarımlar.

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INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has a place in a family of coronaviruses, which is a family known as zoonotic infections, and which sorts betacoronavir and is closely associated with two other infections, including severe acute respiratory syndrome coronavirus (SARS-CoV) and the Middle East respiratory syndrome coronavirus (MERS-CoV). It should be cover in an icosahedral shell of protein. The surface has different club-shaped spikes; the electron microscopy (EM) reveals a sun-faced crown. The surrounding virus contains a lipid bilayer in which auxiliary proteins are protected for layer (M), envelope (E) and spike (S). Both coronaviruses are used as receptors of cellular passage by angiotensin-converting protein. In any event, the propensity of SARS-CoV-2 to join these receptors is far higher, and it has strong infectivity (1). The various variants of the coronavirus disease 2019 (COVID-19) virus circulate around the world: the United Kingdom (UK) has reported the B.1.1.7 strain with a large number of mutations in the fall of 2020. This version is simpler and quicker to spread than other variants. Experts in the UK stated in January 2021 that the risk of this variant was higher than the other variant viruses, but more studies are needed to confirm it. In several countries around the world, it has since been identified. This version was first observed in the United States in late December 2020. Another edition named B.1.351 appeared in South Africa separately from B.1.1.7. B.1.351 shares certain mutations with B.1.1.7 originally detected in early October 2020 (2). At the end of January 2021, cases arising from this variant were registered in the USA. A P.1 variant, first observed in Brazilian travelers who had routine check-ups checked on an airport in Japan in early January, was established in Brazil. This modification includes a variety of other mutations, which can impact the ability of antibodies to be recognised. In the USA, at the end of January 2021, this variant was first observed (3).

NEED FOR CORONAVIRUS VACCINE

The active sedation against infection or the subsequent infection was severely examined and no operators were moved further. There have been several medications, primarily hydro-xychloroquine and resuscitation advocated as frenetic steps to tackle COVID-19 on the basis of a vast number of preparatory, contradictory and ambiguous studies. These and other medicines can save lives but do not shut their doors to regularity in the expressed turmoil of the pandemic. It brings us, as it was, to a particular option of a successful and stable antibody, which must be rendered as long as all nations and communities influenced by the widespread at fair prices may conceive and accessible (1).

Vaccination may build an insensitivity of the crowd inside a society that can decrease the disease incidence, minimise square transmission and reduce the social and financial impact of the disease. Except for a widespread vaccine scope, an auxiliary contamination wave can be prevented, and frequent endemic disease revolutions can be regulated. Finally, the disease could be murdered, as it was in many other illnesses with a higher potential to cause pandemics such as smallpox, poliomyelitis, etc. than COVID-19 (2).

HISTORY OF VACCINES FOR CORONAVIRUSES

A single-stranded positively receptive RNA genome is encircled by coronaviruses, which have an expansive (30+kb), helical nucleocapsid (N) and an exterior surface consisting of a protein grid M, a protein E or S proteins (3). The S protein, usually trimeric, includes the space for the receptor retention (RBD) that can officially be converted into the angiotensin over the protein 2 (ACE2) and into the cell (Figure 1). S protein has been shown to elicit a neutralising counteracting agent in SARS-CoV, all of the essential proteins, and maybe a main vaccine antigen target (4). The progression of coronavirus immunisations has been verified with issues. In the animal models that mimic human disease, coronavirus antibodies were immunogenic and it mostly ineffective in preventing infection securing. There is fear; however, that inoculation might not be practicable for long-lived insusceptibility, as with a typical coronaviral illness, and reinfection may be conceivable. Improvement of illness linked to immunisation in several cases. Former usage of certain animal models of coronaviral antibodies (SARS-CoV and MERS-CoV) posed protection issues with Th2, and immunopathology interfered. Two days after the SARS-CoV challenge was not found in the lungs of threatened non-vaccinated mice, mice vaccinated with two inactivated whole infection antibodies, recombinant DNA spicy protéine immunisations or viral molecule vaccines produced a lung pathology counting eosinophilic penetration (5).

In a few other ponders, comparison with younger muses who have been challenged in the process of taking post-immunisation, comparable lung immunopathology is found. The SARS-CoV N protein immunisation inocular mouse induces extreme pneumonia or pulmonary eosinophilic occurrence in viral disease, whereas the N protein antigen may not be an antigen linked with the viral copy of particles communicating glycoprotein, which is recommended by the mouse immune system. In mice with inactive MERS-CoV vaccination when threatened by live infections, comparable enhanced immunopathology was observed (6).

Upgrading contagious antibody linked may be more nervous for certain kinds of antibody. Improved viral disease infection took a major position after the inactivation of measles and RSV vaccinations. The possible components are the Th2 warped reaction arising from formalin inactivation and the need for liquid antibody development (7).

VIROLOGICAL CHARACTERISTICS OF SARS-CoV-2

The causative pathogen of COVID-19 is SARS-CoV-2, with the coronaviridae family as its place. Near after other β-CoVs, the ~3-kb genome-estimated SARS-CoV-2 virion comprises a nucleocapsid of genomic RNA and the nucleocapsid phosphorylated (N) protein (8). Nucleocapsids are inserted in bilayers of phospholipids and enclosed in the two separate kinds of spiking proteins: spiken glycoprotein-trimmers demonstrate in both CoVs. The S protein plays an important function in receptor authority and its the gateway to the determination of tropism and transmitting capability (Figure 2). On the side of the viral envelope, the lattice protein (M) is located within the viral envelope. Genome analysis showed that SARS-CoV-2 comprises 5 and 3 terminal groupings with a quality structure 5 -free screen perusing (ORF).

Particles of the infection are 60-100 nm long and spherical or oval (9). It may be inactivated or warmed at 56 °C for 30 minutes by light and touches much of the disinfectants (i.e. ether, 75% ethanol, per acetic, chlorine and chloroform) (10). Collection of evidence indicates that SARS-CoV-2 is comparable to the human cell receptor SARS-CoV-2 (ACE2), whereas the pivotal dipeptidyl peptidase-4 pivotal MERS-CoV is similar to the cell-section. Collection of the data ACE2 can be a kind of film I protein, mostly linked to cardiovascular infections, communicated within lungs, hearts, kidneys and digestion tracts. Later analysis of the cryogenic electron microscope structure of the SARS-CoV-2 S protein showed that ACE2 is approximately 10 to 20 times more official than SARS-CoV.

As for the phylogenetic analysis of the genomes SARS-CoV-2, after a review of the test globally, analysts found three key differences, A, B and C. A as the genealogical genus in line with the bat outgroup CoV. Interestingly, East Asia and the European States are greatly external to kinds of A and C. By contrast, B is the most predominant species in East Asia, and its ancestors do not tend to disperse beyond East Asia without being presumed category B. SARS-CoV-2 genomes have been detected as strongly interrelated, and human evolution has been taken on a variety of instances in parallel, where the same viral transition takes place in two separate human beings (11).

Due to its whimsical aspect and its strong contagiosity, it is of exceptional importance to track SARS-CoV-2 continuously from humans or creature organisms.

STRUCTURE AND ORIGIN OF CORONAVIRUS

Coronavirus is a packaged infection, and RNA belongs to the Coronaviridae family, the Coronavirinae family, and organise Nidovirales, with one stranded, non-segmented and positive sensory infections. The coronavirus genome estimate is approximately 26-32 kb and is the major recognised RNA infection genome. Its dimensions vary from a gap of 60 nm to 140 nm through club estimates of the spike (Figure 1). Beneath the lens, the spike appears like a coronavirus (12). Helically symmetrically, coronavirus has nucleocapsides, which is unusual in positive sensory RNA infections. The subfamily, which is phylogic, comprises of four genera: alpha-CoV, betacoronavirus (β-CoV), gamma-CoV and deltacoronavirus (μ-CoV). This is a genetic part of the Coronavirin. α-CoV and β-CoV normally causes human air problems, whereas μ-CoV and μ-CoV deflect mammals.

Extreme respiratory disease induced by four human coronavirals, HCoV-NL63, HCoV-OC43, HCoV-229E and HKU1, was a deeply pathogenic human virus, which caused extreme respiratory syndromes in humans. HKU1 began in rat, and HCoV-NL63, HCoV-229E, SARS-CoV, and MERS-CoV were started from bats in conjunction with the latest sequence database HCoV-OC43 (13). Sequencing reveals that β-coronavirus is present in nCoV-2019. In 2003, beta-gener coronavirus with bat-root in the Guangdong region of China transmitted to humans through civet cat. This infection triggers extreme respiratory syndrome, and in China and Hong Kong, around 8,422 people were infected. Another epidemic occurred in Saudi Arabia in 2012 with 2494 individuals influenced, and 34% of casualties (CE) recorded in the MERS-CoV.

TRANSMISSION

In December 2019 in Wuhan, Hubei Province, China, a novel β-coronavirus was to start. The third plague of the twenty-first century, now exceeding SARS and MERS, in China. Right now, an immense amount of pneumonia patients who were subjected to fish ads were detailed, which may be a centre for many live creature organisms. The entire COVID-19 genome groups were dumped into an open database in 10 January 2020 and noticed that there is a certain similarity to SARS. The International Scientific Categorisation Committee for Infections 2019-nCoV was renamed as SARS-CoV-2. The inherited COVID-19 arrangement reveals about 80% similarity to the SARS-CoV and 50% proximity to the MERS-CoV (14). A detailed analysis of phylogenetics has shown that the COVID-19 belongs to the family of beta-coronavirus. The receptor authorship is the key stage in viral disease after cell fusion.

It is known that the interactions between COVID-19 and angiotensin-transforming chemical 2 (ACE2) have been contrasted with the SARS-CoV in the classification of coronavirus spike official space receptors. On 17 November 2019, the number of coronavirus cases in Wuhan, China increased exponentially. The coronavirus easily spreads from China to other countries including Thailand, Nepal, Malaysia, Sri Lanka, Singapore and, jointly, the Philippines, India, Australia, Finland, Germany, Cambodia, Vietnam, Taiwan, Canada, Japan, France (Figure 2). WHO has declared the novel Coronavirus episode generally recognised and illustrated the call for urgent action from all countries in detecting, managing, and reducing dissemination to save lives. The WHO detailed 8.9 M cases of coronavirus at the time of the planning composition and approximately 0.4-0.5 M cases of. Some sources suggest

personal-to-person correspondence through teamwork contacts; the courses for the transmitting of COVID-19 are through efficiency hacking or sneesing of a tainty individual and roundabout touching, for instance, surface defilement. Other experts were researched on pregnant ladies who were affirmed for COVID-19 disease in the third trimester of pregnancy, but mother-to-child transmission did not reinforce this. Pregnant people are more susceptible to respiratory pathogens infection (15).

SYMPTOMS AND DIAGNOSIS

Fever, hacking and exhaustion are typical side effects of this infection. A few patients may have defining signs such as throbbing, nasal blockage, sputum generation, hemoptysis, nose running, a sore jaw, loose bowels, lymphopenia and dyspnoea. Following hatching, the signs turn up for around 5.2 days (16). The duration from coronavirus disease starting to death differs between 6 and 41 days, with an intermediate of 14 days. Patient vulnerability and age depend on the time of infection. In patients >70 years of age, the duration of diseases is shorter than those below 70 years of age. Chest CT philtres shown as pneumonia, intensive reflex sympathetic dystrophy (RSD), extreme renal injury, heart hurt and, indeed, passing can occur in serious cases clinical characteristics shown as Chest CT philtres. Numerous ground glass turbulence observed in a few patients in the subpleural location of the lungs, which triggered both localised and healthy reactions leading to inflammation (17).

The upper lungs flap, connected to dyspnea and hypoxemia, is defined by chest radiology of certain patients. The faecal and pee tests are also necessary to include an elective coronavirus transmitting course, as patients that have been infected with COVID-19 also create side effects such as looser bowels. The amounts of the pro-inflammatory cytokine, large numbers of leukocytes, and exceptional respiratory work tend to be rising in coronavirus infected patients. Severe pneumonia, soil opacities RNAaemia and acute hearts injury are the most pathogenesis of COVID-19 infection. Top of cytokine and chimiocine amounts, such as the TNF-α, IL7, IL8, IL9, IL10, VEGFA, GCSF, GMCSF, PGF2, etc. occur in blood in patients with COVID-19 (18). Air studies are carried out from a spotty person both symptomatic and asymptomatic and are forwarded to a testing centre for inference: the nasopharyngeal swab, swab, sputum, throat swab, bronchaeolar lavage. The example was evaluated using the convention distributed by WHO with a reverse transcription chain response (RT-PCR). If the number of patients grew on a regular basis, this contributes to a shortage of atomic test capability and reagents dependent on the laboratory. Quick and easy to use gadgets were produced for the external test of the testing setup in a few minutes. It is much tougher to seek rectifications in the antibody-based monitoring device since a counteracting agent will identify infection antigens other than COVID-19 that induce common cold inside the strip. In order to solve this issue, a simple determination test for patient treatment was developed for the counteracting agent. This fast kit established the counteracting agent in the blood following infection by COVID-19. The intensity of the response of counteracting agents depends on the severity of the illness, the age of the patient, the medical state, the patient's medications etc. (19). Table 1 contained the most commonly distributed demonstrative kits.

Table 1. Some of the diagnostic test kits used for the diagnosis of COVID-19 (20)

Product Name	Manufacturer
cobas SARS-CoV-2 Qualitative assay for use on the cobas 6800/8800 Systems	Roche Molecular Systems, Inc.
Primerdesign Ltd COVID-19 genesig Real-Time PCR assay	Primerdesign Ltd
Abbott Realtime SARS-CoV-2	Abbott Molecular Inc.
PerkinElmer® SARS-CoV-2 Real-time RT-PCR Assay	PerkinElmer Inc.
Real-time fluorescent RT-PCR kit for detecting 2019-nCoV	BGI Europe A/S
Detection Kit for 2019 Novel Coronavirus (2019-nCoV) RNA (PCR- Fluorescence Probing)	Da An Gene Co., Ltd. Of Sun Yat-sen University
RealStar SARS-CoV-2 RT-PCR kit 1.0	Altona Diagnostics
Patho Detect	MY LAB
Allplex 2019-nCoV assay	Seegene
nCoV Real-Time Detection kit	SD Biosensor
TRUPCR SARS-CoV-2RT-qPCR kit version 2	KILPEST (BLACKBIO)
Quantiplus CoV detection KIT Ver 2.0	Huwel Lifesciences Pvt. Ltd.
TaqMan 2019-nCoV Control Kit v1	ABI (Applied biosystems)
BIO COVID ID/ COVID-19 qualitative PCR detection Kit version 2	Biogenomics (India)
qSARS-CoV-2 IgG/IgM Rapid Test	Cellex, Inc.
Quest SARS-CoV-2 rRT-PCR	Quest Diagnostics Infectious Disease, Inc.
EverlyWell COVID-19 Test Home Collection Kit	Everlywell, Inc.
COVID-19 RT-PCR Test	Laboratory Corporation of America (LabCorp)
Panther Fusion SARS-CoV-2 Assay	Hologic, Inc.
TaqPath COVID-19 Combo Kit	Thermo Fisher Scientific, Inc.
Xpert Xpress SARS-CoV-2 test	Cepheid

CLINICAL FEATURES AND SUSCEPTIBILITY

Persons of any age level would not be allowed to utilise COVID-19. Indications during the normal flu (Flu), include fever, hack, an ailment of the mouth, migraine, tiredness, myalgia, smell and taste misfortune and dyspnea. In asymptomatic or mellow infections up to 80 % of the cases have (21). Simple co-morbidities in a few patients may help to exacerbate the illness, influenza, intensive respiratory diseases (ARDS) and multiorgan fractures, and in a long-term, fatal at the end of the primary week.

PHYSICOCHEMICAL PROPERTIES

SARS-CoV-2 can be practical on surfaces like the sodium hypochlorite, hydrogen peroxide, diatyle ether, 75% ethanol, chlorine etc. on surfaces of plastic and stainless steel up to 72 h under positive environment conditions but is prone to the most typical disinfectant compounds. The cleanser has also been seen to work as the lipid bilayer of the bacteria breaks down promptly. Moreover, UV inactivating or warming at 60 °C for 30 min can be achieved for SARS-CoV-2 (22).

DIAGNOSIS AND PATHOGENESIS OF SARS-CoV-2

The quick and accurate conclusion of COVID-19 is critical for managing the outbreaks in populations and centres of healing (23). The ideal demonstration research for CoVs was carried out with developments such as polymerase chain response (PCR), reverse-transcription polymerose chains (RT-PCR), Real-Time RT-PCR (rRT-PCR), invert translation isothermal loop controlled change (RT-Light). PCR testing has been performed to date on the leading edge of SARS-CoV-2. As the gold standard used to identify the disease source, PCR prevails that the requisite preliminary steps will normally be generated easily until the virus system is established (Figure 4). Prior to the identification of the virus long time earlier, WHO initiated and disseminated in January 2020, the key quantitative RT-PCR steps to classify SARS-CoV-2. This evaluation convention was complex, costly and is basically ideal for broad centralised demonstrative testing facilities. All of this is taken into consideration. With regard to the demonstrative standards currently identified by the China National Wellness Board, the standardised COVID-19 evaluation has matured nasopharyngeal and oropharyngeal swab studies. Three new RT-PCR experiments were added, with slightly fewer in vitro discovery maximum, based on the polymerase of RNA (Rdrp)/helicase (Hel), nucleocapside and SARS-CoV-2 spike qualities (RdR). In conjunction with the one-step RT-PCR framework, the SARS-CoV E consistency discovery is popular. The PCR E-Quality was fine for SARS-CoV-2 disease diagnosis, while the RdRp Convention was accepted as positive proof.

Diagnostic Testing for COVID-19

Strictly speaking, a new FDA-licensed COVID-19 procedure has already been developed using Abbott ID. Presently, this diagnostic process will be delivered, all in order to try to draw a verdict in reasonably five minutes. As SARS-CoV-2 efficiency results can result in untrue negative effects, counteracting agent discovery may be accompanied in particular by enhancing the screening of asymptomatic individuals. Clinically, in any event with unfavourable RT-PCR findings, the assessment of the disorder COVID-19 should be carried out with ordinary chest computerised Tomography (CT) properties for those who are late suffering from headache, weariness, sore throat, hacking, or dyspnea due to introduction. Most instances showing the two-sided transmitting of sketchy shadows and dark glass, often with a ring shape, and a lungen conveyance, reveal comparable characteristics on the CT images (24).

In the 21 primary chest CT inspections, some of the knowledge transmitted from China revealed that widening patients (86 %) triggered iced glass nebula affecting more than one lung flap (71 %). Moreover, lung cavitation, pleural emanation, covert aspirational knobs and lymphadenopathy were also significant. It should be found out that Expanding imaging creativity, and a later reflection shows the probability of saddling the Cas13 SHERLOCK stage for the determination of SARS-CoV-2 (25). The Cas13 protein is sent to classify those hereditary goals within this system. The Cas13 is allowed to cleave neighbouring RNAs, which are a 'collateral' function useful for amplification of a columnist flag. Whatever it is, a verified structure for clinical testing should be sponsored. Several of the knowledge transmitted from China revealed an expansive selection of patients (86%) to develop iced glass nebulae with influences of more than one flap in the lung (71%) (two-sided inclusion). Furthermore, lung cavitation, pleural emanations, distinct aspsic knobs, and lymphadenopathy were important. It should be noted that when extending to picture creativity, a later study reveals that SHERLOCK, based on Cas13, is saddled for the determination of SARS-CoV-2 (25). For example, the Cas13-based step will saddle. In this sense, Cas13 protein is sent for RNA-targeting to identify unique genetic goals. Cas13 will separate neighbouring RNAs, the 'collateral' highlight of which is useful to intensify the symptomised columnist flag. Whatever it is, a verified structure for clinical testing should be sponsored.

Pathogenesis of SARS-CoV-2

For SARS-CoV-2 transmissions, an effective viral Replication in the mucosal epithel of the upper respiratory tract is required to occur and promotes proliferation of the lower respiratory tube and gastrointestinal mucocious membranes, triggering mother viremia. Exceptionally, few pathogens are under surveillance at this stage and remain asymptomatic. Moreover, a variety of patients may be impacted by non-respiratory side effects (i.e. extreme cardiac and liver injury, deception of the kidney, runs). Since ACE2 is extensively distributed through the nasal mucosa, bronchus, lungen, cardiovascular and kidney, and so on, SARS-CoV-2 is defenceless in various human organs. In particular, S protein plays a key role in evaluating the cell tropism and consequently, the transmission of SARS-CoV-2 interspecies as it has the effect of infection in a cellular receptor.

The spike protein would catalyse the viral combination handle, enabling the viral genome to reach the cytoplasm, after the receptor's official location. The division of S into subunits, regarded as planning, is a prerequisite for this technique (Figure 3). Hoffmann et al.'s study has unmasked the usage of the ACE2 receptor for transient and the TMPRSS2 serine protease for S protein preparation by

SarS-CoV-2. TMPRSS2 supported inhibitors for therapeutic usage will then position the entrance to offer an alternative to simple therapy. The fact that S will easily be able to get unused protease cleavage premises, as well as the fact that multiple proteases can conduct the same role, indicates that this disorder will effectively be modified to replicate in a few cell species (26).

The SARS-CoV-2 and SARS-CoV-CoV CoV (RBD), which had been detailed beforehand as incapable of transacting with S protein, includes apparent antigene errors between SARS-CoV-2 and SARS-CoV, were all murine monoclonal anticuerpos (mAbs) and polyclonal antibodies (pAbs). The main neurotic study of severe COVID-19, based on neurotic analysis discoveries, indicates that cellular fibromyxoid exudates induced diffuse alveolar harm on both sides of the lung (27). The right lung revealed a fascinating arrangement of the hyaline and lung shedding and ARDS recommendation. In comparison, pneumonic edoema and the hyalin layer arrangement tended to clean away lung tissue, which indicates early ARDS. Lymphocytes have overwhelmed, in both lungs, interstitial Mononuclear Explosive Infiltrate. Another thought about how the passage of COVID-19 disease may often contribute to severe kidney damage and proteinuria.

In patients with COVID-19 ACE2 had been found to be upregulated, and the immunostaining agent of nuclear SARS-CoV counteracting protein in tubules had been positive. It was observed in many interstitial mononuclear fiery invasions, the cardiac tissue did not easily impact this infection (27). Apart from the severe respiratory disruption, overflowing provocative responses in the preparation of the disease were often found in clinical situations, contributing to aspiratory aggravation. It is important to remember that downregulation of ACE2 by viruses, rapid infection replication and cell damage and improvement depending on the antibody will lead to a strong deterioration caused by SARS-CoV-2. A large amount of epithelial and endothelial cells would be triggered by the beginning scheme of fast viral replication, and the seething of pro-inflammatory cytokines and chemokines (Figure. 5) will be encouraged subsequently.

Intriguingly, the later study contrasted SARS-CoV-2's transcriptional reactions with other respiratory infections to discern between transcriptional highlights which could frame COVID-19's organic premise. The analysis reveals that SARS-CoV-2 is rare and commonly transcripted. Despite viral replication, the host responded to SARS-CoV-2 and at the same times initiated high chemokine levels sufficient to pick the effector cells, resulting in productive reactions of Sorte I and II I interferon (IFN-I and -III). In other words, the moo amounts of IFN-I and -III were typical of this kind of arson reaction in contrast to elevated chemokines and high IL-6 expression. The reduced intrinsic antiviral tolerance and plentiful fires of cytokine may be the main features of COVID-19.

As the weakened resistant reaction facilitates motivated viral reproduction, this fundamental observation may also justify why severe COVID 19 events are more commonly found in comorbidity patients. In expansion to a cytokine storm, some studies have shown that the typical function of COVID-19 can be lymphopenia, which can be too severe and trigger death (28).

CRUCIAL SARS-CoV-2 TARGETS FOR NOVEL DRUG DEVELOPMENT

The schematic of SARS-CoV-2's virology as well as the broad-reaching possible danger tools provide the foundation for care and expectation in particular. In the statistic, there is a general interpretation of immediate deadlines for sedate revelation. 6.-6. Inside the virus-cell receptor transaction, the part of the surface auxiliary S is of particular intrigue for antiviral development. S1 sub-unit mAbs and S2-focused inhibitors are likely to have in vitro or in vivo capacities for anti-SARS-CoV-2. As ACE2 is essential to use for SARS-CoV-2 receptors, mAbs or atoms that depend on their receptors are viable in deciding pathogenesis against SARS-CoV-2 medicines, as long as they do not provide inspiration to immunologic effects on the animal models (29). The test was subsequently performed at a protein binding site COVID-19 S to the cell-surface receptor.

The effects of their observations showed a more desirable position between the official S-protein districts III and IV and GRP78. The most tractive drive for the official GRP78 is locale IV, which can be used to schedule preventive action against this infection (30). It was noticed that, notwithstanding the fact that protease inhibitors which have a combined Prime S antiviral activity, several inhibitors are important because S may use a variety of proteases in the preparation of this product. If they develop, prospective care applicants will be operators focused primarily on the well-preserved S2 subunit. The expansive polyproteins 1a (pp1a) and pp1ab encoded by the ORF1a / b are subjected to two viral proteases, papain-like protease (PL professional) and cleavage 3C protease (M master), for a non-substantive protein produced by viral translation and replication (Figure. 3) (31). (SARS-CoV-2)

Then chemicals that concentrate on these proteins will display aggressive SARS-CoV-2 in vitro movement. Later thinking has revealed that the master M of SARS-CoV-2 is a cornerstone protein which intervenes in viral replication or translation (32) as interpreted polyproteins of ORF 1a / b. In fact, a Gln-residue needs an amino corrosive substrate at P1 almost continuously. There is now no M competent person like-minded, rendering it an antiviral goal that is promising (Figure. 6) (33). The antiviral staff 'systemic strategy for this protease by analysing the substrate-binding M master take had been performed by Dai and colleagues (32). In this regard, an emphasis on such a protease can lead to certain antiviral sedate candidates.

However, the chemicals that interface the acyl chain with S have not been detected, but the cellular proteins are, as part of the substratum specificities, acetylated by the ZDHHC family. In the absence of acetylation in aviation cells inside the lung's route, a variety of them will stifle viral reproduction, and cellular protein acylation can become dangerous once in a while. The emphasis on acyl transferases can, in this sense be promising as the set of cysteine occurs in all CoV form S, indicating contempt for its source (34). In any case, if the proteins of intrinsic protection reaction are altered by the same proteins as the viral proteins in the light of the palmitoylation of pivotal proteins inside the natural resistance, the inhibitor of acylation may be decreased. As Bojkova et al. expanded,

the cell paths balanced by SARS-CoV-2 disease were late differentiated, and it was discovered that concealment would prevent viral replication in human cells.

Notes the SARS-CoV-2 infection profile was decided at different times following contamination by translatom 3 and proteome proteomics, recommending that this contaminated disease could re-shape central cell tracts. Similarly, spliceos can also be the future aims for some antagonists and glycolysis inhibitors. The last argument is the usage of tiny RNAs (siRNAs) interferometers. SARS-CoV-2 will collapse into cells and release the nucleocapsid and viral RNA to the cytoplasm and then, for genomic RNA replication, interpreted the pp1a and pp1ab ORF1a / b. SARS-CoV-2 diseases may then play a role in siRNAs with an emphasis on basic genes and can render them clinically relevant via the enhancement of SiRNAs transport in vivo.

SARS-CoV-2/COVID-19 VACCINES

Creating and scaling up mass immunisation production in a global context rapidly and broadly is difficult because, in comparison to a typical decade of successive planning in the process of preclinical trials, phases of clinical trials, arranged generation and dispersion, multiple practices need to be well organised and conducted at once. These problems contribute to a build-up of savings and a lifting of monetary opportunities. Delayed immunisation will lead to the episodes of amassing death and dreariness, as defined by the 2013/14 Western African Ebola flag that killed more than 11,000 people at the expense of over $53 B. Appallingly, the antibody was advanced and was then proved feasible in Ebola protection which could have related to episode management (35).

Tragically, the 2003 SARS plague has just ended a phase of progression of antibodies. It is frustrating that at that time, subsidising organisations moved shops that were dedicated to advance immunisations, disturbed suppliers and re-established other immunisation programs. The 2017 merger of pesticide readiness creative initiatives (CEPI) was planned to resolve previous disappointments in an effort to build smoother reactions to irresistible infection hazards in order to ensure the progression of immunisation and the early reaction of scourges (36).

Different characteristics of phases of invention One technique was used for solving street squares in order to further advance immunisation (37). Immunisations approved for individuals typically include live constriction infections (for example, measles, mumps, rubella), protein or polysaccharide conjugated subunits (protein: acellular pertussis; hepatitis B; pneumococcus, meningococcus), polysaccharide conjugated with viruses. A collection of unused technological platforms was developed in the last decade, combining anticorrosive (DNA and RNA) nuclear antibodies and viral vectors as well as recombinant proteins.

DEVELOPING COVID-19 VACCINES

Stages of Vaccine Development

Every modern vaccine is conducted following a strict Investigate and Advancement convention that has to be taken rapidly and recently completed and has been approved (Figure 3). The rules on improving anticuerpos are more restrictive than the rules on drug creation, which are relevant in clinical evaluation, are provided by administrative specialists directly WHO, US Sedate & Diet Organisations, the European Solutions Organisation and national specialists from various countries (38). This should be apparent because antimicrobials are used globally, have tremendous demographic potential and are distributed to stable communities, including infants, elderly and pregnant moms.

The improvement of anticorps takes place following an evolved design which is widely separated into exploratory, preclinical, therapeutic and post-marketing processes. The clinical organisation, to particular processes I, II and III, is split into 3 phases. The clinical organisation is recently needed for two administrative authorisations, "Clinical trial authorisation," which provide for "first-in-human" research and "biolocation / authorisation" to facilitate immunisation following fruitful clinical trials (Table 1). Two administrative approvals ought to be provided.

A Race against Time

Due to certain truths, almost antibody progress is dazzling. Immunisation from exploratory agreements to exhibiting can be a long task that typically requires 5 to 10 y. For COVID-19, the usage of innovative technologies to establish candidate antibody (preclinical arrangements) and swift permission by regulatory institutions for clinical trials has greatly compressed this time. This period of immunisation. It took 42 d from community monitoring of the infection to form an unexploited immunisation period (mRNA-1273) at the cGMP office of Moderna Inc. (the American biotech corporation located in Cambridge, Massachusetts). It would have taken typically more than two long stages to produce such a vaccine without stage invention.

Under either event, the "rate-limiting" and "temporary" clinical studies after a special convention. In addition, the examiners investigate innovative knowledge gathering techniques in order to react to the general issue. Many engineers perform simultaneous clinical testing (stage I-II) to reduce the approval period. Some of them also started gathering adequacy data from Step II (IIb) itself. In COVID-19, an analysis of the opportunity for a successful voluntary officer is severely challenged to determine if challenge spokesmen are moral. In the off-price situation, efficient evidence on the COVID-19 antibody could be accessible within a couple of weeks instead of a long period. In either scenario, without proof of immunogenicity, success and efficacy of COVID-19 vaccine, it would be risky.

Success Rate

The moment that requires to be considered is the pace of development of immunisation from authorisation for clinical studies to authorise. In the years 2000-2010 period, the rate was consistently < 10%. One of the 37 antibodies developed for Ebola, as one was approved depending on viability and protection within the step II research, is a 2015 study that indicates only 20 % of therapeutic immunisation tests vary from stage I to licence. In the immunising scene of COVID-19 examiners introduced untapped, nuclear corrosive technology-based vaccines. Such advancement in immunisation against irresistible diseases is no scientific procedure, and specialists recognise the effective rate of an approved urgent immunisation of 5% (39).

Costs

It must be considered, too, that progression to immunisation will entail a high risk. Apart from a rivalry between other large suppliers of antibodies, it has been considered to be worth more than1 M USD to establish a single untreated immunisation against an irresistible infection. The Figure 1 includes deserted antibodies in readiness for improvement. A few institutional and non-governmental organisations here have upheld the teaching of sufficient stores in the light of the human tragedy and worldwide extinction. Coalition for Scourge Preparation Advances (CEPI) will be an organisation that takes the donations of free investigative projects to build antibodies to evolving unstoppable pathogens through transparent, private, caritative and respectful organisations in society. The US Government decided to offer 483 M USD to Moderna Inc. to produce the vaccine COVID-19.61 The Canadian Government started the CAD 1.3 B in improving immunisation financing to investigate the advancement and improve it is now using in its 2022.62 stage technology - a Gamechanger breakthrough. Conventional biotechnology techniques have been used to generate the nominee antibodies throughout the year. As it took between 2 and 5 y for a model anticorps to be developed and some vaccinations were prohibited. The accessibility of bleeding-edge investigations into offices was essential for the enticing expert to be included, which could be conceived of as it was in just a few testing facilities worldwide.

Stage advancement provides a couple of areas of interest in the production of antibodies that involve mechanisation, speed, ability to generate certain model antibodies in a single sense, productivity and simple formation, including complicated mRNA antibodies. As the candidate vaccine may be developed within days instead of a long period, stage technology has been described as a single play changer while combating the scourges or pandemics induced by modern times. The antibody produced by the mRNA is appropriate and is created by the stage invention. In general, eight kinds of plans were evaluated for the development of COVID 19 antibodies under four large bunches (Table 2).

Every immunisation strategy has a delicate framework, priorities and impairments in immunogenicity, protection, user-friendliness and efficacy (Figure 1) (40) The mechanism through which living infection is carried by a creature or human cells before its genome changes, and it cannot trigger illness is produced through living attenuated immunisation. The infection at the end of the week imitates a normally contaminating condition that triggers a heavy T-cell and B-cell healthy, permanent reaction. This anticorps are perfect for individuals to become disrespectful to the population and piece epidemic spread. However, there is a slight risk of a transition to destructive consequences and the disease occurrence. Other than this, the city wants a cold chain to distribute these Anticorps. These vaccinations are demonstrated by GCB, PMD, MMR, rotavirus, polyomyelitis (OVV), etc. Multiple immunisation is not accessible. Formaldehyde or warm inactivated vaccines are treated and, until the virus is slaughtered, those vaccines are healthy and do not contribute to an infection.

In any event, these immunisations should not duplicate, induce an immune response suboptimally and requires

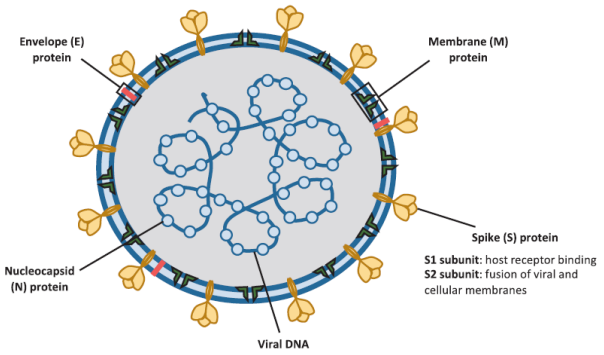

Figure 1. Schematic of the structure of SARS-CoV-2 (41)

rehazed dosages and adjuvants to boost insensitivity. In such vaccines, ADE has been detailed and to prevent this, the arrangement of epitopes on the antigen surface should be controlled during inactivation. Poliomyelitis (IPV), HAV, rabies, etc., are illustrations of such anticorps. The new anticorrosives made available by cutting-edge advances are the nucleic corrosive antibodies. Incorporations of DNA that encode a pathogen into plasmid DNA are the foundation for DNA immunisation. RNA antibodies use SARS-CoV-2 lipid-coated mRNA that transmits Spike protein. The proteins are displayed from CD + 8 T cells BY MHC course I and activating a solid T cell response. These anticörpers are healthy, simple to produce by stage advancement, and are likely to improve immunisations for the future. No nucleic acid vaccines are presently licenced in clinical practice.

Recombinant vector infection vaccines are developed by the invention of recombinant DNA. The DNA is integrated into the cells and then filtered (42). In the process of the vaccine, the vector duplicates and alongside, the embedded DNA is communicated and generated, which produces a robust T cell and B cell-resilient reaction. It often involves the usage of DNA as microbes or infection vector. Microscopic species like E can be vectors. Coli, Adenovirus or poxvirus diseases. Coli. Standard vector anti-corps examples are HBV, HPV, Hib and Meningococcus. Antibodies consisting of antigenic decontaminated peptides from pathogens such as SARS-CoV-2 Spike Protein are healthy to use. Such antigen is expressed directly at the MCH Lecture II and does not routinely induce a significant cytotoxic T cell reaction. These vaccines need revived dose and tolerance adjuvants. Virus-like particles are composed of inherited tissue free purge infection particles. These vaccinations are healthy and immunogenic, which are difficult to produce in any event.

TREATMENT OPTIONS

Clinical studies are performed in which possible antiviral therapeutic goals, such as the restriction of the genomically replicable viral proteins, or the blockage of the viral transit through human cells, are examined. There are numerous plausible strategies for Fighting COVID-19 pharmacologically: small-molecule medicines, antimicrobials, oligonucleotides, peptides and monoclonal anticorps. Medicines that can function on the coronavirus may be classified by viral proteins or chemicals appropriately by viral auxiliary proteins, limiting the

automatic assembly or preventing infection by binding to ACCE2, by preventing RNA replication and amalgamating by preventing and encourages reconstruction. The S protein may be a fundamental aim for advancing immunisation (43). In both situations, few drugs are produced to attack proteins from the film, atomic capsid or envelope. Figure 2 demonstrates a conspiracy of SARS-CoV-2 and some of its atomic protein goals (44). Such medications which are currently used to prescribe COVID-19 are recycled medicines which are typically prescribed to people who have other viral problems, such as anti-HIV operators or medicines that are used for the administration of flu. As of late, the high-resolution architectures of the complete ACE2 were reported in Yan and his colleagues. The authors recommended that connexions between the ACE2 dimer and the two S protein trimmers be present at the same time (45). The use of specific medicines to inhibit viral attachment and passage or use large-speed antiviral medicines will either ensure the use of persuasive pharmacohilfe-based approaches to SARSCoV-2.

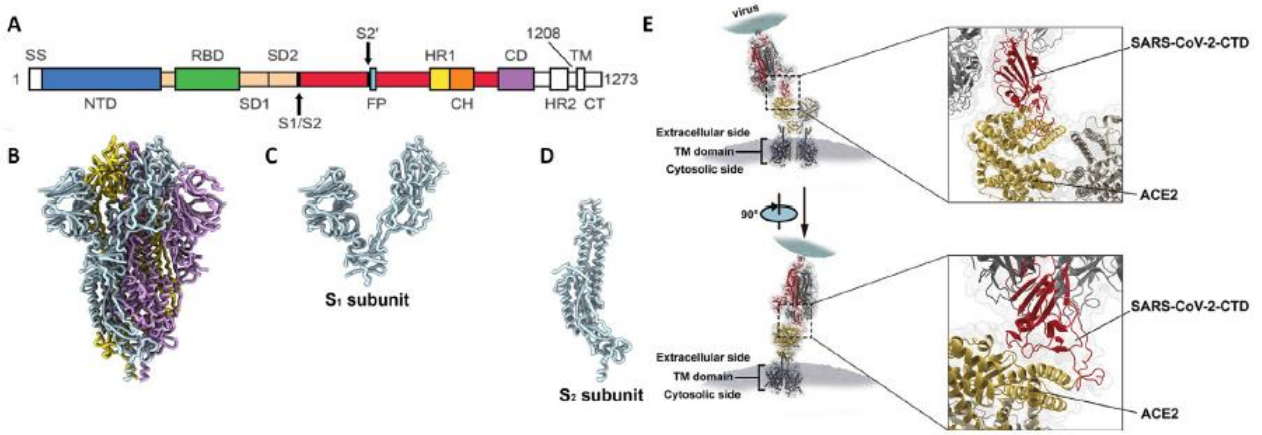

Figure 2. Structure of SARS-CoV-2 S in the pre-fusion conformation and the genome. Along with the crystal structure of the C-terminal domain of SARS-CoV-2 (SARS-CoV-2-CTD) S protein in complex with human ACE2. **(A)** Schematic of SARS-CoV-2 S primary structure colored by domain. SS: signal sequence, S2_: S2_ protease cleavage site, FP: fusion peptide, HR1: heptad repeat 1, CH: central helix, CD: connector domain, HR2: heptad repeat 2, TM: transmembrane domain, CT: cytoplasmic tail. Arrows denote protease cleavage sites. **(B)** Ribbon diagrams of the SARS-CoV-2 S ectodomain cryoEM structures. **(C)** The SARS-CoV-2 S1 subunits. **(D)** The SARS-CoV-2 S2 subunits. **(E)** A hACE2-binding mode of SARS-CoV-2 (46)

The pharmacotherapeutic alternatives may be formulated as peptide inhibitors, monoclonal anti-SARS-CoV-2, protease inhibitors, certain antipalarial solutions and anti-ACE2 monoclonal anticorps. Confrontational studies are published nearly scientifically adequate for some of the test drugs used for COVID-19 administration. Because of the present elevated morbidity and death, research studies are not performed correctly, and most of the medications are only for humanitarian purposes. Around the same period, clinical studies on each of these medications are being performed, but the trials are yet to commence. Figure 3 (47) displays a sterilising SARS-CoV-2 Development cycle and restorative goals. During a wide range of the examinations, Monteil and colleagues demonstrated in vitro that humans could reduce viral development by recombinant dissolvable ACE2 (hrsACE2).

The creative companies have also detailed the fact that early hrsACE2 can totally block contamination of kidney and human blood vessel organoids (49). The treatment of COVID-19 is suggested for re-desivir, favipiravir and chloroquine. Ritonavir / lopinavir, alone or used with monoclonal antibodies and intergalactic-b, is a recurring medicines that may be useful (50). In vitro and in creature studies, lopinavir (LPV) was found to be movement square coronavirus protease. Analysts combine ritonavir periodically with lopinavir to increase plasma halving through cytochrome P450 suppressions (51). Protease inhibitors target 3C proteases and papain-like proteases in coronaviruses. The COVID-19 randomised controlled test persisted in dyspnea and desaturation in China and recommended that lopinavir / ritonavir treatment be comparable to normal care for clinical progression.

However, this combination treatment was terminated early since side effects like loose bowels, queasiness and hepatotoxicity (51). Leronlimab might be a 5 adversary and a humanised monoclonal counter acting agent for C-C

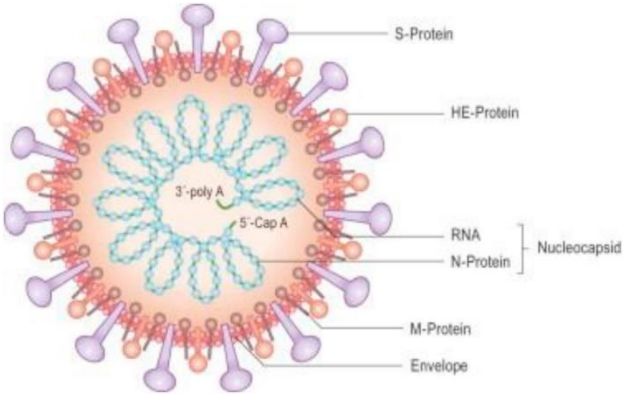

Figure 3. Skeleton of coronavirus; inside and outside morphology (48)

chemokine receptor, whereas Galidesivir may be a nuclear RNA polymerase blocker. Analysts were analyse the efficacy of the application of COVID-19 through the two medications (52). The SARS-CoV-2 is linked to the alveolar epithelium and therefore both the versatile and the natural resistant frame acts, counting interleukin 6 (IL-6) as an expanding cytokine discharge. Tocilizumab (TZM) is a monoclonal counter acting agent for anti-IL-6 receptors. The sedate attaches to both the membrane-bound and the dissolvable IL-6 (mIL-6R and sIL-6R) receptors and squares mIL-6R and the flag-mediated sIL-6R, respectively. A number of patients with severe VOC-19 had cytokine discharge (CRS) archived, and a few passes were taken by CRS (53).

IL-6 is a key part of the CRS, so IL-6R TZM is useful for administering the "cytokine storm" seen in COVID-19 patients. IL-6 is also a vital part of the CRS system. "Cytokine Storm" is distinguished by a raised level in particularly cytokines inflammatory markers (54). Actually, TZM is being used as a SARS-CoV-2 inquiry operator. CR3022 can be a monoclonal counter acting agent calmed out of SARS, and the compound is captured by the quality of IGHD3-10, IGHV5-51 and IGKV4-1, IGKY2 (light56 chain) CR3022 can be a monoclonal counteracting agent. Although a highly moderated area in the epitome was detailed, the interatomic CR3022 Fab with SARS-CoV RBD is more notable than the SARS-CoV-2 RBD. It was assumed to be possible, from the non-conserved build-ups in the epitope, to determine incongruities within the bonds between SARS-CoV-2 and CR3022 (SARs-CoV-2). The SARS-CoV-2 Spike Protein RBD is attached to the CR3022 (55).

This can happen since the epitope of the antimicrobial and the ACE2 receptor binding topic have no cover. CR302, either alone or in pairs with other neutralising antibodies, can be valuable for the management of COVID-19. However, clinical adequacy and security ponder ought to be carried out sometime recently utilising these drugs for people enduring from COVID-19 (50). Remdesivir (RDV) may be a 10-cyano-substituted adenosine analogue, a phosphoramidate prodrug and an RNAdependent RNA polymerase (RdRp) blocker that acts by repressing the synthesis of viral nucleic corrosive by means of bond arrangement with the dynamic location of RdRp (56). RdRp could be a protease interceding in the centre of the roadway structure for the replication of RNA (57). The shirting of the editing of SRS-CoV-2 exoribonuclease is another tool of the RDV. The viral RNA is prevented prematurely as a consequence of these impacts.

Remdesevir, originally developed to cure and afterwards dropped Ebola infection, is used as a research drug for patients with COVID-19. In addition, Remdesevir has antiviral effects on other RNA infections, for example, MERS-CoV or SARS-CoV (58). In reality, while widespread intelligent and cardiovascular toxicity drugs have not, after a single patient has stacked dose (among 175 add up to) after Remdesivir usage in the Ebola epidemic, hypotensions with subsequent cardiac catch were not reported (59). The CC chemokin receptor 5 (CCR5) competitor may be Leronlimab (PRO140) as well as the investigational, unused COVID medication. CCR5 is categorised into many types of biological structure, e.g. tumour intrusion, metastases, HIV-1 joining CD4μ T and nonalcoholic steatohepatitis pathogenesis (NASH) (60). Favipiravir is another compound used for COVID-19 administration.

Although the basic component of SARSCoV-2 behaviour cannot be fully clarified, it is easily established as a substratum for RNA viral polymerase after a phosphoribosylated transformation (61). The viral genomic RNA medicines mix together as a chain remover. An efficient way of finding COVID-19 medicines is to assess whether current antiviral medications are effective (62). Favipiravir is a verbal pyrazinecarboxamide subsidiary (FPV) and guanine analogue that is robusted and precisely carries the RNA dependent RNA polymerase (RdRp) of RNA (63). Favipiravir is a subsidiary of RNA pyrazinecarboxamide (FPV). It appeared late that FPV in Vero E6 cells as a medication would considerably delay the disease SARS-CoV-2 (62). Along with antiviral solutions, hydroxychloroquine and chloroquine were used to create research options for pneumonia linked to COVID-19 pharmacotherapy (64).

Chloroquine is suspected to discourage viral matter from attaching to the cell surface receiver and therefore from preventing COVID-19 viral pre-entry. The medication operates on quinone reductase 2, ultimately bound to 2-epimerase UDP-N-acetylic-glucosamine (UNEs). A sialic biosynthesis catalyse. Sialic acids are fundamental compounds of cell transmembrane protein sugar particles which are necessary for ligand recognition. Closed ACE2 glycosylation has culminated in the strong effects of chloroquine on SARSCoV-1 in vitro. The endosome-mediated entry of SARS CoV infections may be too interspersed with pH-dependent chloroquine. In mixing endosomal and viral layers for the cytosolic conveyance of the SARS-CoV-1 genome, acidic pH is essential (65).

The virus reaches into the lysosome without an anti-viral pharmaceutical, where both the enzyme and moo pH clamps the viral molecule and activates replicant proteins alongside the RNA. The portion of chloroquine-antiviral activity is hypothesised to contribute to the rapid increase of endosomal pH, endocytose anticipation and destructive combination of endosome viruses (66). Chloroquine and hydroxychloroquine (67) antiviral elements. In another study, blood plasma was transfused into people with SARS-CoV-2 disease with positive and swift development in COVID-19 patients and pushed them to recovery (47).

The FDA has affirmed that Ivermectin is a broad spectrum anti-parasitary operator. Caly et al. have tached Vero / hSLAM cells with SARS-CoV-2 disconnect Australia/ VIC01/2020 following the extension of ivermectin to assess the antiviral movement of ivermectin to SARS-CoV-2 (40). This sedate has declined viral RNA up to 5000-overlapping after 48 hours of SARS-CoV-2 disease (51).

VACCINE CANDIDATES

Figure 5 depicts the spread of the pandemic scenario globally. As of 1 December of 2020, the COVID-19 prophylaxis was propagated by 124 candidate antibodies. For these, ten individual clinical trial applicants in adult patients have reached step 1, mixed stage 1/2 or stage 2 (69). Several antibodies against SARS-CoV-2 are being planned and generated using different methodologies. Figure 6 indicates a schematic stream of COVID-19 transmission and the job sources used in SARS-CoV-2 vaccine candidate preparation (70). In the management of

inactivated virus antibody chemical and physical methods including formaldehyde, ultra-violet light, or b-propiolactone may be used. A reduced pathogenetic infection, such as improved anti-inflammatory cytokine concentration, lower neutrophil dilution and less lung damage compared to wild SARS-CoV-2 (71) can be described in the distinction. The surface-exposed spike (S) glycoprotein is the coordinate of most anticorruptions.

Different examiners employed strategies of the immunisation programme focused on the usage of official S1 space receptor (RBD), full-length S antigen, virus-like particles (VLP), and DNA or vectors speech. It is presumed that the use of spike protein-based vaccines might contribute to the development of antibodies that decode square viral genome and authoritative receptor. Enhancing an all-inclusive CoV antibody is feasible as the SARS and MERS CoV T-cell epitopes are identical in nature and can contribute to cross-reactivity. SARS-CoV-2 has a tall, genetic resemblance to SARSCoV, such that the cross-reactivity of the SARS-CoV-2 antibody may be shown. Research in both forms of infection with S proteins found extremely variable accumulations of amino corrosion in the subunit S1. This heterogeneity indicates that SARS-CoV-2 (50) does not have effective consequences with immunisations that contribute to a preventive, resistant reaction against SARS-CoV. On the surface of SARS-CoV-2 the local S protein can be used as a trimmer. Its ectodomain or sub-unit S1 mainly interacts in a monomeric mode in a eukaryote. Kim et al. have a meld of the SARS-CoV-2-S1 and MERSCoV-S1 structures to a 27 amino corrosive foldon segment to synthesise trimeric recombinant codon-optimised sub-unit proteins. The foldon is received from the C-terminal region and can be framed by trimmers of the T4 fibrite bacteriophagus. TLR4 or TLR5 are collectively known as RS09 or flagellin. These resistant protein immunisation stimulants were included. Too many were consolidated to help metal-chelating partiality refining (72), the six histidine tags and an arrangement for the cleavage of Tobacco Carve Infection (TEV) was used. In the context of the examiners (73), a transportation carrier (pAd / MERS-S1f) was used.

It has been shown that adenoviral antibody conveyed by a SARS-CoV-S1 and MERS-S1 has been rendered more viable than a full-length S1, which indicates that the immunogenic subunit might be an ideal antibody. Carboxymethyl cellulose was employed in the manufacturing phase to prepare dissolvable micro-edles with the MERS-S1, MERS-S1fRS09, MERS-S1fFliC or with the SARS-CoV-2-S1fRS09 proteins. Micromolding was used in the planning of 10 x10 polydimethylsiloxane (PDMS) obelisk-shaped microneedles. The developers then arranged immunisations using a two-step spin-drying process for CMC-based MNArMERS-S1f, MNA-rMERS1fRS09, MNA-rMERS-S1ffliC, MNA-rSARSCoV-2-S1 or MNA-rSARst-CoV-2-S1fRS09. In comparison to intracutaneous organisations of arranged dissolving miniature needles, the preclinical immunogenicity of MERS-CoV immunisations treated subcutaneously via routine hypodermic needles.

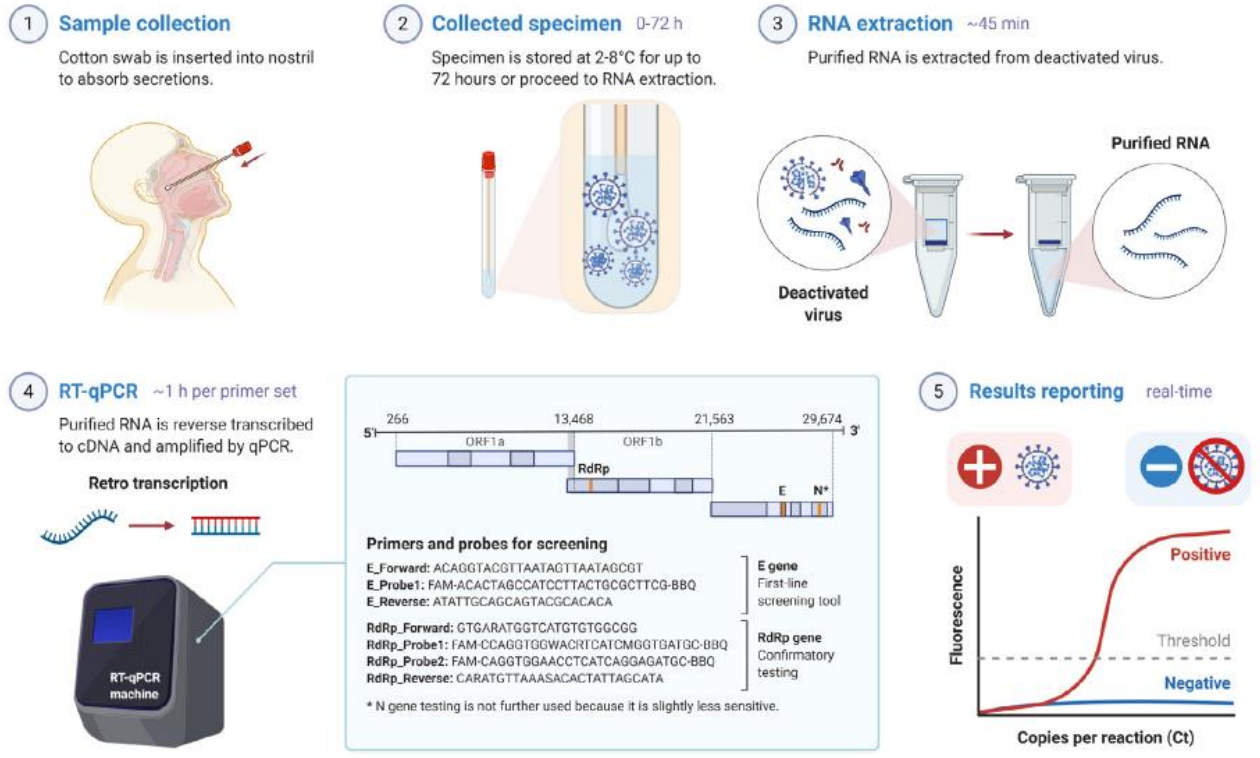

Figure 4. COVID-19 diagnostic test by RT-PCR. First, a cotton swab is deployed to collect the secretion sample from the patient's nose or throat. The virus particles in the sample are then deactivated along with the separation of RNA strands. Then, the purified RNA strands are copied by utilizing reverse transcription and amplified by RT-PCR to detect the presence of virus-specific gene sequences (68)

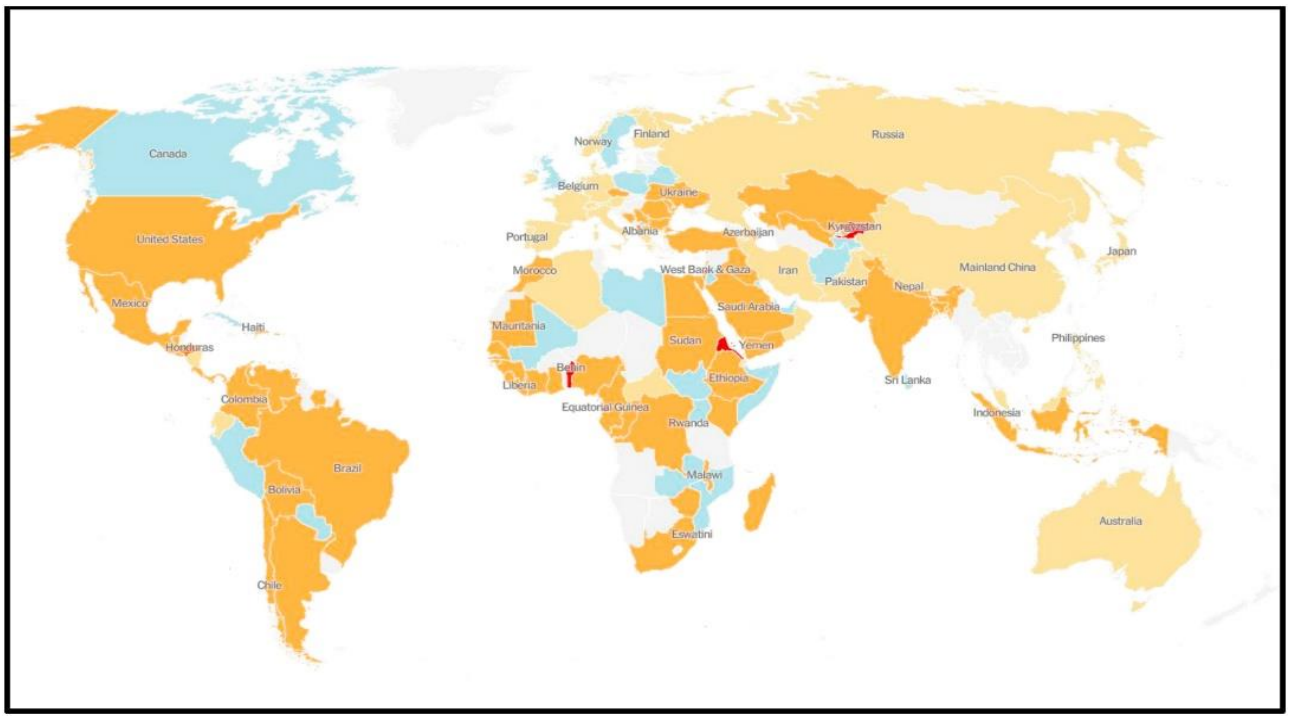

Figure 5. Map of spread COVID-19 global outbreak as of 31 Jan 2021. Blue colour indicates a decrease in coronavirus cases where orange and red colour indicates the increasing number of coronavirus cases (20)

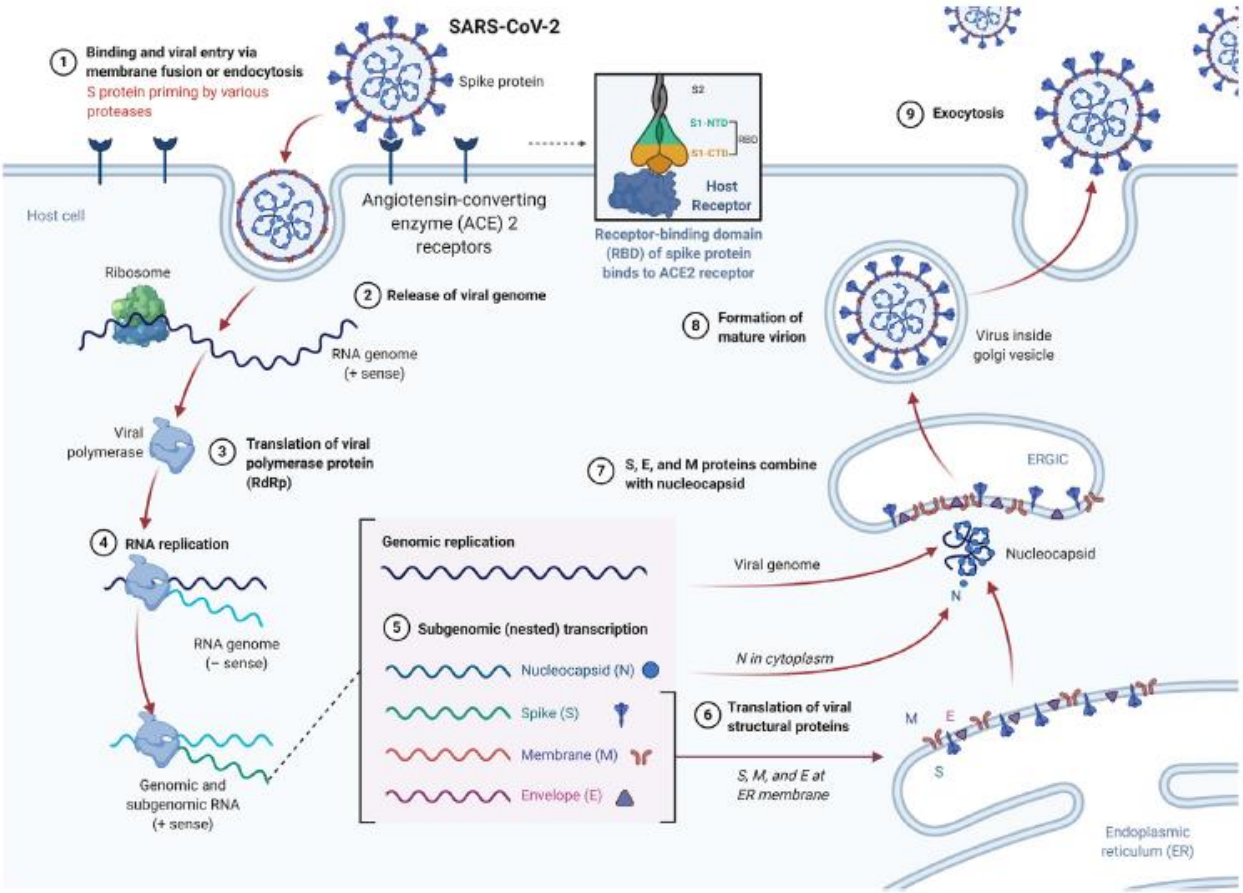

Figure 6. The possible viral entry and replication mechanism of SARS-CoV-2. When the S protein of SARS-CoV-2 binds to the cellular receptor ACE2, it begins its life cycle. After the receptor is bound, the conformational change of the S protein helps the viral envelope to fuse with the cell membrane through the endosome pathway. Then, SARS-CoV-2 releases the RNA into the host cell. Genomic RNA is translated into viral replicase polyproteins pp1a and 1ab, which are then cleaved into small products by viral proteases. The polymerase generates a series of subgenomic mRNAs through discontinuous transcription, which is ultimately translated into related viral proteins. Viral proteins and genomic RNA are subsequently assembled into virions in the ER and Golgi, and then transported through vesicles and released from the cells. ERGIC, ER-Golgi intermediate compartment (68)

Antibodies to immunoglobulin G have been evaluated and neutralised in pathogens. Significantly, the antibodies conveyed by microneedles of the SARS-CoV-2 S1 subunit were observed after 14 days of inoculation (72) with good healthy reactions. Because of its unpainful and painlessness, microneedles are beneficial. The most common application of peptide Antibodies is to synthesise T-cell and B-cell epitopes that are immuno-dominant. Immunogens can be produced by binding a T-cell epitope to a destination atom's B-cell epitope. T-cell epitopes are small fragments of a peptide (8e20 amino acids), while B-cell epitopes are large and protein-limited. In addition, the implication may be used to control peptide-based vaccinations. The JI et al. used Non-replicating antigens SARSCoV2, antigen-specific cells (the so-called "Icells") as moderation and immunogenic antigen vectors (74).

The protected system will identify viral proteins that are productively insusceptible by using illuminated cells as a carrier of SARS-CoV-2 antigens. The organisation named Generx uses a co-ordinated peptide method for biotechnology. The business has developed a SARS-CoV-2 peptide antibody that uses ingenious viral peptides as immune mechanisms and uses the secure and special Ii-Key Healthy Structure (75). Another company (Novavax) has also developed NVX-CoV2373 as a co-ordinated SARS-CoV-2 vaccine candidate. The company's restrictive nanopart platforme (Matrix-M) typically contains a steady prefusion protein, which enhances the resistance to resistant reactions and enhances the blood concentration of antibodies that neutralise. While mRNAs and DNA vaccines are illustrated and converted into clinical trials, the administrative authorities for human usage should still accept these kinds of anticorporeal diseases (71).

The SARS-CoV-2 DNA antibody can be identified and communicated within human cells as an antigenic protein. This technique is valuable because it reflects live vaccinations from the viewpoint of facilitated reaction. Moreover, it is reasonably effective to schedule DNA vaccines, and to some extent, protection problems (as opposed to live vaccinations) are minimised (76). The large-scale, highly distilled DNA anticörpers can be generated and are compatible with proteins and other biopolymers (77). However, for individuals, DNA anticorps were not verified. Any firms are researching SARS-CoV-2 DNA antibodies, and Inovio Pharmaceuticals is actually running clinical trials for the immunisation of the SARS-CoV-2. For SARS-CoV-2 vaccine candidates, certain vectors are also being explored. The SARS-CoV-2 immunisation (78) is now being carried out by the Oxford Antibody Gather in conjunction with the Oxford Jenner Institute (ChAdOx1). In India, the Oxford/AstraZeneca coronavirus and the Covaxin domestically produced vaccine has been granted emergency authorisation and are announcing the launch of one of the world's largest immunisation drives Covid-19. During a Sunday press conference, India's General Drug Controller said the decision to approve the Oxford vaccine and the Covaxin, both developed from and partly funded by the government by the Indian company Bharat Biotech, came after 'careful review' of the results. Indeed, it has made India the second country to allow the use, after the UK given the green of the Oxford/Astra Zeneca vaccine known as Covishield, in India.

Viral vector-based immunisations may be constructed and used without an adjuvant, but antigens with neutralising epitopes are needed for the specifics of these anticorps. The combination of adenovirus vectors is normally safe and can cause strong, large and safe mobile and humoral reactions (53). Owing to the large dimensions used by the genome in use kilobases (79), adenovirus vector production is very challenging. Furthermore, there are insufficient areas of confinement. More frequently than not, ordinary recombination-based methods are used, with certain examiners relying on the unusual local boundaries, but such techniques are time-consuming and difficult to monitor. Some designers used the Gibson ligament which permits examiners, through the composite effects of a DNA polymerase, exonuclease and a DNA ligase, to gather a couple of covering DNA particles (79).

The researchers first broke down the DNA components and obtained a specially tempered single-stranded DNA overhang and subsequently covalently combined. The usage of RNA immunisation for the administration of COVID-19 is greatly fascinated. Courier RNA (mRNA) speaks to the half-way point of the understanding in the cytoplasm of protein-encoding DNA and protein biosynthesis. There is a clear analysis as an antibody of two main forms of RNA: virally defined RNA self-amplification and mRNA not replicate. The RNAs normally encode themselves as the antigen and the specified viral replication appliance, while traditional mRNAs encode fascinated antigen with 50 and 30 untranslated areas (UTRs). MRNAs are extremely potent, and they can easily be produced, rendered with a moo and handled securely in comparison with traditional antibodies (80).

The specificity of antigen plans is important for having both relaxed and imperative reactions to the production of hazards of pandemics and scourges (81). Usage of mRNA for anticorps detail has certain advantages compared to live, slaughtered pathogens, sub-units and vaccines dependent on DNA. mRNAis a non-integrative and non-infectious level, so insertional mutagenesis or contamination is not potentially dangerous. Many mRNAs may also be conveyed in a single antibody, encoding a few antigens (82). Moderna has established the candidate for antibody (mRNA-1273) which forms part of the amalgamation of SARS-CoV-2 S protein perfusion-stabilised enforcement. Clinical studies are actually being performed for immunisation. An updated non-auto-amplifying immunisation with an mRNA containing an open perusal frame (ORF) was developed by Richner and his colleagues at the latter stage. The antigen is encoded by the ORF (83).

The designers arranged DNA-dependent RNA translation for the mRNA in vitro through T7 polymerase where 1-methylpseudoUTP was replaced by the Uridine-50-tryphosphate. There was used a linearised DNA format with a poly-A tail comprising 50 and 30 non-translated areas (UTRs). The designers used the S-adenosylmethionine (SAM), a methylated capsulated RNA (cap 0), which was engineered for a cap 1 structure to increase mRNA interpretation performance. Two important approaches to strengthen COVID-19 antibodies are in place: the choice of antigens and the choice of a production firm. The progression of COVID-19 vaccines is currently investigated for the lipid nanoparticles. The

writing was highlighted with the Lipid nanoparticle (LNP) transport of modified mRNA (82).

In a fascinating study, Geall and associates have clarified in-depth that the NPL transmission of a 9 kb RNA that amplifies itself totally enhances immunogenicity compared with the exposed RNA organisation. In order initially, to encode the self-amplifying RNAs, the developers created DNA plasmids. The plasmids were opened, and the DNA was linearised by the containment method. The MEGAscript T7 packs were used for the interpretation of the linearised RNA formats, and lithium chloride (LiCl) precipity was used to decontaminate them. In these lines, the RNA was capped and washed by LiCl precipitation with a vaccine capping system. The LNPs that include lipid compounds, such as 1, PEG-DMG 2000, N, N, NDimethyl- 2,3-bis ([9Z,12Z]-octadeca-9,12-dienyloxy]propan-1-amine [DLinDMA], 2, Dia-Dia-Sn-Glycer-3-phasphocholine), and Cholesterol (84) were produced via a controlled ethanol-weakening technique.

The latest period, Baruah et al. used an immunoinformatic method in the spike SARS-CoV-2 protein to pinpoint B cells and cytotoxic T lymphocytes (CTLs). In addition, the developers used atomic elements to analyse the connexions between the main Learning I (MHC) and CTL epitopes. The investigators found three consecutive B cell epitopes, five CTL epitopes and five S cell epitopes. It was discerned that a few instruments such as salt bridge grapples and hydrogen bonds were used in the CTL epitope tie to MHC course I to demonstrate how these epitopes may be used to mount a stable reaction (85). In another respect, the T-cell and B-cell epitopes, both SARS-CoV-2 and SARS-CoV, were recognised by Ahmed and colleagues. About 82% of 229 epitopes were limited epitopes of the MHC Course I (86).

102 of the 229 epitopes of the N or S protein had been organised. The SARS-CoV receptor binding theme has been thoroughly defined by three groupings (QPYRVVLSF, GYQPyRVVVL and PYRVVVLSF), which is known to be an indispensable virus for cells to join the have cells. The developers studied the MHC alleles and recommended certain epitopes of a relationship in the T-cell epitopes that could give a wide safe reaction in China and across all (86). In another analysis, the SARS-CoV-2 spike defence for the immunogenic epitope plan was defined by Bhattacharya et al. The developers have selected 13 MHC-I epitopes and 3 MHC-II antigenic epitopes. The developers had used the Secure Epitope Database server to examine the S protein and observed that 34 straight B-cell epitopes had T-cell epitopes competent to function with the MHC-I, and MHC-II particles had been analysed by the SARS-CoV-2 arrangements. The designers found 8 MHC-II epitopes and 29 MHC-I epitopes (87). Functional vaccination is still being tested. The Joint States of America investigates a linguistic polio antibody, while in the Netherlands, Australia, and South Africa, 3 multicenter, randomised, controlled studies are ongoing. In Egypt (69), a measles antibody assay for COVID-19 prophylaxis was recruited.

VACCINATION STRATEGIES

Many attempts were coordinated to further the immunisations of COVID-19 to deny the common usage of the S-protein SARS-CoV-2 by most of the candidates in the development of immunisations (50). From 2 July 2020, 158 antibody candidates were included in the worldwide SARS-CoV-2 scene, 135 of them being preclinically or exploratorily enhanced. Right now, a number of stage I / II clinical trials are being carried out on mRNA-11273 (Moderna), Ad5-nCoV (CanSino Biologicals), INO-4800 (Inovio, Inc.), LV-SMENP-DC, ShinzenGeno-Immune Coordinated Therapeutic (APC) and ChAdOx1 (Oxford College) (88). Sub-unit antigen, virus-like sections (VLP), viral vector (such as duplicative and nonduplicating) DNA, RNA, nanoparticles and others are used in vaccines in the conduit. Antibody Advancement Analysts are currently open (89). In comparison to the epitope with identifiable data of the antibody candidates SARS-CoV-2, an immunoinformatics method is used. The extraordinary cytoto-toxic T cell and B cell epitopes are distinguishable inside viral proteins (85).

Protein Sub-Unit Vaccine

Subunit immunisation is focused on engineered peptides or recombinant antigenic proteins that are important to strengthening a healthy and/or long-lasting response to the protective (90). The antibody, though, is a moo-immunogenic antibody and requires an adjuvant's assistant bolt for the production of resistant vaccine-induced reactions. The bio-half-life of an antigenic substance can be improved, or the immunomodulatory cytokine response can be increased. The extension of an adjuvant also affects the direction in which protein subunit antibody deficiencies are resolved (91). In order to deter the pathogen, the S antibody of SARS-CoV-2 is the key suitable antigen for neutralising antibodies. Two sub-units are found in the S Protein. The S1 subunit has the spaces FP, HR 1, & 2 and RBM (RTD, RBD and RBM). By using the official S-protein interceded with the HACE2 receptor, the virus reaches the cell by an endocytism. Thus, for the institution of a subunit antibody, the S-Protein and its antigenic sections are the primary targets. S glycoprotein can be an energetic protein with a pre-fusion, two conformational conditions. In order to secure the epitopes for high illumination efficiency counteracting agents reactions (92), the antigen then has to retain its surface chemical and profile of the first pre-fused spike protein. In addition, it indicates targeting the veiled RBM as an antigen enhances the neutralising response of the counteracting agent and raises the overall viability of the antibody.

NVX-CoV2373 (Novavax, Inc. Emergent Bio-Solutions)

The nano-partisan immunogenic antibody NVX-CoV2373 is focused on the recombinant expression, coronavirus S-Protein, steady pre-fusion. The protein has been communicated steadily within the context of Baculovirus (93). The organisation aims to use the Matrix-M adjuvant to enhance the tolerance to the spike protein SARS-CoV-2 by accepting elevated levels of antibody neutrality. A single immunisation occurs inside the high degree of anti-spike protein antibodies that obstruct the authoritative space of the hACE2 recipient, which tend to motivate wild-type SARS-CoV-2 virus-neutralising antibodies (Novavax covid 19 immunisation study, 2020).

Molecular Clamp Stabilised Spike Protein Vaccine Candidate

It is developed in partnership with GSK and Dynavax by the College of Queensland. In order to improve anti corps reaction and reduce the amount needed by the metrics of immunisation (94), the College will have to establish a

stage adjuvant invention (AS03 Adjuvant Framework). The College has established a safe, recombinant subunit vaccination of viral protein pre-fusion, focused on the invention of Atomic Clamps. This innovation has shown that the development of neutralising anti corps is being undertaken (94).

PittCoVacc (University of Pittsburgh)

A recombinant SARS-CoV-2 vaccine, based on a MicroNeedle Cluster (MNA), which contains the rSARS-CoV-2 S1 and RSARS-CoV-2-S1fRS09 (recombinant immunosubstances) organisations, may be used. In the preclinical experiments two weeks after the mice models, a substantial rise was found in particular antigen antibodies of factual noteworthiness. In addition, following sterilisation with gamma rays, antibody immunogenicity was successfully preserved. In the early stages, the factually interesting titres, which were recently strengthened, further reinforce MNA-SARS-CoV-2 immunisation (72). Their findings have been enhanced.

Triple Antigen Vaccine (Premas Biotech, India)

It could be a multi-antigenic VLP immunisation model wherein the recombinant spike, film, and envelope protein of SARS-CoV-2 have been co-expressed in a built Saccharomyces cerevisiae expression stage (D-Crypt™). The proteins at that point experience self-assembly as the VLP. The TEM and partnered expository information at the same time outfitted the biophysical characterisation of the VLP. This model has the potential to enter the preclinical trials as an antibody candidate after assist investigates and advancement. Besides, it is thought to be secure and simple to fabricate on a mass scale, in a cost-effective way. 2.2. Viral Vectored immunisation prime the cytotoxic T cells (CTL), which eventually leads to the disposal of the infection tainted cells (89).

Viral Vectored Vaccines

Ad5-nCoV (CanSino Biologics Inc. Beijing Institute of Biotechnology)

It could be a recombinant, replication imperfect adenovirus type-5 vector (Ad5) communicating the recombinant spike protein of SARS-CoV-2. It was arranged by cloning an optimised full-length gene of the S Protein at the side of the plasminogen activator flag peptide quality within the Ad5 vector void of E1 and E3 qualities. The immunisation was developed utilising the Admax framework from the Microbix Biosystem. The stage I clinical trials have set up a positive counteracting agent reaction or sero conversion. A four-fold increment within the RBD and S protein-specific neutralising antibodies was famous inside 14 days of immunisation and topped at day 28, post-vaccination. Moreover, the CD4 + T cells and CD8 + T cells reaction crested at day 14 post-vaccination. Be that as it may, the pre-existing anti-Ad5 insusceptibility somewhat constrained both the counteracting agent and the T cell reactions. The ponder would encourage assessing counteracting agent reaction within the beneficiaries who are between the age of 18 and 60, and gotten one of three consider dosages, with follow-up taking put at 3- and 6-months post-vaccination (95).

Coroflu (University of Wisconsin-Madison FluGen Bharat Biotech)

M2SR, a self-limiting form of the flu infection, which is adjusted by addition of the SARS-CoV-2 quality arrangement of the spike protein. Moreover, the antibody communicates the hemagglutinin protein of the flu infection, in this manner actuating safe reaction against both the infections. The M2SR is self-limiting and does not experience replication because it needs the M2 quality. It is able to enter into the cell, in this manner actuating the resistance against the infection. It might be managed intra-nasally, mirroring the normal course of viral disease. This course enacts a few modes of the resistant framework and has higher immunogenicity as compared to the intramuscular infusions (96).

LV-SMENP-DC (Shenzhen Geno-Immune Medical Institute)

Dendritic-cell (DC) architecture with the lentiviral vector, which interacts with the retained spaces of the auxiliary proteins of SARS CoV-2, and the protease used by the SMENP minigens is ready for LV-SMENP-DC immunisation. Antigens on antigenic show cells (APCs), which ultimately work Cytotoxico T cells and establish a stable reaction, are introduced by subcutaneous immunisation of the vaccine.

ChAdOx1 (University of Oxford)

ChAdOx1 recombinant immunisation with codon-optimised S glycoprotein was identified and synthesised at the end of the 5-inches pioneer arrangement with a plasminogen tissue activator (tPA). The amino acid SARS-CoV-2 coding (2-1273) and the tPA pioneer were paired together in the plasmid transportation system. This carrier is built to encrypt, together with the tetracycline administrator (TetO) destination and the polyadenylation flag of the bovine growth hormone (BGH), between the recombinant cloning site of Gateway ®, significant early qualities of human cytomegalovirus (IE CMV). The vector genome of Adenovirus is formed by embedding the SARS CoV-2 S quality into the E1 site of the ChAdOx1 adenovirus genome into the Bacterial Manufactured Chromosome. In the T-Rex 293 HEK (Human Embryonic Kidney 293), the infection was at this stage allowed to double and was filtered by an ultra-centrifugation angle of the CsCl. Intra-muscular inoculated creatures, the non-attention of subgenomic RNA (sgRNA) is indicative of enhanced infection insurability (97). The past experts have proposed that a single shot can be used to respond safely. The antibody is in therapeutic Stage II tests and can be tested in an immense community test.

mRNA Vaccine

mRNA is an evolving and non-infectious level with almost no possibility of insertional mutagenesis. The non-replicating RNS is actually being considered, and the virus is self-replicating RNAs. The mRNA's immunogenicity can be reduced, and the soundness of these antibodies can be enhanced. In comparison, anti-vector insusceptibility remains a strategic distance as the mRNA is the negligible genetic vector, causing the organisation of the immunisation to be re-harvested. Due to its adaptability and ability to mimic antigen structure and expression in the course of typical contamination (98), this stage has enabled the fast antibody production programme.

mRNA-1273 (Moderna TX, Inc.)

It may be a Lipid Nanoparticle (LNP) antibody consisting of processed mRNA, which codes for the full-length pre-fusion, stabilised SARS-CoV-2 spike protein (S). It may inspire a complex antiviral response to an overly S-protein. It is also deemed moderately protected as neither the inactivated

pathogen nor the live pathogent sub-units are composed of it. The FDA has a quick-step clearance for Stage II trials. The organisation discharged the cycles of eight members of varying dose thresholds of Stage I counteracting agent informations. The representatives of the set of 25 μg are close to the cure sera. However, nAb levels were significantly higher than the healing sera levels in Members who obtained the 100 μg dose. In the 25 mg and 100 mg dose cohorts, the vaccine was shown to be exceptionally effective and well lasting, although three participants had 3 systemic signs following the organisation of the existing measurements of 250 mg dosage amounts (99).

BNT162b1 (BioNTech FosunPharma Pfizer)

BNT162b1 may be a codonoptimised mRNA vaccine that codes the specific target of nAb infection, trimerised SARS-CoV-2 RBD. The antibody demonstrates improved immunogenicity through the extension of the foldon trimerisation space derived from the T4 to the RBD antigen. The mRNA is typified in cationic lipid nanoparticles that are ionised 80 nm and which ensure its efficient transport. Step 1/2 clinical tests have discovered an improved RBD specific IgG antibody concentration of 8 to 46.3 times titer in geometric cruelty serum gain. The SARS-CoV-2 neutralising anticords were found to be 1,8 to 2,8 times as high as the SARS-CoV-2 crude geometric titers. There were no unfavourable effects for immediate and temporal neighbourhood reactions and processes. In both situations, the defence and resistance reactions were not measured over the past two weeks after the time calculations were coordinated. The findings from Israel demonstrate the effects of the vaccines administered outside clinical trials. They show early evidence that Pfizer–two-dose BioNTech's vaccine can prevent or limit infection in some vaccinated people. According to a preliminary analysis of 200,000 people older than 60 who received the vaccine, the chances of testing positive for the virus were 33% lower two weeks after the first injection. Preliminary clinical trials of the Pfizer-BioNTech vaccine show it to be around 90% effective at preventing COVID-19 and some protection from infection. It will take a long time to show whether vaccinated people no longer carry the virus. More than 75% of older people in Israel have been vaccinated and should see a drop in hospitalisations over the coming weeks. Most countries are prioritising COVID-19 vaccinations for people who have a high risk of dying. The first evidence of success for shots will be a drop in the hospitalisation rates for people infected with the disease, and then a drop in the death rates (100).

DNA Vaccines

The most sophisticated immunisation strategy is the creation of a DNA antibody that codes an antigen and an adjuvant that drives the flexible, safe response. Transfected cells express the transgene, which provides the transgenic specific proteins with an unchanging supply that is quite close to the living infection. The antigenic material is also endocytosed by youthful dendritic cells which display, subsequently, convincing humours as well as cell-mediated safe reactions to the antigenes CD4 + and CD8 + T cells onto the cell surface as an association with MHC 2 and MHC 1 antigens (101).

Live Attenuated Vaccines

It may be a SARS-CoV-2 prophylactic vaccine (102). The S protein classification of SARS-CoV-2 is used tailored for codon and is combined with IgE groundbreaking structure. The IgE-spike SARS-CoV-2 arrangement was synthesised using BamHI and XhoI and processed. Under the control of IE CMV and BGH polyadenylation flag, the treated DNA was joined with plastomide expression pGX0001. The close similarity of T functional antibodies and the cell reaction in the pre-clinical trials indicates that within 7 days of vaccination, the antibody will respond successfully. The antibody reached the clinical stage I trials (Stage I: NCT04336410). The members obtained 1,0 mg INO-4800 electric proportion by using CELLECTRA ® 2000 gadget per visit for the sum of this stage of the clinical trials by July. The experiment will test an intradermal infusion antibody candidate's immunology and protection and tolerability and will evaluate the electroporation of strong human adults (102).

DelNS1-SARS-CoV2-RBD (University of Hong Kong)

This LAV is a strain of influenza vaccine with a cancellation of the NS1 mutation. It is reoriented and is formed within the life of the chicken, or Madin Darby Canine Crane Cells (MDCK) cells, to evaluate the RBD space for SARS-CoV-2 spike protein on their surface. It can be handled by a nasal shower rather than the wild kind of flu infect.

Others

Different immunisation candidates have been easily strengthened with probable but too antagonistic immunisation due to the composition and genome of the SRAS-CoV-2. In certain long-term clinical studies, the assignment of antimicrobial enhancement is long and lumbering. The British and American Tobacco Industry (BAT) late unfurl the immunisations of the COVID-19 utilising their unused and rapid-growing tobacco plant invention while Tianjin College has established a verbal antibody that used Saccharomyces cerevisiae to transport them effectively. Separate biotech wanders used numerous developments for the improvement of their vaccine candidates. The yeast status of GRAS (mainly respected as secure) provides high adaptability, vigour and cost-effectiveness of endless steps needed in order to combat this widespread disease (103).

Further, it has been noticed that the WTAGAAYYY and YDPPLQPEL epitope clusters can be exploited for the description of epitope-based peptide vaccination in silico thinking using various databases such as VaxiJen (104).

Self-Assembling Vaccine (HaloVax)

In order to enforce the immune framework, the immunisation uses a warm stun protein (hsp). It consists of a protein mixture sandwiched between Avidin and HSP. To tailor immunisation (Voltron Therapeutics, Inc., 2020) Tables 2 is mixed with biotinylated immune peptides.

Recombinant Vaccines/Viral Vectors

Viral vector invention involves a transfer to an irrelevant, engineered infection of one or more qualities which cover a target antigen. The viral vector can be competent for replication (live weakened) or not. Antibodies that use viral vectors to count the adenovirus (WAR) for HIV, Ebola, Zika, and Chikungune were found to be able to stimulate cellular or humoral insusceptibility with a capacity to enhanced vesicular stomatitis (vSV), alphaviruses, poxviruses and herpes viruses that enabled the addition of 5 kb or more of transgenes (106). This stage concerns the possibly slower pace of anticörper-production in the

Table 2. The vaccine development stages and the process (105)

Phase	Aim	Features
Exploratory	• Develop a vaccine	• Research intensive phase • Identify synthetic or natural antigen • Develop a vaccine (natural or synthetic). Time: 25 years • The success rate to proceed is 40% • Causes of failure based on the nature of the pathogen
Pre-clinical	• The vaccine is safe and immunogenic • Evaluate the starting dose for human studies	• Subjects: Vaccine is studied in Cell culture & animals • Design: Toxicity and antibody response, challenge studies. Time: <1 year • The success to proceed is 33%
Clinical Trial Authorization	• Allow human experiments • (Application for IND)	• The basis for Authorisation-Manufacturing steps & analytical methods for vaccine & placebo production • Availability and stability of vaccine & placebo during clinical studies. Time: within 30 days
Phase I	• First-in-human testing • Vaccine safety and immune response	• Subjects: Healthy volunteers (20-100) • Site: vicinity of the tertiary care for close observation • Design: Escalation study to avoid severe adverse effects (SAEs) • Monitor: Health outcomes (clinical and laboratory) and antibody production. Time: a few mon • The success rate to proceed 66% • Caution: Follow strict go/no-go criteria based on safety and immunity data
Phase II	• Vaccine safety, immunity/ partial efficacy • Dose-response, schedule and method of delivery	• Subjects: Healthy volunteers (hundreds), may include a diverse set of humans • Site: Community-based (university, colleges, schools, etc.) • Study design: Studied against a placebo, adjuvant, or established vaccine • Dose: Test vaccine in different schedules and a diverse set of humans • Monitor: Health outcomes (clinical and laboratory) and antibody response • Partial efficacy data can be procured under the circumstances. Time: 2 y • The success rate to proceed 30%
Phase III	• Vaccine efficacy and safety	• Subjects: Target population (thousands) • Site: Field conditions similar to future vaccine use • Design: Vaccine randomized vis-a-vis a placebo, adjuvant, or an established vaccine • Monitor: Vaccine efficacy and SAE • Time: Many years • The success rate to proceed 70%
Biologic License Application	• Marketing of vaccine	• The basis for an approval-The vaccine is safe and effective in humans (Efficacy >95%) • Capacity to produce in bulk for market demand • Affordable cost to a susceptible population
Phase IV	• Postmarketing surveillance	• Spontaneous reporting (Adverse Events Reporting System) • Monitor: Data collected by the end-users

outbreak environment as testing facilities at Biosafety level 2 (BSL2) is necessary and imaginable pre-existing immunisation resistance to virus vectors, such as Ad5 and MV, decreases the adequacy of the anticorps.

To illustrate this issue, approaches such as the collection of prevalent human Moo adenoviral serotypes (Ad26 or Ad35) were used. Ebola vaccine (rVSV-ZEBOV) is currently the authorised vector-based vaccine that has been licenced for human use and, as has occurred, has been developed and used to a small extent. The open name MERS-CoV (MVA-MERS-S DF1) immunisation was tested in a stage 1 study of 26 people matured from 18–55, which involved the usage of a modified vaccine Ankara and the contact of the spike (S) protein MERSCoV. There seemed to be a positive safety profile without serious antagonisms, but the laughter and T-cell response to the MERS CoV are mildly reduced (107).

It has been reassuringly taken into account that whilst a specific vector counteracting agent was evoked, counteracting agent reactions to the transgene after boosters inoculation have been evoked by the antibody. The ChAdOx1 MERS vaccine, a Phase 1 clinical trial with a replacement antibody, shows that a single measurement was capable of inspiring both attitude and cellular reactions toward MERS Co V, which was repeated with no simian adenoviral vector that communicates the spike protein (S) in 24 individuals who had a ripening period of 18 to 50.

Nucleic Acid Vaccines

Nucleic corrosive vaccines use antigen coding plasma plasmid DNA or RNA, RNA (mRNA) transmission individual or viral replica. The nucleic corrosive, if picked up by a cell, starts the protein blend in contrast to traditional diseases with the humoral and cell-mediated immune reactions. Veterinary irresistible pathogens, illustrated immunogenicity, foetus inflammation, mouth, deer powassan infections and rabies infection have been examined with this method of a vaccine. Step I tests are being performed in humans for Ebola, Flu, and Zika nucleic corrosive antibodies. The benefit of a nucleic corrosive stage is the simplicity of which antigen regulation and generation speed are achievable, as development can be produced in such a way that the criteria for BSL2 research facilities can be fully cell-free. There are disadvantages, such as fragile core corrosivity, especially mRNA, that the cold chain prepares for transport and capability on a continuous basis (108).

Clinical tests for SARS-CoV and MERS-CoV DNA antibody applicants in stage I have been performed. 10 adults have tested the SARS-CoV N-protein genome

recombinant DNA vaccine candidate, developed by the National Sensitiveness and Irresistible Disease (NIAID) (109). The next number of representatives (n=75) had been a MERS-CoV DNA immunisation (GLS-5300), developed by GeneOne Life Science / Inovio coding, and all had fulfilled safety profiles and inductible humoral and cellular reactions. The MERS-CoV DNA immunisation advanced into a clinical phase 2 study. The following number of participants were reported. An inactivated Immunisation (ISCV) given by Sinovac Biotech is the like-for-other SARS antibody that has entered a stage I study. No human spokesmen have been identified in which the signature virus threatened inoculated subjects.

Peptide-Based Vaccines

Using intramuscular or subcutaneous intramuscular injection, typically a viral peptide, or a mixture of recombinant energy tide, to induce a healthy reaction. The approach is generally stable, offers the option of the finest epitope as an antigen and promotes a strong, resistant reaction, particularly with adjuvants. Candidate antigenes are the full-range or S, M and N protein spacers of SARS-CoV-2, since they have antibodies at least in the case of SARS-CoV at their producer stage. To improve the immunogenicity of viral peptides, the viral protein is also paired with an adjuvant or an epi-top which is recognised by the T- or B-cells. In addition, multi-epitope peptides may give a resistant reaction. The regularly rehabilitated organisation, a humoral and cellular-resistant reaction is essential. The transmission of a viral S protein component through a microneedle cluster is a late operation, which is restricted to routine subcutaneous infusion. Most of the composite proteins are produced and attempted to inoculate, comprising of a portion of viral S or M protein and an adjuvant, such as Aluminium. A dozen projects advance from preclinical consideration to early stage 1 and 2 clinical ponders in people through various phases of peptide-based vacuum cine.

CURRENT SCENARIOS AND FUTURE IMPLICATION OF VACCINATION

As COVID-19 vaccines are being deployed globally, researchers look forward for the early evidence its affects on the pandemic. Preliminary figures published recently in Israel showing that people who had been vaccinated were around a third less likely to test for SARS-CoV-2 positively than those who had not been getting vaccine shot. However, researchers suggest that it takes time to see the populational impact of immunisation. A variety of variables will allow us to detect the effects of vaccination on the pandemic as soon as possible. That includes the coverage of vaccination, the efficacy of shots on disease and infection prevention and the rate of viral transmission. The world's leading vaccination coverage is Israel and the United Arab Emirates. Around one-quarter of their populations have been vaccinated by both nations – more than 2 M each. Other countries, including the UK and Norway, have targeted high-risk populations for their vaccine programmes. The UK has vaccinated more than 4 M people, mostly health professionals and elderly people, including caregivers. Norway has vaccinated about 40,000 residents in care homes (110).

India plans to vaccinate 300 M people. The 30 M healthcare employees, police and military, will be prioritised. The vaccine will be given to those over 50 and those suffering from co-morbid conditions. A free vaccine will be given. There are several doubts that the approval of Covaxin was premature. The findings from the Phase 3 trials have not been released. India's Drug Action Network is "baffled" by the FDA's decision to approve a vaccine that's still in trials. The government pledged that Covaxin, a government-run drug developed in collaboration with the Indian Council of Medical Research, will be available by August 2021. The vaccine will be manufactured by Oxford/AstraZeneca, which already has a stock of 40 M doses available. The company vowed to produce 300 M doses by July 2021 and said it would reserve 50% of its vaccine production for India (111).

After data have shown that it has provided limited protection from mild to moderate infections caused by the dominant coronavirus in the region, South Africa will stop using AstraZeneca's shot Covid 19 in their vaccination programme. Minister of Health, Zweli Mkhize said that after misleading results of a trial conducted by Université de la Witwatersrand, the government would await scientific advice on how to proceed. After receiving 1 M doses provided by the Serum Institute of India on Monday, the government intended that the AstraZeneca be shot down soon by medical staff (112).

The creator of vaccines is now working by leaps and bounds for vaccines to improve their effectiveness against variants of spike protein mutations. Most of the vaccines have the protein bound to a human cell. The South African Spike series has been presented in the works. It’s very likely that countries will be able to use a new version in the autumn. Several people will then have a third hunt later this year, which opens up the possibility. More than 100 South African cases have already been reported in the UK. In places where there has been a case, attempts are made to avoid the spread with quarantine measures for foreign tourists and home-to-house checks. "We are doing with influenza vaccines, whereby you look at the variant of viruses spreading around the world, you quickly produce a variant of vaccine and start vaccinating and protecting the nation," Zahawi told the BBC that in the coming years people should expect to see frequent Covid vaccines boosters.

In comparison to a reactive scheme which is introduced when a new pathogen emerges, a plan has now defined targets and initiatives which could start immediately at large. The approaches are understood, and infrastructure is developed thanks to work already done on other viruses, especially HIV and influenza. Investments in basic science - including virology, genomics, immunology and structural biology - have provided a great opportunity to further improve SARS-CoV-2 and make ready for new virus pathogens. The investment of 100 M USD to 200 M USD in trials per virus is anticipated to the range for many years.

It is visualised that public-private collaborations between governments, business and philanthropy will support these costs. Organisations such as CEPI, the COVAX and GAVI Facilities could assist in putting together resources and initiating negotiations to introduce the types of vaccine are proposing. There will be outbreaks in the future, and more epidemics will most likely happen. These pandemics must be prevented (113). The world pandemic also has besides

the health and lives of the population, also a very substantial impact on the environment. The pandemic caused a substantial increase of single-use plastics (114), problems with plastic waste (115) and namely on toxic waste (116). It also has both ways impact on energy use as well as generation, and consequently, it is related to the increase of several environmental footprints, as Greenhouse Gases (GHG) Footprint, Nitrogen Footprint, Water Footprint and Plastic Waste Footprint (117). A vital issue is minimising the negative impacts on the society and industry with the post-pandemic perspective in mind (118).

CONCLUSIONS AND LIMITATIONS

In compliance with requirements established by the FDA and WHO, the immunisations applicant needs to pass the protection and viability of a minimum of three phases of placebo-controlled clinical trials, which may take time to complete. Given the severity of the large-scale economy, which limited a global shutdown, it is important to boost immunisation rapidly. A few designers suggest that regulated human challenge experts can perform the phase 3 training correctly to enable accelerated licencing of immunogenic immunisations. Any longer-term recommendations raised by immunisation should still be tested inside the extended sector pondering participants.

In addition, sometime recently, protection trial extended immunisation to these bunkers could be performed for rare bunches, infants and pregnant women and immunocompromised patients. Stable and viable antibodies are evaluated and encouraged on models of testing facilities for creatures. These animal models must behave as in human beings as a comparable path of illness. However, because of the difference between the ACE2 receptors of humans and mouse, the normal innate strains of mice are not helpless against COVID-20 contamination. The progression of the transgenic mouse demands that the hACE2 receptor be transmitted. Two creatures models were already developed for SARS-CoV (hACE2 transgenic mice and another, primate macaques prove), but the current situation needs that such creature models be continuously replicated and disseminated to satisfy analysts worldwide demands (119).

In the lungs of the Syrian hamsters, the SARS-CoV-2 distinction will efficiently be imitated. The lungs of infected hamsters are strongly linked to COVID 19 patients with pneumonia with obsessed injuries. Furthermore, the nAb response demonstrated by the infected hamster indicates insensitivity to the successive challenge. The conversion of the benefit force sera into the naive hamsters often monitored the reaction of the counteracting agent and thus hampered the viral replication in the lungs. The scope of such studies has demonstrated that Syrian hamster may be a result of recognising and assessing antiviral drugs and immunotherapies for SARS-CoV-2 pathogenesis (120).

By the way, the determination of the subordinate immunisation protected upgrade cannot be extrapolated from creature models and involves true analysis from arrangement III individual experimentation or recognition of the human challenge. The subordinate upgrade of counter spoken agents (ADE) is misused as an elective technique for contaminating a number of cells, with multiple infections such as Dengue, HIV, coronavirus etc. The anticorps-virus complex can attach to the FC receptors, trigger the additional structure or cause a conformational alteration within the viral enfolding glycoprotein. This method is tested for non-neutralising or insufficiently amounts of vaccine-induced antibodies. The preparation stimulates the viral entry into the cell since the virus antibody complexes are improved officially in efficiency to hold FcR cells. ADE discomfort has been shown by the clinical and preclinical studies performed by the SARS-CoV vaccine applicants. Improved Respiratory Infection Associated Immunisation (VAERD) also can be done by TH2 tolerant and complicated reactions (92). The viral genome is powerless to alter and may undergo antigenic motions and antigenic float, as it spreads between populations. This will vary in conjunction with the natural conditions and population thickness of a topographical range. The researchers could evaluate 198 transformations by screening the 7,500 samples of infected individuals, which would autonomously materialise and demonstrate the gradual progression of the human virus inside the patient. These adjustments can lead to diverse subtypes which will allow the infection, after the organisation of the antibody, to evade the safe structure actually.

Ethics Committee Approval: Since our study was a review, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: The authors are thankful to the Institute of Research and Consulting Studies at King Khalid University, Saudi Arabia for supporting this research through grant number 2-N20/22. The support of the Research Center for Advanced Materials Science is highly acknowledged. This research was also supported by a project “Sustainable Process Integration Laboratory - SPIL”, project No. CZ.02.1.01/0.0/0.0/15_003/0000456 funded by EU as “CZ Operational Programme Research, Development and Education”, Priority 1: Strengthening capacity for quality research.

CRediT Authorship Contribution Statement

Sami ULLAH: Conceptulisation, Consultation and Funding Acquisition; Abdullah G. AL-SEHEMI: Conceptulisation and Idea development, Jiří Jaromír KLEMEŠ: Writing, Editing and Proofreading, Funding Acquisition, Project administration, Supervision; Sanam SAQIB: Medical technical consultation; Sahibzada Muhammad Azib GONDAL: Medical technical consultation; Sidra SAQIB: Writing, Review and Editing, Data collection; Akasha ARSHAD: Writing, Review and Editing, Data collection; Hira SAQIB: Writing, Review and Editing, Data collection; Ahmad MUKHTAR: Writing - original draft, Visualisation, Data interpretation and Data analysis; Muhammad IBRAHIM: Writing and Editing; Saira ASIF: Visualisation, Writing and Editing, Data collection; Awais BOKHARI: Writing - original draft and proofreading, Data analysis, Visualisation, Supervision and Project administration.

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Invited Review / Davetli Derleme
doi: 10.18678/dtfd.891171

Duzce Med J, 2021;23(S1):24-26
Düzce Tıp Fak Derg, 2021;23(S1):24-26

Lessons from COVID 19 - What the Virus has Taught Us

COVID-19'dan Dersler - Virüs Bize Ne Öğretti

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ABSTRACT

The traditional view, of a linear relationship between the development levels of countries and their ability to deal with problems has been completely changed with the coronavirus disease 2019 (COVID-19) pandemic. The countries hit hardest by the pandemic have been the so called developed ones of Western Europe and the USA. Equating development to mega cities has been shown to be misplaced. The pandemic has spread fastest in crowded cities such as New York and Los Angeles. Aside from overpopulated cities, ignoring the environment and the need for healthy living conditions are other important reasons for their failure to control the epidemic. Yet, countries such as Taiwan, South Korea and Japan have had very low infection rates relatively, even though most of their populations live in large urban centers. The difference may be due to the extensive practice of using face masks in these countries. The need to emphasize and rely on science and technology to solve the problems of humankind is among the key lessons that the pandemic has taught us. A final lesson the virus has taught us, is that regardless of which country we live in, our well-being and destinies are closely indeed intertwined. A health care crisis anywhere in the world can affect us all and very quickly too.
Keywords: COVID-19 pandemic; developed countries; measures.

ÖZ

Koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisi ile birlikte, ülkelerin gelişmişlik düzeyleri ile karşılaştıkları sorunlarla baş etme konusundaki performansları arasında doğrusal bir ilişki kuran geleneksel bakış kökten değişmiştir. Beklenilenin aksine, pandemiden en fazla etkilenen ülkeler Batı Avrupa ülkeleri ile ABD gibi gelişmiş ülkeler olmuşlardır. Mega kentlerde de benzer olumsuz tablo görülmüş, pandemi New York ve Los Angeles gibi büyük kentlerde en yüksek yayılma düzeyine sahip olmuştur. Kentlerin aşırı nüfuslu olmaları bir yana, kaliteli çevre ve yaşam koşullarının büyük kentlerde ihmal edilmesi bu kentlerde hastalığın yayılım hızının daha yüksek olmasına yol açan diğer faktörler olmuştur. Öte yandan, Tayvan, Güney Kore ve Japonya gibi ülkelerin yüksek nüfusa sahip olan kentlerinde, diğer gelişmiş ülkelerin büyük kentlerinde hastalığın hızlı yayılım sorunu gözlenmemiştir. Bu farklılık, bu ülkelerde toplumun temizlik ve maske kullanımı kurallarına uyma konusunda çok daha yüksek hassasiyet göstermesi ile ilgili olabilir. Modern zamanlarda akla gelmeyecek olan bu pandeminin bizlere öğrettiği en önemli konulardan birisi hiç kuşkusu insanoğlunun karşılaştığı bu sorunlara karşı bilim ve teknolojinin bu sorunlarla mücadelede hayati öneme sahip olduğudur. Virüsün öğrettiği bir diğer şey de ne düzeyde gelişmiş bir ülkede yaşadığımıza bağlı olmaksızın sağlık yönünden iyi durumda olmak ve kaderin birbirinden bağımsız olmadığıdır. Ayrıca, dünyanın bir köşesinde yaşanan bir sağlık sorununun aslında dünyanın geri kalan tamamını da ilgilendirmesi gereken bir sorun olduğu bu sağlık krizi ile tescillenmiştir.
Anahtar kelimeler: COVID-19 pandemisi; gelişmiş ülkeler; tedbirler.

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 14.02.2021
Available Online /
Çevrimiçi Yayın Tarihi : 04.03.2021

A virus far too small for the naked eye has brought the world to a screeching halt. Lockdowns, something unheard of previously, became a common feature across many countries in early 2020. Subsequently, the world witnessed a series of lockdowns of different duration and intensity. Yet, the virus shows little sign of abating. The trillions spent by advanced nations on defense budgets, seemingly to protect their citizens lives and their economies has had zero effect in this war. Ironically, even the billions invested in biological warfare defense has meant nothing. Across the world, even in the most developed of countries, death and destruction has been rampant, the world just passed the 2 million mark for deaths and the global economy is in ruins. Like the kid who exposed the emperor to have had no clothes, the virus has laid bare the stupidity if not the misplaced priorities of mankind.

Governments, as they always have with crises, have responded with stimulus packages. Only this time the packages have been very much larger. There is a good reason for this unprecedented size, the world was already sitting on a tinder box of debt even before the virus came along. Thanks to the addiction of central banks particularly the US Fed, to monetary stimulus, governments, corporations and even households are up to their necks in debt. The numbers are staggering. Just before the pandemic, at end 2019, total global debt, according to Washington based IIF was about US$ 255 trillion while total global GDP was US$ 86 trillion. Thus, global debt to GDP is a massive 300%. These debt numbers have continued to grow. If the first lesson the virus taught us was the futility of spending on military hardware for safety, the second maybe the irrationality of dependence on monetary stimulus. More than the virus and health issues, governments and central banks are now worried that any number of events could trigger an avalanche from the mountain of debt they have created. So, even if the vaccine enables us to beat the virus and bring it under control, managing the potential economic fallout promises to be the bigger battle.

The fact that countries deemed the most developed and advanced have been among the hardest hit by the virus, the US, UK and Western Europe points to the fallacy of "development" as we now know it to be. If the aspiration for development means mega cities and tall gleaming towers with very high human densities, it is misplaced. That New York and Los Angeles have been the hardest hit within the US shows the need for less human concentration. The obvious lesson here is that; development has to be more diffused and better balanced environmentally with emphasis on green investment. Our cities may have to be redesigned with less overcrowding, much lower density ratios enabling better hygiene and living standards. The virus has spread exponentially where population density is highest.

The need to change our social and cultural behavior is another lesson from the virus. Much of our social norms entail closeness. Praying in congregations, shaking hands, hugging, travelling in jam packed transportation and meetings/conferences involving hundreds if not thousands within closed confined spaces, must all be rethought. Humans are social beings, we cannot live in isolation, yet, the pandemic has taught us that where interaction is necessary hygiene and personal protection is necessary. It is not by accident that countries such as Taiwan have had the lowest infection rate. Taiwan together with South Korea and Japan are societies where the use of facial masks is common practice. All three countries are among those that have had the lowest infection rates, as per cent of population. This despite the fact that most of their populations live in large urban centers. Governments should encourage the continued use of masks in public spaces especially where social distancing may be difficult. This should be one good social habit that comes out of the pandemic but outlives it.

Until last year, the budget allocation for health care was not priority for most governments. If anything, reductions in health care spending could easily go unnoticed in most government budgets. Governments in many developing countries were happy to privatize as much of their health care system as possible. This slow erosion in health care funding over years, meant that capacity constraints were reached very quickly. Not only were public health care systems of most countries understaffed but physical facilities too were inadequate. The years of underinvestment in public health facilities and services became apparent very quickly into the crisis. It is fortunate that unlike the other variants of the coronavirus like severe acute respiratory syndrome (SARS), coronavirus disease 2019 (COVID-19) had a much lower mortality rate. The lesson here is that not only must public healthcare be prioritized, there also has to be a quick reallocation of resources away from items like military to health care. The flaw in depending on the private sector to provide a social good at a time of a health emergency is obvious. The pandemic showed health care to be far too important to be left largely to the private sector.

As the pandemic raged, governments were forced to spend billions in emergency unbudgeted funds. This was money not previously intended for health care but had to be, in order to meet the emergency. Until recently, all increases in government budgetary allocations were thought off as trade-offs. A cost-benefit framework being used in the evaluation. The pandemic has shown that there is a huge social cost, what economists would call an externality at work here. The trade-offs in deciding on allocations to health care has changed massively. The pandemic has shown that the risk of under allocation is far greater than previously thought.

The need to emphasize and rely on science and technology to solve the problems of humankind is yet another lesson that the pandemic has taught us. Even if it is still early, the vaccine has been a game changer. Science has indeed delivered and in a timely fashion. The challenge is now for organizational leadership and logistics to deliver the vaccine to a critical mass of the population. It is clear that economic revival of countries now depends on how quickly sufficient portions of their population are vaccinated. The efforts that went into vaccine development, is a lesson in itself, initiatives such as Operation Warp Speed show how focusing attention and giving resources to the best and brightest can get us the desired results. Operation Warp Speed produced more than one vaccine and in record time. Though less known, it is obvious that countries like China and Russia which have also produced vaccines would have had their own operational initiatives. The success of these initiatives provides lessons for how future crises, health or otherwise should be handled.

A final and perhaps the most important lesson the virus has taught us, is how closely our well-being and destinies are intertwined. Regardless of where we live, a health care crisis anywhere in the world can affect us and very quickly too. The world is but one village and there is no way to detach one's country or community from others. Let's hope this one lesson does finally sink in.

Ethics Committee Approval: Since our study was a review, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: OIB, Design: OIB, Data Collection/Processing: OIB, Analysis/Interpretation: OIB, Literature Review: OIB, Drafting/Writing: OIB, Critical Review: OIB.

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Invited Review / Davetli Derleme
doi: 10.18678/dtfd.896445

Duzce Med J, 2021;23(S1):27-29
Düzce Tıp Fak Derg, 2021;23(S1):27-29

The COVID-19 Pandemic and Waste Management

COVID-19 Pandemisi ve Atık Yönetimi

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ABSTRACT

Waste management has been a great problem globally for at least five decades. Some of the developed countries could initiated certain processes to benefit from the waste. In this way, countries could both got rid of waste and they could exploit from it and used waste in different ways such as heating, recycling, etc. The situation became even worse during the coronavirus disease 2019 (COVID-19) pandemic. The COVID-19 pandemic has altered global waste generation dynamics and thus became one of the most important issue for all countries for now and for future. Actually, healthcare waste is all the waste generated by healthcare facilities, medical laboratories and biomedical research facilities, as well as waste from minor or scattered sources. However, during the pandemic, masks, increased amounts of contaminated waste including gloves, other protective equipment, and along with non-contaminated materials, many types of additional medical and hazardous waste are produced. These contaminated wastes not only dirts the environment, but also may cause the pandemic spread. The inadequacies and inefficiencies of current waste management system to deal with the increased dependence on plastic could aggravate its mismanagement and leakage into the environment, thus triggering a new environmental crisis. Therefore, this study will highlights the possible effects of COVID-19 on the waste management and environment.
Keywords: COVID-19; waste management; healthcare waste; air pollution; environment.

ÖZ

Atık yönetimi sorunu tüm dünyanın en az elli yıldan beri gündeminde olan ve giderek derinleşen bir sorunudur. Kimi gelişmiş ülkeler, atık yönetiminde önemli ilerlemeler kaydetmiş ve atığın belli proseslerden geçirilmesinin ardından farklı alanlarda kullanımı ile ekonomik ve yararlı bir ürün haline dönüştürülmesini başarmışlardır. Bu sayede bu ülkeler hem atıktan kurtulmuş hem de ısınma, geri dönüşümlü plastik gibi alanlarda kullanılmışlardır. Atık yönetimi sorunu koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisi döneminde farklı boyutları ile yönetilmesi daha güç hale gelmiştir. COVID-19 pandemisi, küresel ölçekte atık yönetimi dinamiklerini kökünden değiştirmiş ve bütün ülkelerin günümüzde ve gelecekte en önemli sorunlarından biri haline gelmiştir. Pandemi öncesinde de sağlık hizmetleri dolayısıyla laboratuvar malzemeleri, biyomedikal malzemeler, kitler, iğne ve eldiven gibi atıklar çıkıyordu. Ancak pandemi dönemi ile birlikte maske, kontamine olmuş tıbbi malzemeler, eldivenler, koruyucu malzemeler, tıbbi atık ve tehlikeli atıklar miktar olarak aşırı düzeyde artmıştır. Bu kontamine atıklar, sadece çevreyi kirletmekle kalmaz, hastalığın yayılmasına da yol açar. Pandemi döneminde güçleşen atık yönetimindeki yetersizlik ve plastik ürünlere olan bağımlılığın daha fazla artması, bunların çevreye daha fazla atılmasına, çevrenin pandemi öncesine göre daha fazla kirlenmesine ve yeni çevre felaketlerinin tetiklenmesine yol açabilir. Bu çerçevede, bu çalışmada COVID-19 pandemisinin korunma tedbirleri kapsamında artan çevreyi kirletici tıbbi malzeme kullanımı dolayısıyla atık yönetimi ve çevre üzerinde oluşturduğu olumsuz etkiler incelenecektir.
Anahtar kelimeler: COVID-19; atık yönetimi; tıbbi atıklar; hava kirliliği; çevre.

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 08.03.2021
Available Online /
Çevrimiçi Yayın Tarihi : 14.03.2021

All through the history of mankind, there have been a few huge flare-ups of irresistible illnesses, and the passing toll of these illnesses is comparable to numbers of lives misplaced in wars. Inside the 20 years of the 21st century, there have been numbers of huge scourges, such as severe acute respiratory syndrome (SARS), H7N9, Zika, Ebola, and presently coronavirus disease 2019 (COVID-19). The current battle against the novel coronavirus isn't as it were a weight test of World's in general therapeutic framework, but moreover an extreme challenge to each clinic across the country, particularly in open wellbeing crisis distinguishing proof speed, crisis administration capacity, and the capacity to save and disseminate supplies (1).

From the initial time in history, a wellbeing crisis has closed down the whole worldwide economy, agonizingly illustrating how indivisible healthcare and the economy have ended up.

The COVID-19 pandemic and administrative arrangements to contain the spread of infection have caused a worldwide financial subsidence and have too produced a gigantic sum of restorative squander. The affect of COVID-19 is changing the way we live, from one day to the following. Whereas national and nearby intercessions are generally centered on securing lives and economies, administration of dangerous squander is additionally basic to play down long-term dangers to human and natural wellbeing. Since the flare-up of COVID-19, medical squander era is expanded all inclusive, which could be a major danger to open wellbeing and environment. For test collection of the suspected COVID-19 patients, determination, treatment of tremendous number of patients, and sanitization reason parts of irresistible and biomedical squanders are created from clinics (2).

Healthcare waste is all the waste generated by healthcare facilities, medical laboratories and biomedical research facilities, as well as waste from minor or scattered sources. The inadequacies and inefficiencies of current waste management system to deal with the increased dependence on plastic could aggravate its mismanagement and leakage into the environment, thus triggering a new environmental crisis. The viral pandemic has produced both positive and negative indirect effects on the environment.

In spite of several negative effects of COVID-19 as shown in Figure 1, it has been reported in many studies that the reduction in economic activities due to COVID-19 significantly improves the air quality in different cities of the world, reduces greenhouse gas emissions, water pollution and noise. In other words, in spite of the negative aspects of coronavirus on the globe, the coronavirus crises brought a positive impact on the natural environment. In addition, several recent studies also indicated that this COVID-19-induced lockdown has reduced the environmental pollution drastically worldwide. For example, in China, emissions of harmful gases and other pollutants dropped 25% at the start of the year 2020 and the quality of air improved up to 11.4% with respect to start of the last year, in 337 cities across China (3).

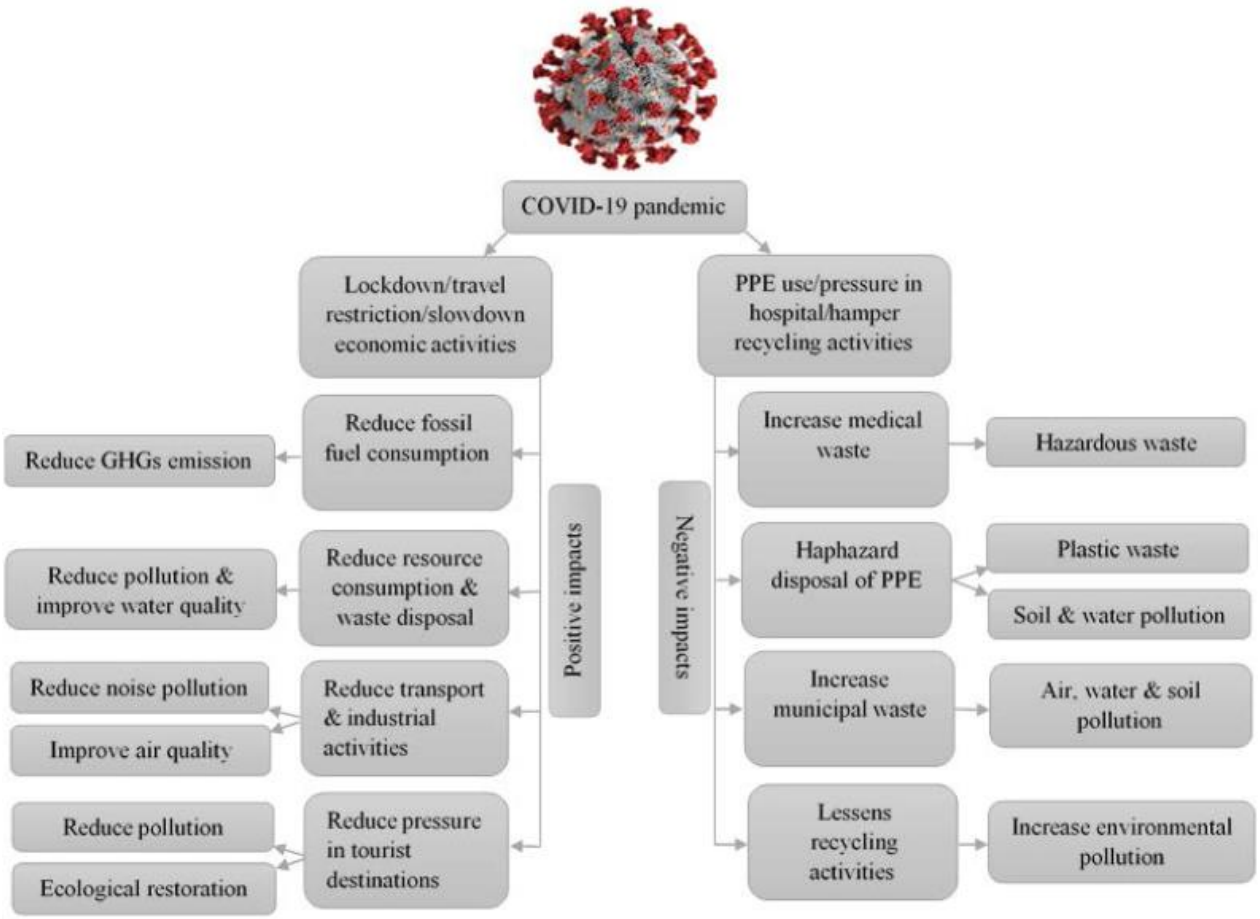

Figure 1. Positive and negative environmental effects of COVID-19 pandemic. Source: Rume and Islam (4).

According to a European Environment Agency (EEA), the COVID-19 pandemic and resulting restrictions imposed to fight the spread of the disease have provided some short-term positive impacts on Europe's environment, such as improvements in air quality, lower greenhouse gas emissions and lower levels of noise pollution. However, the EEA also stresses that there have been negative consequences such as increased use of single-use plastics and medical waste during the same period. Similarly, in the USA, an increase in garbage production from personal protective equipment has been recorded. The problem got worse, after many countries particularly the USA and the European nations have stopped waste recycling programs in some of their cities, concerning the risk of COVID-19 spreading in the recycling centers (5).

The utilize of expendable plastic-based individual defensive gear (PPEs) and single-use plastics amid the widespread not as it were increments the amount of restorative squander but too changes the normal thickness of the therapeutic squander. Squander era in the midst of COVID-19, particularly disposed of PPEs and single-use plastics, has been a natural and open wellbeing emergency around the world especially within the nations with creating economies and those in move.

The current quick surge in healthcare squander due to the COVID-19 pandemic is advance compounding the issue and there's a prompt danger that the impacts of hazardous transfer of healthcare squander will spill over into an emergency of natural contamination. Hazardous transfer of healthcare squander not as it were contaminates the environment but moreover conduces to the spread of irresistible illnesses such as Hepatitis, HIV/AIDS, cholera, typhoid and respiratory complications, which are primarily caused by the reusing of the transfer restorative gear or by rummaging the restorative waste, as detailed completely different nations (2). During such an epidemic, masks, increased amounts of contaminated waste including gloves, other protective equipment, and along with non-contaminated materials, many types of additional medical and hazardous waste are produced. For example, in Wuhan, the center of the epidemic in China, six times more medical waste is produced.

Masks, gloves and protective gowns, which are the main defense tools in the fight against coronavirus and protection, are turning into a growing waste problem worldwide. Uncollected waste, after being dragged by winds and rains, can enter the sewer and enter the water, exacerbating the already large plastic waste problem worldwide.

To reduce the burden of wastes and environmental pollution, both industrial and municipal wastes should be recycled and reused. Moreover, hazardous and infectious medical waste should be properly managed by municipal and hospitals. Therefore, proper strategies should be adopted to control environmental degradation and wastes.

Ethics Committee Approval: Since our study was a review, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: İÖ; Design: İÖ; Data Collection/Processing: İÖ; Analysis/Interpretation: İÖ; Literature Review: İÖ; Drafting/Writing: İÖ; Critical Review: İÖ.

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Invited Review / Davetli Derleme
doi: 10.18678/dtfd.896469

Duzce Med J, 2021;23(S1):30-37
Düzce Tıp Fak Derg, 2021;23(S1):30-37

An Evaluation of the Performance of the Turkish Health System in the COVID-19 Pandemic

COVID-19 Pandemisinde Türk Sağlık Sisteminin Performansının Değerlendirilmesi

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Received / Geliş Tarihi : 08.01.2021
Accepted / Kabul Tarihi : 12.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 14.03.2021

ABSTRACT

The coronavirus 2019 (COVID-19) pandemic is among the deadliest pandemics due to its impact on human health and its spread throughout the world. The impact of this outbreak has led to social, economic and human institutional transformations, especially health. Analyzing the performance of health systems at the point of identifying problems related to the current situation and developing solution suggestions, while providing opportunities to develop policy suggestions that will minimize the effects of the pandemic in the short term, can provide new perspectives to service delivery in the long term. This study aims to evaluate the performance of the Turkish health system in the COVID-19 pandemic and to contribute to the solution of problems. Within the scope of the study, the economic, social and technological effects of the COVID-19 pandemic were discussed, and its effects on the health system were evaluated. In the study, the performance of the health system and the reflections of the political and administrative system on the fight against the COVID-19 pandemic were also discussed. It is thought that this study will provide an opportunity to evaluate the effectiveness of the steps taken in combating the COVID-19 pandemic. As a result of the study, it will be possible to put forward a model proposal for the provision of health services in case of a global epidemic. In addition, in the COVID-19 pandemic, it is thought that the Ministry of Health will allow the evaluation of the health system and health service delivery.
Keywords: Health system; performance; pandemic.

ÖZ

Koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisi, insan sağlığı üzerindeki etkisi ve tüm dünya üzerindeki yayılımı itibariyle en ölümcül pandemiler arasında yer almıştır. Bu salgının yarattığı etki sağlık başta olmak üzere sosyal, ekonomik ve beşerî boyutta kurumsal dönüşümlere neden olmuştur. Mevcut duruma dair sorunların belirlenmesi ve çözüm önerilerinin geliştirilmesi noktasında, sağlık sistemlerinin performansını analiz etmek, kısa vadede pandeminin etkilerini en aza indirecek olan politika önerilerinin geliştirilmesine fırsat tanırken, uzun vadede ise sağlık sektöründe hizmet sunumuna yeni perspektifler kazandırabilir. Bu çalışma, COVID-19 pandemisinde Türk sağlık sisteminin performansını değerlendirmeyi ve sorunlara çözüm noktasında katkıda bulunmayı hedeflemektedir. Çalışma kapsamında, COVID-19 salgınının ekonomik, sosyal ve teknolojik etkileri tartışılmış ve sağlık sistemi üzerindeki etkileri de değerlendirilmiştir. Ayrıca bu çalışmada, COVID-19 salgınıyla mücadelede sağlık sisteminin performansı ile siyasi ve yönetimsel sistemin yansımaları da tartışılmıştır. Bunun yanı sıra, bu çalışmanın COVID-19 pandemisiyle mücadelede atılan adımların etkinliği konusunda değerlendirme yapma imkânı da sağlayacağı düşünülmektedir. Çalışma sonucunda, küresel bir salgın durumunda sağlık hizmetlerinin sunumuna dair bir model önerisinin ortaya konulabilmesi mümkün olacaktır. Ayrıca, COVID-19 pandemisinde Sağlık Bakanlığı'nın sağlık sistemi ve sağlık hizmeti sunumunun değerlendirilmesine de imkan sağlanacağı düşünülmektedir.
Anahtar kelimeler: Sağlık sistemi; performans; pandemi.

INTRODUCTION

It is predicted that the coronavirus disease 2019 (COVID-19) pandemic, which emerged in China at the end of 2019 and then spread rapidly all over the world, will intensely occupy the world agenda in 2020. In this process, the policies, strategies and plans of countries, international organizations and health authorities are carefully followed by the public. Undoubtedly, the effects of the COVID-19 pandemic are not limited to the field of health; it also brings about radical changes in almost every field, especially in politics, economy, finance, trade, energy, agriculture, tourism, education and management. It is possible to say that the COVID-19 pandemic is also the beginning of a period that breaks the routine in the system and policy perspective in the field of health, breaks the usual patterns and questions the prevailing health system in the world. As a matter of fact, the health system model, which connects access to health services to the conditions of the market mechanism and emphasizes the role of the state in preventive health services and health promotion, has failed in the COVID-19 pandemic. Developments in this process have resurfaced the role of the state in health services, citizens' access to health services and the importance of public health services.

COVID-19 emerged in December 2019 in the form of a pneumonia epidemic of unknown etiology in Wuhan City, Hubei province of China. A new type of coronavirus was identified as the causative agent of this disease and was later named COVID-19 by the World Health Organization (WHO). As a result of clinical studies, it has been revealed that COVID-19, which is considered a relative of severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), is caused by a betacoronavirus called SARS-CoV-2, which affects the lower respiratory tract and occurs as pneumonia in humans. (1). This virus is an enveloped RNA virus that causes severe respiratory failure and belongs to the coronavirus family such as SARS-CoV and MERS-CoV, identified by determining its transmission to human on January 7, 2020 (2).

There have been five pandemics caused by respiratory viruses in the world since the beginning of the twentieth century. The first four of these were caused by influenza (Influenza A) viruses, and the ongoing COVID-19 pandemic was caused by the coronavirus strain. The Spanish flu pandemic of 1918 covered nearly 500 million people worldwide and resulted in 40-100 million deaths, today considered the worst-case scenario for respiratory viral pandemics. In the COVID-19 pandemic, a new coronavirus disease with higher mortality is observed based on the type of virus and the age of the host, and a new page has been opened in the history of medicine. In addition to this, it is still an effective anti (corona) treatment of viral and in this case there are medical, sociological, psychological and macroeconomic consequences are felt around the world and in Turkey (3). The unlimited feature of globalization manifests itself in the negative effects of epidemic diseases that go beyond borders. Because these negative effects are not only the problem of the regions and administrations where epidemic diseases are experienced, but they become widespread globally in a short time; its cost is quite heavy, both economic and social (4).

First COVID-19 cases were seen in Turkey on March 9, 2020, while the first death occurred on March 17, 2020. Various preventive measures have been implemented in certain countries; including flight restrictions, gradual suspension of all flights and prevention of entry of foreign nationals, 14 days of isolation for arrivals from countries at risk, and symptom monitoring. In accordance with the pandemic plan, actions were taken with a multi-sectoral approach and preventive measures were taken to cover the society as a whole (5). In addition to international organizations such as WHO, UNESCO and UNICEF, local governments, Ministries of Health, disease control centers, health protection agencies, research centers and universities play crucial roles at different operational levels to control and survive the pandemic (6). In order to reduce the pandemic burden, attention is drawn to the issues of case definition, finding the cases and the first case set, appropriate treatment, adequate drug stocks and containment strategy and community cooperation (7).

The COVID-19 pandemic has revealed the necessity of configuring health systems to respond to a global epidemic around the world. Although restrictions and measures for the epidemic in China have reduced new cases by more than 90%, this picture is not applicable in other countries. Many countries in Europe, especially Italy, have not been able to demonstrate a clear attitude and practice in restrictions and measures for the epidemic due to political, social and cultural dynamics. As a result of this picture, serious concerns have arisen about the capacity of the Italian healthcare system to effectively respond to the needs of infected COVID-19 patients who are infected and require intensive care. It is thought that the developments in Europe in the COVID-19 pandemic are closely related to the structure and functioning of the European Union, the socio-demographic structure, the structure and functioning of health systems (8).

VARIOUS DIMENSIONS OF THE IMPACTS OF COVID-19 PANDEMIC

COVID-19, which is declared by WHO as a pandemic, significantly affects Turkey as well as other countries in the World. Due to the current lack of a formal treatment plan and the uncertainty of the outbreak, the COVID-19 pandemic is expected to cause changes in many areas that are likely to be permanent in the long term. In other words, the short, medium and long term economic, social, human and so on. It is anticipated to cause effects. In this direction, after evaluating the economic, social and technological effects of the COVID-19 pandemic in general, its effects on the health system will be emphasized, and finally, the relationship between pandemic and health system performance will be discussed.

Economic Impacts

The COVID-19 pandemic is thought to have serious negative effects on employees, consumers, supply chains and financial markets, in short, it will cause a global economic recession. However, due to the uncertainty of the end of this pandemic, both the length and the scale of the global economic crisis that will emerge cannot be predicted (9). It is predicted that global trade will be reconstructed as a result of the serious economic losses caused by the

COVID-19 pandemic, especially in China, Italy, France, Germany and the USA (10). Due to the COVID-19 pandemic, entry and exit bans to countries that many countries have implemented as a precaution, quarantines applied in areas where the epidemic was detected, international sports and arts events, congresses and travel restrictions that are in question have directly affected the tourism sector. It is thought that the COVID-19 pandemic will cause damages that can be felt in the economies of the country for a long time and the tourism sector will be directly adversely affected by these damages (11).

Using the SIR Model (S: Susceptible, I: Infectious, R: Recovered), which defines the dynamics of communicable diseases after the COVID-19 pandemic, the study reveals a projection on the economy over the next 12-18 months, to examine the negative effects of the COVID-19 pandemic on health and economy, attention is drawn to the difficulty of the steps to be taken to reduce it (12). The uncertainty of the course of the COVID-19 pandemic and its possible effects on the economy makes it difficult for policy makers to formulate an appropriate macroeconomic policy. It is predicted that the COVID-19 pandemic, which is expected to affect the global economy significantly in the short and medium term, will have more destructive effects, especially in underdeveloped economies and countries with high population density. Therefore, by investing more in preventive health services in these countries, the fight against global epidemics can be carried out with lower costs (13).

While the priority for health systems in the COVID-19 pandemic is to reduce disease-related deaths and prevent the spread of the disease, taking measures to ameliorate the economic recession is among the priorities of states. In this direction, it is emphasized that while hygiene and social isolation are the main things to be done in terms of health in the fight against the COVID-19 pandemic, where there is no official treatment plan, economic support packages are vital (14). Coordination should be established to control the pandemic, the flow of information should be regulated, the necessary health interventions (case management algorithms, vector control) should be determined, health systems (hospitals, healthcare personnel, medicine) should be strengthened, the society should be informed and the society should be included in pandemic surveillance and control (15).

Social Impacts

It has been observed that prioritizing preventive health services such as vaccines, hygiene and protective equipment in pandemics reduces the risk of contamination and spreading, while social capital dimensions contribute positively to individuals' intention to adopt and display health protective behaviors in pandemics. Similarly, it has been stated that individuals' trust in the state and health system increases the effectiveness of the fight against pandemics. In other words, developing interpersonal communication networks, taking steps to increase social capital, increasing the reliability of the state and the health system are the key points of an effective fight against the COVID-19 pandemic (16). According to Turkey in the public COVID-19 results of a study assessing the attitude towards the pandemic that has high sensitivity people against the pandemic, it was found to show maximum effort to protect and they have an average level of social trust (17). Poor management, insufficient social cohesion and solidarity, insufficiency of vital equipment such as protective equipment, ventilator and intensive care bed, delayed managerial decisions are the biggest challenges in policy making in combating the COVID-19 pandemic. COVID-19 policies need to be addressed from a public health perspective, with intersectoral collaboration, with the global support of all countries, and a professional initiative (18). While different countries show different daily number of cases, total number of cases, and case mortality rates, it is seen that they show a similar epidemic curve. The international public and the scientific world are learning new data about the current epidemic every day. Since the outbreak is not yet over, every detail should be carefully evaluated and updates should be followed closely to monitor the epidemiological characteristics of COVID-19, in other words, the disease and risk factors and treatment methods (19).

Although there are advances in the treatment of COVID-19, it appears that there is currently no drug or treatment for this global pandemic that has a definite effect on the virus. COVID-19 is spreading strongly and effectively not only on public health but also on the economy, politics and social order. For this reason, hand hygiene, social distance and quarantine are the main points of preventing social spread in the fight against COVID-19. Undoubtedly, preventing social spreading is expected to have positive results not only in the field of health, but also in many areas such as economy, politics, management and social order (20).

As the COVID-19 pandemic affects disadvantaged groups more, the problem of inequality in access to healthcare has more devastating effects. In this framework, the issue should be handled in the perspective of social sciences and the health policies to be designed should identify and eliminate situations that lead to health inequalities, and health systems should ensure responsiveness (21). It is stated that the COVID-19 pandemic has caused serious pressure and crisis on the management, financing, service provision, medicine and medical device, healthcare personnel and health systems in information dimensions (22). Turkey and COVID-19 number of cases located in the top position in terms of overall positive number of cases in 22 countries, the number of patients who died in total, of the course of the epidemic by taking the assessment criteria the number of patients infected daily comparison and in a study that analyzes are carried out; it has been revealed that parameters such as population, area, air pollution level, number of healthcare personnel, number of hospital beds, obesity rate, happiness score, social support rate, average life expectancy are related to the performance of health systems of countries struggling with the COVID-19 pandemic (23).

Technological Impacts

It is seen that the COVID-19 pandemic brings along opportunities in many areas, especially in technology, on-line services and education, as well as its negative sociological, psychological and economic consequences, especially health. For example, based on the widespread digital learning experience that has been passed with a rapid adaptation due to the COVID-19 pandemic, it is predicted that this method will serve the development of this method all over the world, and in the near future, its

functionality will increase and become the main learning structure with the contribution of new technologies and systems (24). Similarly, the COVID-19 pandemic has also provided an opportunity to use digital technologies more effectively in health. It is thought that the difficulties in providing healthcare services in disasters and epidemics can be overcome with the widespread use of digital technologies such as tele-medicine (25).

COVID-19 seriously threatens human health, production, life, social functioning and international relations. In the fight against COVID-19, Geographic Information Systems (GIS) and big data technologies have played an important role in many aspects, including the rapid collection of multi-source big data, rapid monitoring of epidemic information, and spatial tracking of confirmations. However, the main challenge to tackle the widespread epidemic is to adjust traditional technical methods and to find strategies to improve the speed and accuracy of information delivery for social management. At the data level, in the age of big data, data no longer mainly comes from the government, but is collected from more diverse businesses. As a result, the use of GIS faces difficulties in collecting data and integrating heterogeneous data that requires governments, businesses and academic institutions to jointly encourage the formulation of relevant policies. Today and for a long time in the future, the development of GIS should be strengthened to create a data-driven system for rapid information acquisition (26).

Interaction models revealed in a study examining the role of social media platforms such as Twitter, YouTube, and Instagram in the COVID-19 pandemic show that when combined with the characteristics of each social media platform's audience, it plays an important role in the spread of information and misinformation (27). The lack of evidence-based data on COVID-19, which has been declared a global epidemic, and the disinformation emerging on social media make the rapid and objective management of the process difficult. Within this framework, with the widespread use of accredited studies, it will be possible to manage and plan this global epidemic more effectively, to clarify the current situation and to make clearer projections for the future (28).

Impacts on the Health System

The COVID-19 pandemic has shown that health systems need additional financial resources at national and regional levels to combat global epidemics. On the other hand, it is important to supply infrastructure and medical supplies such as protective equipment, diagnostic kits, ventilator and intensive care bed, as well as the need for adequate health personnel in terms of quantity and quality. It is also critical for individuals to adapt to extraordinary living conditions such as quarantine and social isolation for a long time during the epidemic process. It seems that coordination and harmony between central and local governments are among the success factors in combating global epidemics. Finally, it is expected that the picture that will emerge after the epidemic will cause the need for additional investment in the health sector (29).

By using data from 182 countries to compare health systems in the context of the COVID-19 pandemic, Kandel et al. (30) made a comparison. According to the results of the study, 52 of 182 countries have 1 or 2 level prevention capacity, 60 of them have 1 or 2 level response capacity. It turns out that 81 countries have 4 or 5 level prevention capacity, 78 countries have 4 or 5 level response capacity. 138 countries scored higher in detection dimension than other dimensions. 44 countries did not have an effective activation function for public health risks and events, including epidemics, and 102 countries were found to have 4 or 5 level activation capacity. While 32 countries have low operational capacity, 104 countries have a high level of operational capacity to prevent, detect and control an outbreak. According to the results obtained from the study, countries differ greatly in their capacity to prevent, detect and respond to outbreaks. It is noted that while half of the countries analyzed have strong operational readiness capacities, the findings from local risk assessments are needed to fully understand national preparedness capacities for COVID-19. In other words, capacity building and cooperation between countries is required for global epidemic control (30).

In the studies of Legido-Quigley et al. (29), based on the recent pandemics such as H5N1 and H1N1, based on the examples of Hong Kong, Singapore and Japan, they examined whether high-performance health systems give a more successful test in the COVID-19 pandemic; they drew attention to the importance of integration into the health system and other sectors to combat the epidemic, the spread of fake news and false information is a major challenge, and the trust of patients, healthcare professionals and the public in the state is of great importance in overcoming crises. According to the results of this study, 9 dimensions stand out in the high performance of a health system in a pandemic such as COVID-19: 1) Detection and isolation, 2) Coordination with other countries, 3) Patients' treatment being covered by social security, 4) Routine health services (coordination between hospitals, local governments and private sector, intensive care bed capacity), 5) Medicines and personal protective equipment used in the treatment of COVID-19 (masks, overalls, visors, etc.), 6) Infection prevention and control activities in hospitals, 7) Health information system and information sharing, 8) Risk communication, 9) Anxiety management (29). In other words, it is possible to say that a health system must have sufficient capacity in these dimensions in order to exhibit high performance in a pandemic such as COVID-19.

PANDEMIC AND HEALTH SYSTEM PERFORMANCE

Considering the studies emphasizing the relationship between the performance of health systems and the effectiveness of combating pandemics in the literature (8,16-18,21-23,29,30), it is considered important to investigate the relationship between performance levels of health systems and health service delivery and health outcomes in the COVID-19 pandemic. The performance approach, which came to the agenda for the first time in the healthcare sector with the World Health Report published by WHO in 2000 (31), revealed the goals of strengthening health systems and improving human health with the Tallinn Convention, which was signed and accepted by the member countries of the WHO European Region in 2008 (32). Again, in the 2009 European Health Report published by WHO, it was emphasized that improving the performance of the health system should be

a priority target (33). OECD Health System published in 2008 Studies: The report called Turkey, according to WHO's approach to health care in the performance of the equity and financial risk protection reveal their goals. In the said report, it was stated that the Turkish health system had a high performance in terms of absolute conditions and in terms of equity and financial risk protection when compared to other countries (34).

In this direction, it formed the basis of the understanding of performance management in health services that emerged in the USA and Europe at the end of the 20th century, and health reforms in many countries in a short time. The institutional structure and service delivery in the health sector has increasingly focused on the understanding of performance (35,36). The world according to these developments in Turkey, which was introduced in 2003 by the Ministry of Health, Health Transformation Program, it is possible to say that laid the foundations of performance management approach. With the Health Transformation Program, which aims to act in accordance with the principles of efficiency, productivity and equity in the organization, financing and delivery of health services, it is aimed to increase the health level of the society (37). Efficiency, quality service provision and access to health services are considered as important tools to achieve high performance in healthcare services, and these tools are the elements that constitute the objectives of the Health Transformation Program. As a matter of fact, the objectives of the Health Transformation Program are to organize, finance and provide health services in an effective, efficient and equitable manner (38).

PANDEMICS AND POLITICAL/ADMINISTRATIVE SYSTEM

The political and administrative process which Turkey has followed in its fight with the COVID-19 pandemic has been carried out within the framework of a model which is based on coordination and governance principles. The COVID-19 pandemic has revealed, once again, the importance of state capacity, trust and good governance, as well as effectiveness of the health system and strength of health infrastructure as effective factors in combating crises. Another lesson the COVID-19 pandemic has taught us that governments need to have a solid and good working public administration structure in order to quickly cope with the crises and produce widespread and effective responses to the crised they have encoured whatever the nature and extent of the crisis may be. In this context, another complementary parameter of social policy elements such as public health, basic services and economic protection policies is the prominence of the security/public order perspective. The healthy and transparent operation of public communication is considered as another important reason for success in combating the COVID-19 pandemic. Informing the public regularly and transparently prevents the increase of vulnerability at the social level and instills trust in the society and ensures that it survives financially, socially and mentally. On the other hand, the importance of the national capacity of countries, especially in the fields of economy, technology and health, has been evident in the COVID-19 pandemic, where the borders between countries are closed and nations are left on their own (39).

It is also seen within the framework of COVID-19 pandemic that the political and administrative structure and functioning of the Turkish health system as well as the structure and functioning of the Turkish healthcare system are decisive on the process and outcome. Indeed, in 2017 the Constitutional Referendum and the political system changed in Turkey after the 2018 elections; a presidential system, in which the President uses the executive power defined in the Constitution, has been introduced. Significant changes in the role, functioning and organizational model of the Ministry of Health in the Presidential Government System have come to the fore (40). It has been observed that the Presidential Government System can give early, fast and decisive responses to such crises as the COVID-19 pandemic, unlike the parliamentary system, with its rapid and determined policy-making process (41).

In this process, the recommendations and decisions of the Scientific Committee established within the Ministry of Health were implemented without delay. At the same time, it has been observed that all ministries, especially the Ministry of Health, and other official institutions act jointly. The harmonization of state institutions has accelerated and facilitated the taking of measures. Turkey is unprecedented in the process of propagation of the epidemic in point Ministry to take measures in matters within their areas of interest and negative statements in coordination with other Ministries execution. From this point of view, it is evaluated that the Presidential Government System passed a successful test in the COVID-19 pandemic (42).

As it is quite well-known, Turkey and Iran exhibit many similarities in terms of population, and a number of other human development criteria. In a comparative study of these two counties in terms of their performance at fight against COVID-19 pandemic, a number of interesting results have been revealed. According to the above-mentioned comparative study, number of the cases and speed of the infection spread are similar in both countries, but the death toll in Turkey is much lower, when compared with Iran.

The prime reason for the relative success of Turkish government in its fight with COVID-19 pandemic would be the fact that the Presidential Government System allows the health bureaucracy and other institutions to act in a coordinated manner. Some other factors impacting on this result include economic differences between Turkey and Iran, relatively strong financial position of Turkey and the fact that Turkey has had more health resources such as intensive care unit, medical equipment and test kits (43).

Another study evaluating Turkey’s strategies against COVID-19 pandemic has revealed that, the reasons for this success can be attributed to measures taken in order to maintain social distance among citizens, travel ban on visitors from high risk countries; quarantine measures for citizens returning from such countries; and the implementation of various restrictions such as the closure of educational institutions, shopping centers and entertainment venues. Having a young population of Turkey is ready adequacy of health personnel and health facility also has the capacity to provide a significant advantage in this context. According to the results of the research mentioned above, the regular sharing of current

data and information on the subject with the communication and information network of the Ministry of Health contributes to the awareness of the citizens and creates trust (44). In other words, domestic and international travel restrictions, curfews, quarantine, tourism and accommodation facilities, restrictions on wedding, engagement ceremonies, funeral organizations that allow citizens to be found together, closure of workplaces and flexible working arrangements, law enforcement and inspection and controls, etc. The administrative measures taken enabled the COVID-19 pandemic to be kept under control (45).

In another study examining the role and function of central and local governments in the COVID-19 pandemic based on various countries, central governments' travel restrictions, increasing the capacity of health services, without applying financial and economic measure packages, banning the use of schools and various meeting areas, mandatory quarantine practices. It has been observed that it has carried out many activities, ranging from informing citizens about combating the virus.

It has been observed that the services that local governments try to provide to citizens within the scope of combating the COVID-19 pandemic are mostly services for local people (for example, public transportation, food and accommodation support, regulation of urban traffic and information activities). Therefore, extraordinary periods such as the COVID-19 pandemic have shown the necessity of central government and local governments to provide services to citizens in cooperation and coordination. Combining the points where central government and local governments are advantageous in service provision and cooperating by establishing coordination between them will provide faster, effective, efficient and fair service to citizens (46).

CONCLUSION

At the point of analyzing the social, human and economic effects of the COVID-19 pandemic, especially on health, determining the problems and developing solutions; it is important to reveal the relationship between the performance of the health system and health service delivery and outcomes in global epidemics. With the Health Transformation Program accessibility of Turkey's health system, satisfaction, service delivery, the high performance demonstrated in many aspects, especially hedge, and it seems so it provides significant improvement in health indicators (47).

In other words, detection and isolation, coordination with other countries, treatment of patients under social security, provision of routine health services (coordination between hospitals, local governments and the private sector, intensive care bed capacity), drugs and personal protective equipment used in the treatment of COVID-19 (it is expected to contribute to the evaluation of the perceptions of citizens and healthcare professionals about the performance of the Turkish health system in terms of masks, overalls, visors, etc.), infection prevention and control activities in hospitals, health information system and information sharing, risk communication and anxiety management.

The COVID-19 pandemic, which has affected the whole world, has brought significant changes in almost every field, especially in the health system. The process of change has negative aspects as well as some positive aspects. For example, changes that will occur in the field of digitalization in the long term have entered our lives extremely quickly in the COVID-19 pandemic. Undoubtedly, in the COVID-19 pandemic, especially health systems, economy, education, technology, management, etc. It is important to identify problem areas in many areas and to implement effective and fast solutions. At this point, it is imperative that health systems show a high performance in combating a global epidemic such as the COVID-19 pandemic.

The COVID-19 pandemic has brought about radical changes in almost every field such as healthcare, economy, politics, management, technology, and education. Undoubtedly, this process has revealed the necessity of structuring health systems in a way that can respond to a global epidemic. Developments in this process have reaffirmed the role of the state in health services, access to health services and the importance of public health services. However, the fight against the COVID-19 pandemic is so multidimensional and complex that it cannot be addressed solely from the perspective of the healthcare system and healthcare services.

In combating the COVID-19 pandemic, it is beneficial to consider the political and administrative process from a coordination and governance perspective. Undoubtedly, the political and administrative system is a determining factor in combating the COVID-19 pandemic. At this point, the process of determining the swift and decisive policy of presidential government system in Turkey is thought to contribute to the success of that struggle. On the other hand, it has been observed that cooperation and coordination between central government and local governments are also important in this process.

Ethics Committee Approval: Since our study was a review, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: HA; Design: HA, HK; Data Collection/Processing: HK; Analysis/Interpretation: HA, HK; Literature Review: HA, HK; Drafting/Writing: HK; Critical Review: HA.

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Invited Review / Davetli Derleme
doi: 10.18678/dtfd.896478

Duzce Med J, 2021;23(S1):38-42
Düzce Tıp Fak Derg, 2021;23(S1):38-42

Challenges and Responses of Uzbekistan During COVID-19

COVID-19 Döneminde Özbekistan'ın Karşılaştığı Güçlükler ve Uygulamaları

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 13.03.2021
Available Online /
Çevrimiçi Yayın Tarihi : 14.03.2021

ABSTRACT

Like the rest of the world, the coronavirus disease 2019 (COVID-19) pandemic showed an unprecedented impact on healthcare system and economy of Uzbekistan. Due to lack of resources, stalled organizational agility and highly bureaucratic decision making, the healthcare system of Uzbekistan did not perform optimally. From the top to the bottom decision-making and path dependent strategies were adopted that were ineffective due to volatile and uncertain nature of pandemic. The whole system collapsed because of lack of beds, medical supplies and personal protective equipment (PPE) for healthcare workers. The Uzbek government needs strategic plans to keep a fine balance between the economic recovery and spending on deteriorating healthcare system. Unlike many Commonwealth of Independent States (CIS) countries Uzbekistan didn't deny the existence of COVID-19 in the country. However lack of transparency in data dissemination creates doubts of the intent and accuracy of the information. Uzbekistan would have to apply medium and long-term initiatives and foreign assistance to strengthen the macroeconomic structure and to fight with the inflation and unemployment.
Keywords: COVID-19 pandemic; health management challenges; Uzbekistan.

ÖZ

Tüm dünyada olduğu gibi, koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisi, Özbekistan'ın sağlık sistemi ve ekonomisi üzerinde benzeri görülmemiş bir etkiye yol açmıştır. Kaynak yetersizliği, sağlık sisteminin işleyişindeki yavaşlık ve uzun bürokratik karar alma süreçleri, olumsuz etkiyi arttırmıştır. Pandeminin yapısından kaynaklanan belirsizlikler ve sürekli değişkenlikler dolayısıyla, tüm yönetsel kademelerde etkinlik sağlanamamıştır. Yatak sayısındaki yetersizlik, tıbbi malzeme kısıtı ve sağlık çalışanlarındaki yetersizlik nedeniyle tüm sağlık sistemi çökme noktasına gelmiştir. Özbek hükümetinin ekonomik iyileşme ile kötüleşen sağlık sistemi harcamaları arasında iyi bir denge sağlamak için oldukça kapsamlı stratejik planlara ihtiyacı vardır. Pek çok Bağımsız Devletler Topluluğu (BDT) ülkesinden farklı olarak Özbekistan, COVID-19 pandemisinin ülkede etkili olduğu gerçeğini inkar etmemiştir. Ancak veri paylaşımındaki yetersiz şeffaflık, bilginin doğruluğu hakkında şüphelerin artmasına yol açmaktadır. Zaten uzun yıllardır ekonomik ve sosyal hayatta önemli sorunlarla boğuşan Özbekistan'ın, pandeminin de kötüleştirdiği sağlık sektörü başta olmak üzere, enflasyon ve işsizlik gibi sorunlarla mücadele etmek ve makroekonomik performansını güçlendirmek için orta ve uzun vadeli girişimlere ve yabancı yatırımlar ile dış yardımlara ihtiyaç duyacak gibi görünmektedir.
Anahtar kelimeler: COVID-19 pandemisi; sağlık yönetimi sorunları; Özbekistan.

INTRODUCTION

The first signals of upcoming coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection from Wuhan city of China have been received worldwide at the end of December 2020 (1). The world-leading news agencies started monitoring China's situation and in January reported that Wuhan City faced a lockdown and its citizens were required to stay at home to stop the spread of the coronavirus (2) it is reviewed as the most effective measure (3). However, the preventive measures taken by People's Republic of China (PRC's) official authorities did not stop the virus from getting out of the country of origin and reaching 72 countries later in total. Strongly pressuring a global healthcare system, COVID-19 has been considered as a threat for the population and the pandemic has been declared by the World Health Organization (4).

The Central Asian region remained uninfected for an extended period in early 2020 compared to other countries. Some researchers believe that previous successful experience in prompt and adequate arrangements for preventing the severe acute respiratory syndrome (SARS) epidemic in 2003 was a ground for this phenomenon in 2020. However, firmly believing in the effectiveness of measures did not let local medical authorities manage risks accordingly (1). Simultaneously, unlike Tajikistan and Turkmenistan, Uzbekistan did not tempt to hide numbers of infected people or deny the COVID-19 existence in the country (5).

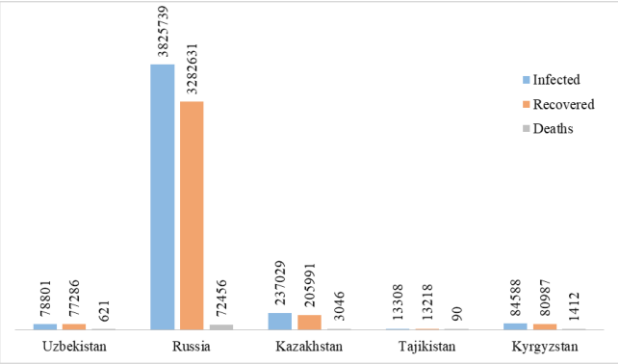

Figure 1. COVID-19 in CIS countries (6)

Uzbek Government's Response to COVID-19

The Uzbek mass media reported on the first infection case at 6 AM on Sunday, 15 March 2020. When one of the passengers arrived from Paris, France, two days earlier, was hospitalized with a high temperature and other COVID-19 symptoms such as cough and sore throat. Bakhrom Almatov - the head of Sanitary-Epidemiological Peace and Public Health Service, informed that all passengers of that flight and any other people who could potentially have contact with the infected person, all have been identified and were taken under the constant monitoring same day (7). Uzbekistan and Kazakhstan and Kyrgyzstan tried to be proactive in the implementation of a combination of measures aimed to stop or at least slow down the spread of the infection (5). As a result, Abdulla Aripov (the Prime Minister of the Republic of Uzbekistan) headed the Special Republican Commission to prevent the import and spread of COVID-19 has announced during the briefing that took place on 15 March 2020. Thus, from the 16 March 2020, Uzbekistan terminated road and air transportation and cross-border traffic with foreign countries while the local railways' company (JSC "O'zbekiston Temir Yo'llari") was given three days to prepare for the service termination. The 14-days quarantine requirement was applied following the announcement of the charter flight program for the Uzbek expatriates. Other measures included the cancellation of the public celebration of Navruz (local public holiday scheduled on 21 March) and termination of local cinema operations. Students from local medicine universities were attracted to conduct a preventive consultancy with the local population in regions. Moreover, the prime minister claimed that all Uzbekistan regions are supplied with COVID-19 testing and protection systems. Hence, he requested to increase the production of facemasks to prevent its shortage in local pharmacy shops (8).

From the same day, to prevent the spread of the infection and ensure the sanitary and epidemiological situation across pre-school, school and university levels, spring holidays were announced (9). Following the example of the PRC (10), Uzbekistan announced the building of a 10k places hospital for COVID-19 patients (11) alongside with organizing a special camp "O'rtasaroy" for incoming citizens from abroad for 14-days quarantine period. Moreover, local student accommodations were turned into quarantine centers for people within Uzbekistan (12). Quarantine measures were introduced by the government from 06 April until 27 April 2020 aimed to slow down the spread of the infection. Considering the spread and severity, Uzbekistan's regions were divided into three (green, yellow and red) zones (13).

Business Continuity Planning and Civic Response

Within the first few days after a lockdown announcement, Uzbeks started stocking up on essential goods. Local retailers HAVAS, Korzinka.uz and Macro reported that such products as buckwheat, rice, wheat flour, seed oil and hygiene products demonstrated a significant increase in demand (14). However, the active measures taken by the government on time let retailers maintain an adequate supply. To ensure that people wear facemasks, the authorities introduced a system of fines (first time warning, then 223,000 soms are to be paid on second warning and 669,000 soms on third one) effective from 6 AM 25 March 2020 (15). Keeping in mind the average income level of 2.5mln soms for that period (16), the fine proposed was considered quite punitive for the local citizens. After that period, the measures were reconsidered, and areas classified as "green" zones received more freedom.

Nevertheless, the hygiene requirements were necessary for following when entering shops and public places. However, the state police department reported an increased number of cases when people did not follow these regulations. As a result, in June, the number of infection and death cases has tripled. E.g., If in May 51 cases of the disease were registered daily in Uzbekistan, then in June there were already 163. According to the Ministry of Internal Affairs' official statistics, 71028 cases of the regulation breach have been identified, and the government raised $4.5mln of fines (17). Uzbekistan's

President declared the return back to the strict isolation measures starting from the 10 June until 01 August that was prolonged until 15 August 2020 later (18).

Such strict measures put extra strain on the vulnerable and people with psychological issues. On 22 June 2020, a suicide case took place at "O'rtasaroy" camp when a man has been found hanged inside a container. The investigation has shown that patient hanged himself due to psychological problems (19). Prolonged quarantine periods led to the financial stress for already dwindling financial position of general public. At the time, when the US or Hong-Kong paid approx. $1200 to every citizen monthly (since many of them were put on remote work or lost their jobs) nothing similar was planned in Uzbekistan. The local authorities identified around 120 000 most vulnerable families during 20-days quarantine and allocated them with free foods or financial aids (20). However, such initiatives were not sufficient and increased health vulnerability of financially strained population.

Challenges

Central Asia was once quite closed and isolated with global networks. Uzbekistan improved its position in terms of openness and foreign exposure since 2016. The lucky escape from the SARS outbreak in 2003 lead authorities a wrong assumption of having appropriate system in place in case of pandemics (1). The biggest challenge that Uzbekistan faced was lack of preparedness in terms of healthcare responsiveness and agility. The top to bottom decision-making and path dependent strategies were adopted that were ineffective due to volatile and uncertain nature of pandemic. The whole system collapsed because of lack of beds, medical supplies and personal protective equipment (PPE) for healthcare workers (21). Many hospitals refused to entertain anyone with symptoms similar to COVID-19 and fever even though the patients were facing other diseases. Emergency services did not answer calls or send ambulance for many patients due to non-availability of proper services (5). During first wave, the preparation very much focused cities (1) whereas large population living in rural or remate were largely ignored that lead to an increase in number of deaths in Karakalpakistan and Jizzakh regions of Uzbekistan (6). Ignoring such large number of population left rest of healthy population at the risk of exposure and re-emergence of the disease. Another dynamic of flattening the curve strategy was creating awareness and limiting movement of population. Considering the fragile nature of industry and small business, it was very hard for Uzbek government to prolong hard lockdown in order to provide livelihood to people. Enforcement of lockdown and facemasks was not effective despite heavy fines due to religious and cultural values and collective culture.

The COVID-19 pandemic has demonstrated the vulnerability of not only ordinary people but also entrepreneurs. Uzbekistan services sector was very badly affected due to strict lockdowns and closure of the business centers. Most businesses tried to cut their overhead expenditure b laying off or stop paying their workers. Uzbekistan was heavily relying on foreign remittances of expatriates living in Russia, South Korea, UAE and Turkey that were laid off and sent back home, adding more strain to unemployment. Similar to the world's declining trends (22) while Food and Beverages (F&B) companies remained partially open due to Uzbekistan's food delivery services, fitness centers and tourism agencies reported their customer database decreased up to 60%. The government's program aimed to support the F&B sector included the tax exemption until 2021. However, the same approach was not adequate for tourism agencies since no revenues were demonstrated. Learning centers managed the implementation of online teaching approach but reported the internet connectivity issues across the country (especially in suburban areas). Another problem raised by local mass media was the tendency to hide the real statistics of infected cases in the third quarter of 2020 by the Governmental Statistics Centre (23). Official stats published by the Uzbek Ministry of Health could have been inaccurate or even false. The Ministry stopped providing detailed statistics by region. Moreover, as mentioned, they no more indicate the gender, age, initials of names and place of residence (treatment) of deceased patients with COVID-19 (23).

CONCLUSION and FUTURE PROSPECTS

Uzbekistan response to COVID-19 provides interesting insights about governance of healthcare system. It has been learned that agile and inclusive decision-making could be more effective. Uzbekistan financial resources would require careful consideration about investment in economic recovery while improving healthcare as immediate priority. According to local F&B experts' forecast, the end of the pandemic will not bring the event-industry back to the pre-pandemic levels. Instead, it will be a roll-back to indicators of 2015-2016 (22). Therefore, companies are getting ready for a long-term recovery period. This can be proved from the graph below (Figure 2) indicating the initial forecast of Uzbekistan's gross domestic product (GDP) (optimistic) as per October 2019 and corrected forecast (real) as per May 2020 (24).

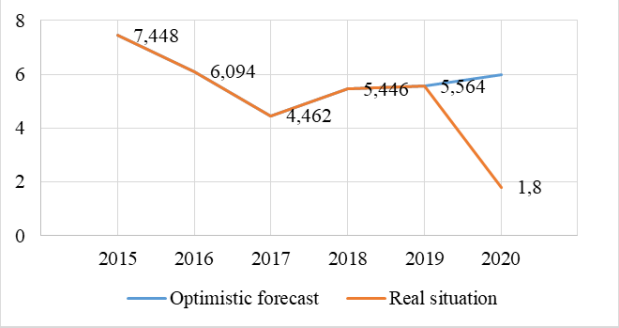

Figure 2. Uzbekistan's GDP

Recently Uzbekistan demonstrated the interest in vaccination of its population. As a result, three types of vaccine were recently ordered or already imported:

- 6000 dozes (out of which 3000 are placebo) of Chinese "Anhui Zhifei Longcom Biopharmaceutical"
- 100 dozes of Russian "Sputnik V" for certification and laboratory testing
- 100000 dozes of American-German "Pfizer/BioNtech" via COVAX program

Uzbekistan plans to continue testing the vaccines and looks forward to localizing one of the above vaccine (25).

Vaccination is expected to start at spring, and by the beginning of June 60% of the population will be vaccinated according to the Ministry of innovative development of the Republic of Uzbekistan (26). The government of Uzbekistan is applying certain medium- and long-term policy to uplift and revive dwindling industries by structural reforms. Domestic bailout plan for economic support is more likely to increase inflation and Uzbekistan must consider foreign assistance to ease of the situation. Keeping in mind the highly collective society awareness and education should be provided by the heads of communities and Imams and inclusive policy and revolving plans should be encouraged instead of quasi authoritarian plans.

Ethics Committee Approval: Since our study was a review, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: HZ; Design: WA; Data Collection/Processing: WA; Analysis/Interpretation: WA; Literature Review: TP; Drafting/Writing: TP; Critical Review: HZ.

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Invited Review / Davetli Derleme
doi: 10.18678/dtfd.898373

Duzce Med J, 2021;23(S1):43-47
Düzce Tıp Fak Derg, 2021;23(S1):43-47

Telehealth as a Panacea Amidst Global Pandemic (COVID-19) in Africa

Afrika'da COVID-19 Pandemisine karşı Alternatif Bir Çözüm Olarak Telesağlık Hizmetleri

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 14.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 17.03.2021

ABSTRACT

Technology is disrupting bringing up a better innovation and strengthening the healthcare services. Telehealth is one of these services. Telehealth can help in times of emergency situations as well as reducing morbidity caused by other diseases other than coronavirus and also constraining its spread as well as sustaining the country's economic development. Although, telehealth is a disruptive innovation, this article aimed to point out why Africa and rest of the world need telehealth to structure out the management of the three phases of health crises (pre, during and post-crises) that must be address to help in economic sustainability, increase accessibility to healthcare and increase in quality of life which in turn reduces costs and easy access to healthcare services either incommunicable, non-communicable, or disastrous situations in the African region. In fighting an outbreak such as this, our study finds that the government of African nations should guarantee all health experts get fitting instruction and preparing; present telehealth accreditation for wellbeing experts; give subsidizing which satisfactorily takes care of the expense of giving telehealth; overhaul clinical models of care; bolster all partners with a viable correspondence; and finally, change the board technique while setting up frameworks to oversee telehealth benefits on a standard premise.
Keywords: Telehealth; Africa; COVID-19; global pandemic; coronavirus.

ÖZ

Teknolojide yaşanan gelişmelerin getirdiği inovasyon, diğer birçok sektörle birlikte sağlık sektöründe de sağlık hizmetlerinin kalitelendirilmesi konusunda kullanılmaktadır. Sağlık sektöründe uygulanan teknolojik uygulamalardan birisi de telesağlık hizmetleridir. Telesağlık hizmetleri acil durumlar başta olmak üzere diğer birçok hastalıkta ve son dönemde yaşamakta olduğumuz koronavirüs pandemisinin yayılmasını azaltmaya yönelik uygulamalar ile daha fazla gündeme gelmekte ve bu olumlu özellikleri nedeniyle de sürdürülebilir kalkınma süreçlerine önemli katkılar sağlamaktadır. Bu çalışmanın amacı Afrika'dan başlamak üzere tüm dünyada uygulanan telesağlık hizmetlerinin pandemi öncesi, pandemi sürecinde ve pandemi sonrası dönemlerde neden telesağlık hizmetlerine etkin şekilde başvurulması gerektiğinin altını çizmektir. Gerçekten de Afrika'nın ulaşılabilen, ulaşılamayan ya da doğal afetler yaşanan birçok bölgesinde etkin, düşük maliyetli, yaşam kalitesinin yükseltilmesini hedefleyen sağlık hizmetlerine daha yüksek erişim sağlamanın yanında ekonomik sürdürülebilirliği de amaçlayan çok güçlü imkanlar sağlaması dolayısıyla telesağlık hizmetleri oldukça dikkat çekici şekilde uygulanmaktadır. Bu çerçevede bu çalışmamızda halen yaşamakta olduğumuz pandemi gibi salgınların yaşanması durumunda tüm Afrika ülkelerinden başlayarak sağlık çalışanlarının telesağlık hizmeti verme konusunda hazırlıklı olması; telesağlık hizmetlerinin tüm ülkelerde akredite olması; telesağlık hizmetlerinin etkin şekilde verilebilmesi için hükümetlerce sübvansiyonların sağlanması; klinik bakım modellerinin gözden geçirilmesi ve son olarak, standart telesağlık hizmetlerini denetlemek için tedbirler, kurallar ve regülasyonların oluşturulması süreçlerinde yönetim kurulu tekniğinin değiştirilmesi hizmetlerin kalitelenmesi açısından üzerinde durulan konular olmuştur.
Anahtar kelimeler: Telesağlık; Afrika; COVID-19; pandemi; coronavirus.

INTRODUCTION

The spread and number of cases from a zoonotic origin virus called 2019-novel coronavirus (2019-nCoV) are alarming (1). The World Health Organization (WHO) declared the spreading contagious virus as the first pandemic ever happen by the coronavirus family as of 11 March 2020 (2). WHO risk assessment for the pandemic is "globally=very high", recorded African Region confirmed cases is 46,829 as of 12 May 2020 according to the WHO coronavirus disease 2019 (COVID-19) Situation Report-113. Government, business, industries, and public sectors are all in a terrific situation and not prepared for the crises especially for the Africa Health services. Seeing the havoc done by COVID-19 especially in health service and global economy, governments are getting set for the worst (3). COVID-19 is a respiratory pandemic, which means most of the patients are vulnerable to the virus particularly geriatrics, chronic obstructive pulmonary disease (COPD), asthma, and immunodeficiency (4).

Technology is disrupting bringing up a better innovation and strengthening the healthcare services, Telehealth has been in existence but with limited impact due to lack of knowledge about its potential, unwillingness to accept the new system and many more factors both in developed and developing countries. Health Resources and Services Administration described "telehealth" in a whole as involving electronic and telecommunications technologies to "support and promote long-distance clinical health care, patient and professional health-related education, and public health and administration." (5). Telemedicine (telecare) is a subset of telehealth, the Centers for Medicare & Medicaid Services explains "telemedicine" systematically as activities involving "two-way, real-time interactive communication between the patient and the physician or practitioner at a distant site." (6). COVID-19 is a communicable virus which most government has declared quarantine to reduce face to face contact even in the hospitals. Healthcare service is a necessity for the population in disasters, crises, or pandemic in order to avoid a long time a decrease in quality of life. Telehealth is an essential tool that can help in the management of patients monitoring, prescription, and diagnoses that won't require a laboratory test as well as reducing long hour hospital queue, exposure to the coronavirus, hospital-acquired infections, hospital admission, and re-admissions thus increasing social distancing as one of the major factors in constraining the virus from spreading (3,7).

According to the WHO African region, 2018 edition, Atlas of African health statistics, most of the countries in the African region did not meet the target of the Millennium Development Goals (MDGs). The WHO region classify Africa as one of the sixth in its region with 2.6% estimated annual population growth speed, much higher than Eastern Mediterranean, South-East Asia, Americas, Western Pacific, and Europe with the respective percentage 2.0%, 1.3%, 1.1%, 0.7%, and 0.3%. However considering the population of Africa, Nigeria was classified as sixth of the most densely populated country in Africa Region. In Comparison to other WHO region in 2015, African had the lowest healthy life expectancy although with a decreased rate of crude birth and death (8). Africa region's healthy life expectancy, health services and improvements in quality of life can be improved and strengthen with telehealth in the era of COVID-19.

This article aimed to point out why African and rest of the world need telehealth to structure out the management of the three phases of health crises (pre, during and post-crises) that must be address to help in economic sustainability, increase accessibility to healthcare and increase in quality of life which in turn reduces costs and easy access to healthcare services in communicable or non-communicable disease settings, or disaster situations in the African region.

TELEHEALTH AS A PANACEA

Telehealth can help in times of emergency situations as well as reducing morbidity caused by other diseases other than coronavirus and also constraining its spread as well as sustaining the country's economic development. Telehealth and telemedicine has previously been applied in the past cases of pandemic and epidemic situations (3). Especially in developed countries, which proved a significant positive result in the country's economic and health outcome. Doarn et al. (9) reported that telemedicine has been a source of aid to governments in a disastrous situation for the past previous years. Since 2013 the North Atlantic Treaty Alliance (NATO), an international military alliance for support, integrated a multinational Telemedicine System with evidential positive results in various crises. Through which teleconsultant and other health support were achieved (10). China decided to focus on telehealth and electronic collaborative medical services after the 2003 severe acute respiratory syndrome (SARS) epidemic outbreak (11).

McDowell et al. (12) conducted a 12-week pilot schemed study on 21 COPD patients by uploading a telehealth system with each patient personal information, quality of life (QoL) was measured by St. George's Respiratory Questionnaire (SGRQ) which displayed a significant improvement in COPD patients and patients acknowledging the scheme as a successful one. This was supported by Koulouri et al. (13) an investigated study of QoL among people working in Shipbuilding Industry compared with a control group. Telemetry technique was used which transmit the message immediately to the specialist and diagnoses is made with immediate effect in accordance with the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines, most workers in the ship zone had advanced-stage COPD compared with the general population (control) without knowing. Health experts have seen the fatal effect of late diagnosing of COPD and so telemetric was introduced for fast detection of COPD to avoid the fatal effect and increase in quality of life through telehealth more than the traditional method because of the easy accessibility to the physicians.

Telehealth can decline the rate of re-hospitalization, mortality rate as well as cost and time-saving. Biermann et al. (14) staged a prospective randomized trial with 43 diabetic patients to access if telemanagement has a significant positive impact on time and cost-saving. The result indicated a substantial amount of time can be secured compare to hospital face-face visit, the cost analysis revealed a cost saving of ≈650 EURO per year per patient if telehealth system is applied, the study concluded that telehealth has a positive impact on time and cost

saving for both physician and the patient. Goldberg et al. (15) pilots randomized controlled trials that involved 208 patient with Class III-IV New York Heart Association heart failure stage, the study investigated the impact of the telehealth home monitoring system for 6 months. The result indicated a negative outcome in the patient rehospitalization rate but a significantly positive reduction in the mortality rate by 56.2%. The Cochrane A review conducted by Inglis et al. (16) validates the results of Goldberg et al. (15), the study pointed out a significant decline in hospital re-admission rates among heart failure patients that received telemedicine. Kim et al. (17) analyzed the key role of telemonitoring in QoL, distress, and anxiety randomly in advance cancer outpatient. The result indicated an increase in QoL, Karnofsky score (32 to 66) and a decrease in suicidal attempts by using the telehealth system.

Furthermore, telehealth plays a crucial role in the psychological effect of the COVID-19 pandemic. Telehealth or more precisely telemental health services is the practical accurate feasible system to use in supporting patients, family members, nonclinical staff, and health service providers during this pandemic. Psychological symptoms accompany by the pandemic have already been observed in populations (governments, students, workers, and families). Stress due to the fear of recession the pandemic may induce due to shut down of businesses, industries, and unemployment (18). If these psychological effects are ignored and unattended to, this may have a long-term health effects on the population (19). Telemental system have shown significant positive effects in psychological distress in diverse ways especially in depression and anxiety (20), post-traumatic stress disorder (PTSD, 21). Some telemental channels have been used successfully and proven to be an effective channel in COVID-19 pandemic, videoconferencing (22) and online forum/service (23). 2019-nCoV was first prominent in China, China government has taken an active step into implementation of telehealth system by providing psychoeducation, monitoring, counseling and training of the population through online podiums, e.g hotline, WeChat, and Tencent QQ (18). In the study of Nicolaidis et al. (24), a telemedicine program is applied in Greece aiming at the improvement of primary health services offered to Greek citizens, especially of remote and rural area. According to their results, participants admitted that Vodafone Telemedicine Program results in more efficient primary healthcare services and improves the patients' QoL.

Health care stakeholders need to reconsider and reclassify which impairment is imperative and which can be changed to non-face-to-face care (telehealth, 25). The traditional care (face-to-face) has a crucial disadvantage in constraining the COVID-19 pandemic (26). The former (telehealth) promotes social distancing and reduced cost, in contrast to the latter (face-to-face). Developing and developed countries need to implement the era of telehealth system to strengthen healthcare, build a healthy population, and increase in economic growth. Hollander and Carr (27) investigate telehealth impact in COVID-19 and reported that about 50 U.S health care systems have already implemented and uncovered the positive impact of telehealth system. Telehealth gives a flexible forum to caregiver or medical specialist and its patient to schedule a suitable time for video consultation while at home to avoid in-person travel, cost, time-saving and promoting social distancing as COVID-19 is constrained. Mercy Virtual Care Center, Sutter Health, and Sentara Healthcare implement the use of the electronic intensive care unit (e-ICU) to allow caregivers to remotely monitor the status of about 60-100 ICU patients in multiple diverse hospitals. Telehealth provides higher medical support by the caregivers allowing monitoring, consultation, prescription, and treatment of other diseases other than the pandemic with easy accessibility.

CHALLENGES AND INTERVENTION TO TELEHEALTH

Telehealth is disruptive innovation. A behavioral, willingness, acceptance, readiness, and education change is needed among physicians, patients and the governmental sector to support the new approach of care. Telehealth requires clinicians to switch from the traditional way of care and show a willingness to learn the new model of health care (28). The clinicians regulation to telehealth relies on them recognizing the potent, effectiveness, safety, strength and importance of telehealth to the health care stakeholders (29). Is expected that clinicians lack knowledge and familiarity to the telehealth system because there is little attention or limited telehealth training for medical, nurses, caregivers and allied health pre-registration curricula (30). This makes it difficult for stakeholders to switch or show willingness.

Health behavioral change for healthcare stakeholders reluctance to switch to the new system should be evaluated with the trans theoretical model, these model of health behavior change comprises of six stages: pre-contemplation, contemplation, determination, action, relapse, and maintenance (31). Marcus et al. (32) conducted a self-efficacy behavioral change study on a sample of 1,063 government workers and 429 healthcare employees in hospital, the analysis result signified employees at different stages of readiness, only 34-39% of employees reach the maintenance stage while others didn't. Tailoring intervention should be considered as part of the health behavioral change to the telehealth system. Lustria et al. (33) carried out an analysis with meta-analysis technic to compare the impact of tailored and nontailored web-based interventions on health behavioral change, the analyzed result indicated a significant effectiveness in the tailored intervention compared with the control condition while Noar et al. (34) obtained similar result with the same method. Emphatically Rakowski (35) states in his study that a good successful tailoring health intervention should focus on "focal point" as a foundation. Continuous adherence and involvement of behavioral analyst will yield a significant result in the implementation of the interventions.

Appropriate founding is a necessity for telehealth to function at a maximal level, traditionally limited founding has been the source and blame for poor healthcare services (36) especially in developing countries. According to the WHO world health report, most of Africa countries did not meet the MDGs goal by the allocation of 15% of the government's expenditure into the health sector. For the appropriate emergency implementation of telehealth in COVID-19 pandemic, a temporary founding allocation of health expenditure is needed.

CONCLUSION

Telehealth system will have a positive impact on strengthening the healthcare system, impact on healthcare stakeholders, governments and population, providing new opportunities for better health care forum between the physicians and patient, reliable upgrade infrastructure and building a healthier population, lower cost and growth in the country economy in daily practices and emergency crises as highlighted by Klein and Busis (26).

Consequently, supportive health policies should be made by policymakers. To start with, while we will be unable to precisely foresee the planning of cataclysmic events and irresistible pandemics, we can be certain that the end to such outbreaks is not near. Hence, the COVID-19 experience is certainly not a first, and nor will it be the last. Telehealth has a basic job in crisis reactions. Focal points of telehealth incorporate the capacity to: quickly send huge quantities of medical supplies; encourage triage so cutting edge suppliers are not overpowered with new introductions; flexibly clinical administrations when nearby facilities or emergency clinics are harmed or incapable to fulfill a need, and lessening the danger of transferable infections which are transmitted by individual-to-individual contact.

In summary, the government of African nations should, in this way, guarantee all wellbeing experts get fitting instruction and preparing; present telehealth accreditation for wellbeing experts; give subsidizing which satisfactorily takes care of the expense of giving telehealth; overhaul clinical models of care; bolster all partners with a viable correspondence; and finally, change the board technique while setting up frameworks to oversee telehealth benefits on a standard premise.

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Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: GNA; Design: İÖ; Data Collection/Processing: FFA; Analysis/Interpretation: FFA; Literature Review: İÖ, FVB; Drafting/Writing: FVB; Critical Review: GNA.

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Invited Review / Davetli Derleme
doi: 10.18678/dtfd.902124

Duzce Med J, 2021;23(S1):48-60
Düzce Tıp Fak Derg, 2021;23(S1):48-60

The Global Economic Hibernation: Macroeconomic Indicators and Health Management Policies

Küresel Kış Uykusu: Makroekonomik Göstergeler ve Sağlık Yönetimi Politikaları

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 20.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 23.03.2021

ABSTRACT

Considering its dire effects on different sectors, the coronavirus is far more than a health problem. The pandemic has hit the global economy starting with the developed world and now spreading into emerging economies. It is a fact that developing countries are more disadvantageous in this process since not only their health conditions and health services are not so sophisticated as their developed counterparts, but also macroeconomic conditions are not strong enough to endure such a long-lasting socio-economic crisis. Those countries are poorer and it is hard for them to allocate sources to the health sector. Comparing with emerging economies, the developed world also has been suffering from the severe effects of the pandemic. Because of long-lasting lock-down and contractions in the global economy, all developed economies revealed negative economic growth rates for the proceeding years. The purpose of this article is not only to compare the macroeconomic effects of the coronavirus disease 2019 (COVID-19) pandemic on developed and developing countries but also to assist economy authorities, health care leaders, and their organizations in anticipating and preempting problems by providing alternative health management policies rather than reacting. Macroeconomic variables data that are released by the World Bank and IMF will be applied to make the comparisons.
Keywords: COVID-19; developed countries; developing countries; macroeconomic performance; health management.

ÖZ

Koronavirüs pandemisinin farklı sektörler üzerinde yarattığı korkunç etkiler göz önüne alındığında, salgının küresel bir sağlık sorunu olmanın çok ötesinde girift ve çok katmanlı sorunlar doğurduğunu ifade etmek yanlış olmayacaktır. Öncelikle gelişmiş ülkelerde başlayan pandemi, alınan tüm küresel tedbirlere rağmen hızla gelişmekte olan ülkelerde de yayılmaya başlamıştır. Olumsuz etkileri uzun yıllara yayılacağı belli olan bu salgınla mücadele konusunda gelişmekte olan ülkeler gerek sağlık hizmetleri arzı ve sağlık altyapısındaki yetersizlikler, gerekse yerel ekonomilerin makroekonomik koşullarındaki kırılganlıklar nedeniyle gelişmiş ülkelere göre oldukça dezavantajlı durumdadırlar. Bu ülkeler, kaynak yetersizliği nedeniyle, sağlık harcamalarındaki artışı karşılayacak ekstra fonlara da sahip değildir. Gelişmekte olan ülkelerdeki bu ağır durum yanında, gelişmiş ülkeler de pandemi sürecinde darbe almış ve peş peşe açıklanan negatif büyüme oranları ile vahim tablo daha da netleşmiştir. Pandeminin etkilerinin uzun yıllara yayılması beklendiğinden, negatif büyüme oranlarının daha birkaç yıl devam edeceği tahmin edilmektedir. Bu çerçevede bu çalışmada koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisinin makoekonomik etkileri gelişmiş ve gelişmekte olan ülkeler ayrımı ile analiz edilecek ve sağlık kurumları yöneticilerinin istifadesine sunmak üzere sağlık yönetimi politika önerileri getirilecektir. Ayrıca, derinlemesine bir litaratür incelemesi yanında, Dünya Bankası ve IMF gibi küresel kuruluşlar tarafından açıklanan verilerin mukayeseli olarak ele alınacağı çalışmada, pandeminin yerel ekonomiler üzerindeki olumsuz etkilerinin en aza indirilebilmesi doğrultusunda mevcut durum ve alternatif politika önerileri de sunulacaktır.
Anahtar kelimeler: COVID-19; gelişmiş ülkeler; gelişmekte olan ülkeler; makroekonomik performans; sağlık yönetimi.

INTRODUCTION

With its unprecedented dimensions, the coronavirus disease 2019 (COVID-19) pandemic has immensely impacted both social and economic life around the globe. Actually, the outbreak created first the purely medical shocks, then the adverse economic impacts due to containment measures, and third the expectations shock which led people all over the globe to wait-and-see mode (1). With the lockdown precautions, patients could not go to hospitals and could not get required medical services either due to fear of pandemic spread, or lack of health services because of excessive healthcare service for corona patients. Furthermore, economic turmoil following the lockdown has reduced insurance coverage and the willingness and ability of households to pay for health care (2).

When the pandemic was come to the light, the first precaution of the governments was to protect the health and safety of their citizens. Therefore, great lockdowns were immediately initiated all over the world. Once the pandemic started to spread, internet technologies were highly used in all sectors, and the health sector had no exception. Internet-connected medical devices have been developed and widely used. Workers from different sectors and particularly medical sector staff had to use those technological instruments. Stand-alone technologies were digitalized and integrated with other systems. Besides, there was a rapid shift to entirely remote work to limit the spread of the pandemic. However, these precautions could neither take the pandemic under control nor has it been supported to protect the local macroeconomic conditions. However, as the process continued, deep economic problems came forth. In front of the governments, there was a trade-off: Either they would continue the lockdown and control the spread of the pandemic, or ease the controls and re-open the economic activities but take the risk of spread. While macroeconomic conditions have been deteriorating due to the great lockdown and the pandemic, the continuous increase in health expenditures and the inability to develop a concrete drug or medication model for the treatment of the disease left countries in a very difficult situation. Indeed, because of the strong health measures and economic lockdown, the global economy went to a long-lasting hibernation. Economic activities dropped dramatically all over the world. For example, economic activities fell around 1/3 in the EU overnight. No doubt that the ultimate damage of the pandemic to societies and economies would be much greater than the initial impact. (3).

It is a fact that COVID-19 triggered a global economic crisis due to the sudden stop which resulted in a depression. No doubt that the current depression is deeper than the recession of the global financial crisis in 2008. On her live webinar speech, ECB President Christine Lagarde (4) warned that the sudden stop of economic activities caused by the pandemic triggered a recession twice as deep as after the 2008 Global financial crisis, and GDP is expected to shrink by 8 to 12 % in the Euro Zone in 2020. She described the current recession as "*a massive economic crisis and one that was literally unheard of in peacetime for the damage it is causing*". Similarly, IMF (5) describes the current economic crisis due to the COVID-19 pandemic as "*the crisis like no others*" and the worst recession since the Great Depression. According to IMF (5), the world GDP growth declined to -17.8% in 2020, from 4% in 2019. The current crisis had devastating effects on people's lives. In addition to the loss of lives, people lost their jobs; many people worry about how to pay rent and bills; because of the increasing number of patients, it becomes harder to get healthcare services. In other words, COVID-19 increased the fragility of health systems. During the pandemic period, the weaknesses of local economies can be summarized as follows (6):

- *Shut-down or not:* A critical trade-off is either keeping the economy working or going to shut-down. Supporters of "economic activities should go on" asked a very critical question of "if the economy is shot-down, what can the government finance the healthcare expenditures". A supporter of the economic shut-down answered this question as "if we cannot take the outbreak under control, more and more people die, it will be more costly and the pandemic may continue many years with millions of people loss.
- *Spending priorities:* The pandemic crisis brought trade-off policies. On what should money be spent, how the budget should be executed, what is the balance between spending on primary healthcare and tertiary health sector and spending on health or other services that condition health outcomes are some of the trade-offs.
- *Lack of equity:* There is a great economic gap between developed and developing countries. While the developed countries may provide lab services for testing and health services for treatment, less developed countries may difficulty in providing these services. Even within the developing countries, richer people can get health services through the private sector whereas poor people have to wait for the government to provide tests/vaccination or work under risky conditions.
- *Left-behind groups:* Not only for social justice but also for controlling the disease, left-behind groups cannot be ignored. Vulnerabilities such as age, gender, homelessness, economic insecurity, unemployment are the basis for critical factors affecting the seriousness of the spread of the disease.
- *Links between the health sector and others:* COVID-19 pandemic affected the other sectors as well. Millions of children cannot go to school due to the pandemic and the education sector had to find alternative models with distance education. Similar devastating effects can be observed in the tourism and aviation sectors.

Due to the suddenness of precautions and measures, i.e. economic downturn, the impacts of the COVID-19 on the local economies are visible and traceable. It is not a surprise that the measures taken to solve the health crisis and economic shutdown would threaten the macroeconomic performances of the countries. It is a fact that there is a great financial burden in both advanced and emerging economies because of the current outbreak. The challenges have great impacts even on many nations with high income and well-developed health systems which indicates how deeply it may impact developing and less-developed countries with poor macroeconomic conditions and fragmented health systems. The weak macroeconomic structure of developing countries exacerbated the financial pressure on them.

Figure 1 illustrates the channels of economic impacts of the COVID-19 pandemic. According to Figure 1, there are health threats on one side. On the other side, there are economic, social, and administrative impacts that result in negative consequences on education, manufacturing, consumption, trade, and transport. These contractions cause less wage, unemployment, and exacerbating poverty with loss of human capital and infrastructure deterioration. The prevailing COVID-19 pandemic caused an increase in demand for health products and services even the best-resources health systems under acute stress. Many states have been suffering from a lack of resources. During the outbreak, partnering with the private sector could be a strategic solution. However, there are some challenges. For example, the private health sector lacks specific inputs needed to play an effective role; in the weak systems emergency legislation can limit the private sector; governments are unsure how best to include the private sector to provide health services; and private healthcare businesses faced with great financial losses during the pandemic, but governments could not support them in this process (8). In their research covering 12 low-and middle-income countries, Hellowell et al. (2) indicated that measures for flattening the curve caused a cash crunch for the private health sector. Those private health institutions had to scale back their businesses and even lay off health workers. Therefore, getting the support of the private sector may be hard for the government in fighting the outbreak.

In this context, the purpose of this study is to analyze the macroeconomic impacts of developing and developed countries suffering from the growing burden of COVID-19. Since the pandemic is still prevailing, there is still a limited number of studies analyzing the macroeconomic impacts of the pandemic on developing and advanced economies. Being one of the pioneer studies in this field will be one of the contributions of this paper to the related literature. The rest of the paper covers first the literature survey. Then, we will explain the impacts of the pandemic on the global economy applying data from different sectors. In the last part, alternative policies to cope with the pandemic will be put forth.

EVALUATIONS OF THE EFFECTS OF PANDEMIC

In the literature, there are limited papers addressing the impacts of the COVID-19 pandemic on the local economies since the pandemic and its effects are not over, yet. Evans and Over (7) expressed that deteriorating macroeconomic conditions negatively affect the healthcare services in low- and middle-income developing economies; they suffer from the impacts of the pandemic more than the advanced economies. Besides, Sembene (9) indicated that a growing number of low-income African countries will suffer from unsustainable debt burdens due to deteriorating conditions of pandemic and its macroeconomic effects. Bohmer et al. (10) pointed the global shortages of crucial materials such as masks, ventilators, incentive care units (ICU), and the number of health workers during the pandemic. The authors explained that the shortages and supply constraints require initiating policies to address both the demand and supply-side roots of the pandemic. Gupta and Jalles (11) analyzed the budgetary impact of the pandemics including SARS, N1H1, MERS, Ebola, and Zika over 170 countries. The authors found a great impact on the budgets of all countries. They also found that the impacts of pandemics

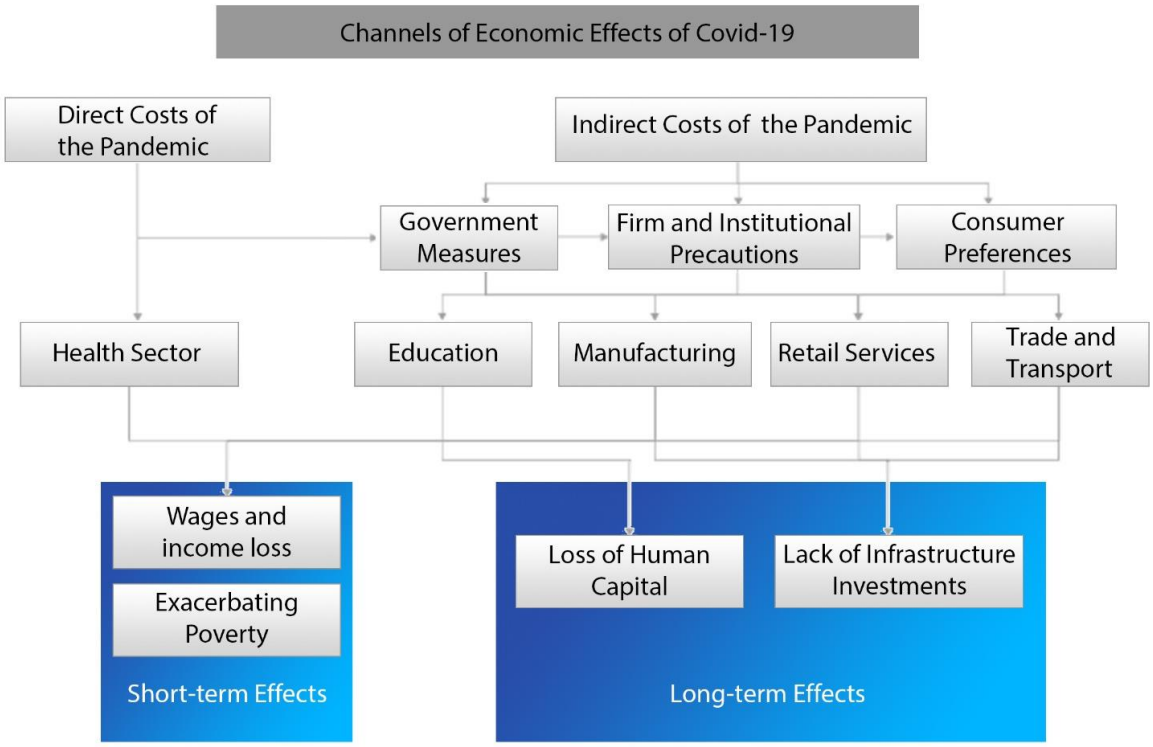

Figure 1. Channels of economic impacts of COVID-19 pandemic. Source: Evens and Over (7).

are more substantial and effects are long-lasting in developing countries due to great falls in revenues. The effects are not enormous in developed countries where revenues are less affected but expenditures than in developing ones owing to the natural operation of automatic stabilizers. Tully et al. (12) investigated the financial measures introduced by the Italian government regarding investment projects for the production and supply of medical devices and personal protective equipment. As one of the developed countries, Italy could manage to provide support to different sectors. The financing covered the form of low-interest or zero-interest loans to cover up to 75% of the investment projects. Glassman (13) also explained the dramatic consequences of the pandemic on countries across the income spectrum. The author also pointed the social consequences of the pandemic and economic recession. Adams (14) searched the effects of the pandemic on the health insurance market. She indicated that insurance premiums jumped from 4% to 40%. Cavallo (15) analyzed the impact of the COVID-19 pandemic on inflation rates in the US. The author found that the COVID-19 had an increasing pressure on the official CPI and therefore the real inflation rate was found to be higher than the official one. He found a similar negative effect of the COVID-19 on 10 out of 16 selected countries.

EFFECTS OF PANDEMIC ON GLOBAL ECONOMY

The pandemic has caused both demand and supply shocks. On the demand side, income losses, fear of contagion, and increasing uncertainty led to less spending. There is also increasing unemployment as well as postponing salary payments. Declines in the spending of consumers have caused demand shock. The great shutdown lowered production and created a shock to supply as well. Furthermore, since the quarantine caused a drop in capacity utilization, there are greater impacts on economic activities. In addition, firms could not get the parts they need in the supply chain, whether domestically or internationally, and they could not continue their production processes even though they wanted to. For example, China is one of the greatest suppliers of intermediate goods, especially in electronics, automobiles, and machinery. The bottle-neck due to the disruption caused knock-on effects on downstream firms. All these negative effects resulted in negative productivity shocks that slowed-down economic activities (16).

Since the advanced economies and China, which represent ¾ of world output, were initially more affected by the pandemic, month-to-date analyzes of the COVID-19 outbreak have been heavily concentrated on these countries. Nevertheless, as 2/3 of the world population lives in developing countries, the responses to the pandemic and current economic shock should also include actions for the developing world as well. There is increasing pressure on the developing countries' government budgets because of the public health expenditures. The social distance protections to control the spread of the pandemic caused the economic shutdown in both developed and emerging economies. In addition to the global economic problems in recent years, the lockdown policies due to the pandemic led to a great fall in employment rates. The advanced economies could manage this process by their strong administrative capacity and their fiscal power. Unfortunately, it was not the same for the developing countries. These countries had to experience contractions of incomes with falling fiscal revenues. Tighter fiscal space and a weak healthcare system brought a higher human and fiscal tradeoff with a dangerous vicious cycle for them. Furthermore, the necessity of crucial goods and services to fight the pandemic caused a further tightening in the balance of payments. (17).

The early precautions of government to the pandemic were banning the economic activities. For example, China shut down the factories, Italy closed the shops. Meanwhile, firms and schools took proactive measures to avoid infection due to government bans and business decisions. However, the result was low wages for workers, loss of jobs, less shopping, travel, and limited social activities. These measures impacted all sectors starting from the health sector, manufacturing, retail, trade and transportation, tourism, and education which reduced income both through the supply side (less production, higher prices for consumers) and the demand side (less demand, less production and sales, and higher unemployment). Those short-term economic impacts turn into a reduction in long-term economic growth. Due to excessive healthcare expenditures and fewer people's social activities, countries invest less in physical infrastructure. Similarly, as schools close, students learn less and cannot improve their knowledge in their field, and the result is reduced overall human capital for their economies. The negative impacts of the pandemic will be observed mostly in the least developed countries as well as low- and middle-income developing countries. Besides, the slowdown in the Chinese economy and reduced Chinese demand for raw materials will reduce investments in energy, mining, and related sectors. Less income in all sectors will increase the vulnerability in the travel and tourism sectors. Apart from poor African countries, 22 Asian countries including Maldives, Cambodia, and Thailand are seriously affected countries (7).

Figure 2 illustrates the annual world output percentage change over the period 2009-2021. 2020 and 2021 are estimated years. The selected period starts from 2009. In the wake of the Global Financial Crisis, there was a recovery period starting from 2010. However, there was a steady negative trend in the global output growth until 2019. As shown in Figure 2, there is a sharp decline in output from the global shutdown. Figure 2 confirms that contraction will continue in 2021 as well. Numerically, world output growth is expected to decline by 4.3% in 2020 and 4.1% in 2021.

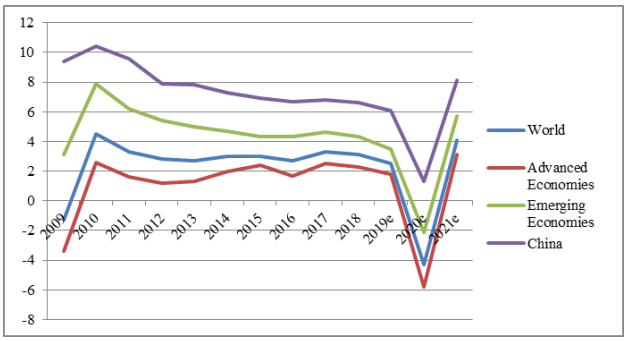

Figure 2. World output growth 2009-2021* (annual percentage change). Source: UNCTAD (17). *2020 and 2021 data are estimated

According to Figure 2, both advanced and emerging economies will have historically bad economic performances. As one of the advanced regions, in the Euro area, GDP is expected to shrink by 20-25% in 2021 relative to the 2019 level. The debt/GDP ratio indebtedness is forecasted to rise by almost 50% of GDP in 2021 (18).

CURRENT ECONOMIC CONDITIONS OF ADVANCED AND DEVELOPING ECONOMIES

COVID-19 is expected to have devastating effects on the developing and advanced European and Asian countries in different channels. The first channel is the trade and global value chains. Especially Central and Eastern European countries are highly integrated with the global trade through final goods, intermediate goods, and services. The second channel is commodity prices which are expected to affect the countries in Central Asia and Russia. The third channel is tourism since this sector is the most affected sector from both the demand and supply sides. This impact will negatively affect the less diversified countries whose economies are heavily dependent on the tourism sector as well as Turkey and the Caucasus. The fourth channel is financial and credit markets. Financial market volatility will impact the countries with vulnerable internal and external positions like Ukraine and Romania. The last channel is remittances. It is a fact that there are millions of refugees and immigrants. Western Balkans, South Caucasus, and Central Asia regions are expected to be affected the worst (19). Comparing with the other regions, the Middle East and North Africa had significant impacts of the pandemic which caused sharp declines in oil production, tourism, and remittances. Furthermore, fall in capital flows and disruptions in global value chains had dropped in domestic production in these regions. While oil-exporting countries had the greatest impact due to sharp declines in oil prices, oil-importing countries also had great GDP drops because of lack of investment and private consumption. What is more, although MENA countries have a great unemployment problem, these countries are expected to see higher unemployment rates. In the aforementioned region, the transportation sector is suffering; particularly aviation sector is deeply affected by the pandemic. The logistic sector of Morocco and Tunisia and the textile sector of Jordan are affected due to weakening international trade. Falling consumer demand reversely affected the wholesale, retail, and construction sectors (20).

In the following parts, the impact of the pandemic on different variables will be analyzed separately.

Impacts on Economic Growth

Economic growth dropped below its average in recent years in the Euro Area. While GDP growth was 0.2% in 2018-Q4, on the eve of the pandemic, it dropped to 0.1% in 2019-Q4 in the Euro Area (21). As illustrated in Figure 3, before the COVID-19 pandemic, the average growth rate of the world economy was 3% between 2017 and 2019. However, starting from 2020 with the emergence of the pandemic, there is a sharp decline in 2020. According to UNCTAD (17) baseline scenario, the world average growth rate will have a positive trend starting from 2021 and is expected to reach its 2019 value with $99,7 trillion. The COVID-19 crisis will cause almost a $12 trillion loss in global income by the end of 2021 (17).

Deteriorating macroeconomic conditions negatively affected the precautions against the pandemic, particularly in low-income developing countries. After a year in the crisis and uncertainty with the near future, the conditions brought great challenges in fighting the pandemic due to a lack of adequate financing (9). IMF provided financial support and policy anchor for the low-income countries to recover from the COVID-19 crisis. IMF initiated a $9 billion Poverty Reduction and Growth Trust which was $1.5 billion per year in the previous five years (22). To support the low-income countries, IMF also allocated the special drawing right (SDRs) have been made to provide additional liquidity to African poor countries in recent months. The issuance of $500 billion of SDRs was called for by ministers of finance of African countries. This amount was distributed across countries, regions, and income groups (23).

Impacts on Unemployment

In many countries, although manufacturing and service sectors limited their activities, governments refrained from layoffs. According to ILO (24), full or partial lockdown due to the COVID-19 pandemic affected almost 2.7 billion workers which represent almost 81% of the global workforce. Besides, working hours declined by 6.7% in the second quarter of 2020 which equals 195 million full-time workers. Also, informal employment is more in hard-hit sectors in low and middle-income countries. The highest informal employment is in Africa with a rate 71.9%. Arab states follow African countries with 63.9% informal employment. This brings loss of income and deeper poverty. Health workers, workers in transport, agriculture, and essential public service providers, workers in residential care facilities, laundry, and cleaning staff confront with serious risk of contacting COVID-19 in their workplace. Employees working in wholesale, manufacturing, real estate, transport, art, entertainment, and recreation sectors were the most affected workers. Following these sectors, agriculture, forestry, construction, financial and insurance, mining, and quarrying are the second most affected sectors from the pandemic (24). In European countries, despite the fact that there were limited productivity gains with above-inflation wage growth affected firms' profits. This strategy brought the firms to the limit of their capacity of labor hoarding. Following this fragility in the labor market, the COVID-19 outbreak and the following confinement measures taken by governments caused significant disruptions in labor markets (21). During the pandemic, many countries

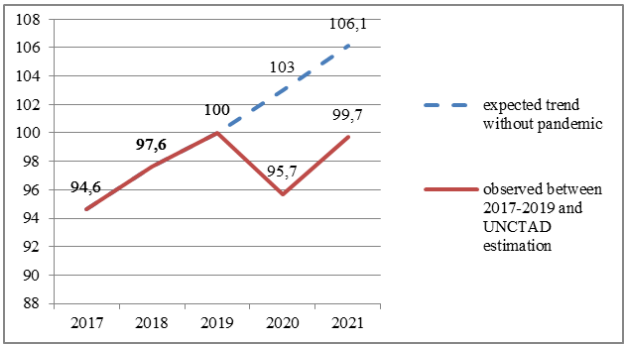

Figure 3. World output level, 2017-2021* (trillion $). Source: UNCTAD (17). *2020 and 2021 data are estimated

initiated business-cycle stimuli to prevent layoffs. Decreasing the labor costs and schemes to create public employment as well as short-term work became popular policies in the labor sector. Short-term work is a labor-market policy that subsidizes the firms to prevent layoffs (25). Besides, some countries initiated technological adoption and employment on it. Technology adoption and applying information technologies not only protect economies from the negative impact of a pandemic but also the unemployment rate increase less (26).

Impacts on Inflation

Because of the shutdown of many sectors and restructure operations, governments had great budget deficits to fund support programs during the pandemic. These problems are likely to cause inflationary or deflationary dynamics depending on the policies the governments initiate (27). For example, a sharp decline in demand for goods and services lowered inflation for many components of CPI in many countries. This situation brought a persistent lack of inflation. There will be practical challenges to measuring during the COVID-19 pandemic period (28). For developed countries, the low level of inflation caused easier monetary policy and quantitative easing programs. After the global financial crisis, in many countries, the inflation targeting strategy has been expanded. However, quantitative easing was introduced during the pandemic to alleviate the recession which may result in long-term inflation (29).

While there have been low rates of inflation in most of the developed economies, Erdoğan et al. (30) indicated that there is increasing pressure on the inflation rates due to increasing domestic money supply and exchange rate variables in developing economies over the pandemic period. The authors also pointed the spread of macroeconomic problems such as inflation to neighboring countries. In his study, Cavallo (15) confirms Erdoğan et al. (30)'s findings. The author indicated that the COVID-19 inflation rate was higher than the official CPI in the US and there were similar findings for 10 out of 16 sample countries. He also indicated that consumers spend more on food and other related categories which push the inflation rates upward whereas transportation and related categories experienced significant deflation.

Impacts on International Trade

In the early months of the pandemic, advanced countries and China implemented a $1.4 trillion stimulus. However, in spite of these supports, there were still sharp declines in economic growth rates of all countries. The negative growth rates will bring lower demand for exports for other developing countries. Sharp declines in energy and commodity prices are accompanying the export losses. Export losses will bring a fall in the foreign exchange earnings in developing countries. This will be an additional challenge to the national currency depreciation against the US dollar for these countries. The import contractions are estimated at $575 billion (17).

Figure 4 and Figure 5 demonstrate the export and import volumes of the world and the country groups. Both figures confirm the consistent declines in both developed and developing country groups and the world as a whole. Among the developed county groups, the greatest drop in trade volume is observed in the Euro Area. While the year-on-year export rate changes were 1.9%; -0.2% and 13.3% in 2018; 2019 and 2020 respectively, the year-on-year import volume changes were 2.2%; 0% and 12.2% in the same period. On the contrary, although the COVID-19 pandemic first hit China, the country had a relatively moderate contraction. Year-on-year per cent export volume changes of China were 5.4%; 0.5%; and -4.4% in 2018; 2019; and 2020. For the same period, the import rate changes were 6.9%; -0.4%; and -2% in China (17).

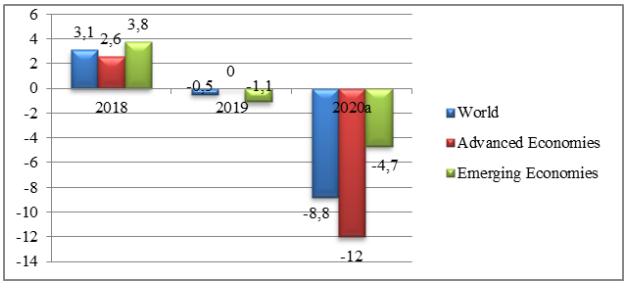

Figure 4. Export volumes of the World and country groups, 2018-2020* (% change over the previous year). Source: UNCTAD (17). Advanced economies: Euro Area, the US, and Japan. Emerging economies: China, Asia (China exc.), Latin America, Africa, and Middle East. *2020 data are estimated

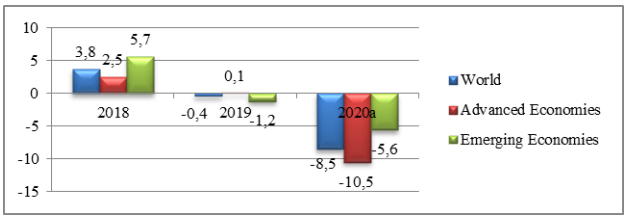

Figure 5. Import volumes of the World and country groups, 2018-2020* (% change over previous year). Source: UNCTAD (17). Advanced economies: Euro Area, the US, and Japan. Emerging economies: China, Asia (China exc.), Latin America, Africa, and Middle East. *2020 data are estimated

Impacts on the Financial Sector

COVID-19 pandemic affected the financial system through four channels (31):

- *Market risk:* Higher uncertainty with investor's insecurity together increase funding costs both in domestic and international markets for government and private sectors.
- *Liquidity risk:* Market volatility leads to higher demand for liquidity. Besides, sharp declines in cash flow affect firms and push public demand for cash that results in tightening funding and liquidity conditions for banks. This impacts lending to the private sector.
- *Credit risk:* Increasing nonperforming loans and costly lending cause loss of income.
- *Risk of earning and resilience:* The other risks weaken the earnings and profitability in the financial sector.

Because of the extraordinary conditions of the current pandemic, borrowing costs will rise and financial conditions will tighten since banks will be suspicious about the consumers' repayments of their loans. Higher borrowing costs will increase financial vulnerabilities.

Credit cuts may amplify the downturn arising from the demand and supply shocks. Furthermore, the demand and supply shocks will dampen the global activity through decreasing international trade and financial linkages which will push the commodity prices down. Besides, oil prices have fallen 30% below their levels during the shutdown period, in addition to its fluctuations in the last three years. Reliance on external financing may be risky since they may stop suddenly. Disorderly market conditions also worsen the conditions. All these improvements may require foreign exchange intervention or capital flow measures (16).

Impacts on Debt Vulnerability

While the debt burden is very risky for developing countries, it is not thought to be a risk for the Euro Area. According to the ECB President Lagarde (4) although many Euro Zone countries are raising extra debt in response to the pandemic, this is sustainable due to low-interest rates which made the costs manageable. She also added that the countries which have a better "fiscal space" will emerge from the pandemic. Therefore, the fiscal space and interest rate of the local country are very critical in debt sustainability and managing the pandemic period.

While the total external debt stocks of developing countries were $4,5 trillion in 2009, it reached $10 trillion, a new record, by the end of 2019. The global financial ecosystem was very attractive for speculative investors with short-term policy-induced boosts which led to a growing inequality rather than a sustainable economic performance or recovery of aggregate demand. Lack of sufficient strong GDP growth in the emerging economies resulted in the rise of the average ratio of total external debt-to-GDP from 25% in 2009 to 29% in 2019. If China is excluded, this figure reaches an average of 38% in 2019. Accumulating external debt absorbs the growing share of emerging countries. The ratio of total external debt-to-exports increased to 111% in 2019 from 105% in 2018. Similarly, emerging countries spent 14.6% of their export revenues to meet external debt obligations while it was 7.8% in 2011. Furthermore, not only middle-income developing countries but also oil exporter countries hit by the recent oil price fluctuations had to transfer more than a quarter of government revenues to publicly guaranteed external debt in 2019. Besides, external debt positions became shorter maturities and higher roll-over risks. Numerically, the total short-term external debt share increased to 29% in 2019 while it was 20% in the first half of the 2000s. And also, due to the fell of the ratio of short-term external debt-to-reserves to 279% in 2019 from 544% in 2009, the ability to develop countries to self-insure against exogenous turbulences and market risk became more fragile position (17). Right after the negative impacts of COVID-19 were recognized, in April 2020, the World Bank and IMF made a call and the G20 endorsed to make Debt Service Suspension Initiative (DSSI) to help up to 73 of the poorest countries manage the impact of the COVID-19 pandemic. The total external debt of those countries reached 9.5% and $744 billion in 2019 from 2018 showing the growing risk of sovereign-debt crises due to the COVID-19 pandemic (32).

Remittances, profit output, and royalty payments may also bring financial difficulties to developing countries during the pandemic period. The outbreak also caused great capital outflows from emerging countries which triggered large currency depreciations vis-à-vis the lead currencies. The countries which have a high volume of foreign debt may have difficulty in debt sustainability. This leads to debt vulnerabilities in emerging countries. At the end of 2018, total developing country debt stocks were 193% of their combined GDP. The pandemic could even worsen this rate. Furthermore, developing countries have to repay the sovereign debt of $2,7 trillion by the end of 2021. Low and middle-income countries' share in this amount is $415 billion in 2020 and $147 billion in 2021. Due to the pandemic, the debt repayment of low- and middle-income developing countries will be so challenging. Lack of capital accumulation may even cause wide-spread debt crises unless sovereign debt repayments in poor developing countries are suspended (17) expects a massive income loss of firms and households as well as adverse effects on savings and income, increasing private debt stock due to COVID-19 in the following years.

Although all central banks initiated very effective monetary policies, these policies will not be solely effective to return to the pre-pandemic levels. Therefore, further fiscal stimulus is required (17).

SECTORIAL REFLECTIONS OF THE PANDEMIC

COVID-19 pandemic has devastating effects on the sectors. In the next part, all sectors are analyzed separately.

Agriculture Sector

Due to the pandemic, agricultural commodities dropped by 20%. All of the countries around the world initiated protective measures. Self-isolation and quarantine measures had impacts on different products but mostly perishable products such as meat and vegetables. The delivery and transportation of products have difficulty in this process. Furthermore, many markets have shut down floor trading. This action impacted the ability to exchange commodities. In many countries, there was "panic buying" that caused shortages (33). The fall of commodity prices will be approximately 37% by the end of 2020, with the major declines in metals and mineral productions. Comparing with the other commodities, there is less drop in agricultural commodity prices (17).

Petroleum and Oil Sector

Oil prices had been decreasing and volatile since 2016. The volatility of oil prices may deteriorate the macroeconomic parameters. For example, while volatility in oil prices increases inflation rates, it negatively affects the growth rates (34). Problematic situation worsened during the pandemic. Oil exporter countries were adversely affected by the COVID-19 pandemic. For the first time in history, the benchmark price for US crude oil, the West Texas Intermediate dropped to negative values. The pandemic led to a structural decline in the market for fossil fuels. Further precautions such as de-carbonization strategies, wider technological changes for renewable energy usage, and sustainable development policies also reversely affected the demand for oil. The pandemic also hit oil-exporting emerging countries for two reasons. First, the dependence of most of the oil-exporter emerging countries on a single commodity (resource extraction) for their export made them extremely fragile to market volatility. Despite the fact that most of the commodity-dependent countries are in sub-Saharan Africa, in Algeria,

Iran, Libya, and Iraq oil and gas have the majority share (approximately 60%) of their total merchandise exports. Second, most of the oil-exporter countries were in a vulnerable position before the great shutdown. The pandemic caused further deterioration. More than half of the lower and middle-income developing countries dependent on natural resource exports are classified as "fragile". Those countries also have a similar strategic mistake. Most of these countries initiated wasteful infrastructure projects or overspend on consumption instead of investing in education or health services. Hence, during the pandemic, social and health services are weak and insufficient that caused vulnerable populations against the pandemic. In brief, these countries just focused on the extraction of resources rather than on improving the collective welfare (35).

Tourism Sector

The tourism industry is one of the two most affected sectors with the aviation sector due to travel restrictions and fully closed borders to take the pandemic spread under control. As illustrated in Figure 6, international tourist arrivals dropped by 70% during the January-October 2020 period. Since the Asia-Pacific region was the first geographic area that suffered the impact of the pandemic first, experienced a 79% decrease in arrivals in January-August 2020. Africa and the Middle East both recorded a 69% drop this the given period. Europe had a 68% decline and the Americas 65%. During the great shutdown between January and August 2020, 700 million less international touristic transportation recorded compared with the same period in the previous year. This loss represents $730 billion in export revenue from international tourism. Another dramatic comparison is that tourism revenue loss under the pandemic is 8 times more than the loss in 2009, the year under the negative impact of the global financial crisis. In the summer months of 2020, some destinations started to render services within the Euro Area. Besides, domestic tourism shows positive signals of recovery in several markets such as China and Russia (36).

Healthcare Sector

The COVID-19 pandemic had great impacts on different sectors, but healthcare services are probably the most affected one. There was a sudden increase in the number of patients since it was very easy to be infected. Also, while hospitals had to deal with overcrowded emergency rooms and incentive care units, they also had to choose the surgeries according to their urgency. In each phase of the pandemic, there were different challenges that the health sector workers had to cope with. Actually, there were three phases of the pandemic. *The first phase was the response phase*. The characteristic of this phase is unpredictability. Due to uncertainties in the real and expected cases, disease progression and transmission as well as fatality rates and treatment alternatives urged the health care managers to operate in a crisis management model. They had to concentrate on how to manage the contingency, optimize supply and demand for healthcare services, arrange beds for inpatients and increase testing capacity. They also tried to improve the policies to fight the pandemic and find partners in the broader ecosystem to support each other. *The second phase was the recovery phase*. In this phase incidence rates became slower, case counts started to decline and organizations could improve back capacity and implement protocols to restore. In this phase, there are vaccination allocation models, new models for preparing and testing solutions. *The third phase is thriving which represents embracing a renewed focus on health and well-being*. Developing an effective vaccine, achieving herd immunity, improving an appropriate infrastructure to manage the disease through evidence-based treatments, safety measures and protocols are some of the characteristics of this phase. In this phase, health managers can monitor, detect, and prevent future risks to devise policies to manage expected lockdowns, and train employees to thrive in digital workplaces (37). Table 1 represents the 3 phases of pandemic management.

Within each phase, the pandemic caused not only the immediate needs of patient care but also required sources to finance extraordinary health expenditures. Finally, hospitals had to compromise cash flow and concern over capital expenditures (38).

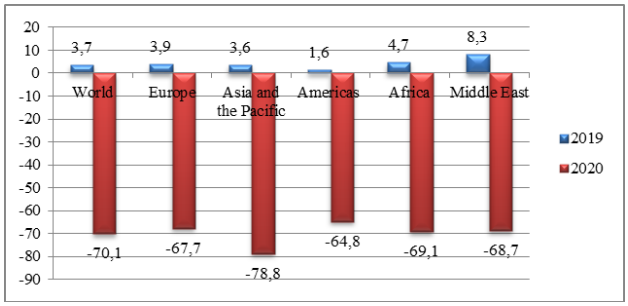

Figure 6. International tourist arrivals, 2019-2020 October (% change). Source: UNWTO (36).

WHAT SHOULD BE DONE?

Peter F. Drucker (1980) said that "*The greatest danger in times of turbulence is not the turbulence itself, but to act with yesterday's logic*". This explains how to manage the crisis in turbulent times. There is no doubt that the COVID-19 pandemic is global turbulence that humanity has to manage. Therefore instead of applying traditional methods, we need to find new and wise strategies to cope with the pandemic. It should be well-understood that combating the COVID-19 pandemic needs to think multidimensional. The problem should be managed multilateral by different parties such as health management, financing, governance, public and private sector support, and public opinion.

From the hospital management point of view, health managers should approach the problem from two sides: Managing demand and managing supply. Social distancing measures, travel restrictions, and lockdowns affected the demand. Hospital managements were also reorganized according to pandemic conditions. They had to decide which patients should stay at the hospital and which should be followed with alternative settlings such as home and telemedicine services. Some of the procedures were postponed for the patients' safety and having more room for urgent patients. And finally, using ICUs was also debated. How long patients (with or without COVID-19) should stay in the hospital and utilize an ICU was another critical decision for the policymakers and health managers. Table 2 shows the healthcare challenges, responses to these challenges, and policy recommendations to these challenges.

Table 1. Phases of COVID-19 pandemic management. Source: Deloitte (37)

Phase	Challenges	Opportunities
Respond	• Regulatory and policy barriers • Lack of ecosystem cohesion	• Acceleration of digital technologies • Integration of data sources
Recovery	• Reactivity of proactivity • Misunderstanding priorities • Managing cybersecurity and ethical risks	• Set a scale for the future • Restore a sense of trust • Focus on citizenship
Thrive	• Unpredicted risk mitigation • Defaulting to the status quo • Defining ongoing needs	• Adopt to digitally restructured workplace • Devise strategies to manage future outbreaks

Table 2. Healthcare challenges during the pandemic, responses, and policy recommendations. Source: Leite et al. (39)

Challenge	Response	Recommendation
Low bed capacity and ICU shortage	• Redesigning flow and process • move non-urgent appointments to telemedicine • Delay non-urgent surgeries and treatments • Giving more responsibilities to private hospitals	Related to the increasing number of patients, increasing need to have more bed capacity. Therefore, strategic action plans should be more proactive rather than reactive
Supply chain constraints, lack of medical device and test kits and resources	• New plan for enlargement of inventory of key sources • To overcome supply chain constraints, it may be a good solution to work closer to supplier • Cross-vertical cooperation between the sectors for key requirements	• Cooperation among the industries and healthcare managers should have inventories of key sources
Healthcare staff shortage	• Staff should be assigned to the high-priority areas and departments • Call the retired staff • Medical and nursing early graduations • Getting support from the social care sector and provide healthcare at home	• strategies and policies to increase the number of healthcare workers
Increasing demand-low capacity	• demand and capacity management • improve quality and safety • reduce costs	• try to increase capacity
A second or third wave of infection or increasing demand	• applying suitable measures • applying technology to have more coverage • continue necessary services such as cancer care • active collaboration between public, private and third sectors • more investment in health services	• to be ready for the second and third wave of the pandemic and try to make more investment in healthcare units such as pandemic hospitals and ICUs.

It is a fact that uncertainty times will continue for a while. Members of the health ecosystem need to improve alternative policies to manage this vague process. The following policy recommendations may be key factors to achieve success in this process (6,10):

- *To be aware of interdependencies between the systems and processes and taking precautions accordingly*. In other words, if there is any change in one part of the system, that may generate unintended consequences. For example, if the treatment of a patient is postponed, the decision-makers should also take the future demand for future complications into account. Similarly, if the policymakers initiate curfew or restrictions for restaurants and social recreation places, there may be negative economic effects for these sectors. Therefore, policymakers and health managers should consider available resources, bottlenecks, and capabilities. That strategy also needs to be supported by the appropriate infrastructure and technological attempts such as mobile care units, telemedicine capabilities, treatment at home, etc.
- *Forecasting sort-term demand:* It may be a good strategy to forecast the short-term future demand in critical sectors such as healthcare, education, and food. Since the beginning of the pandemic, the countries could get enough data. By checking population density, daily testing rates, and social requirements, policymakers can forecast short-term demands.
- *Managing supply-side and overcoming bottlenecks:* Shortage of protective equipment and testing materials increase vulnerability to the pandemic. Producing or importing these materials are critical issues in both health services and working life. Therefore, bottlenecks should be overcome, and not only bottlenecks today but also the ones in the future should be identified. Thus, policymakers should make the forecasting and predict future bottlenecks and take precautions today.
- *The highly interdependent supply chain may bring more bottlenecks and shifts in different sectors and departments.*
- *There has to be coordination and cooperation between the institutions and government entities*. It should be noted that sharing both physical inventory and information is important.
- *Innovating and learning in real-time*.
- *Focusing on information, fast decision-making, and learning from experiences.*

- Policy-makers should be convinced that the cost-effectiveness of investments in primary healthcare is the best response to manage the COVID-19 spending. Particularly in poorer countries, it is necessary to invest in hospitals to increase ICU capacities and the number of ventilators. It is also very important to reach a broader population for medical screening and testing for COVID-19.
- In some of the developing counties, the legislation system is not strong enough and there may be corruption and waste. Therefore, those countries should be more careful in spending. For example, China, India, and the Philippines initiated institutions to control this spending.
- Civil authorities, local governments, and NGOs can be more proactive in supporting government services.
- Countries should get lessons from "beacon countries" that could build their own public health systems. The G20 and G7 countries can play vital roles in terms of leadership and support.
- Governments should ensure that health regimes are equitable.
- Countries should accept that health systems are important for global security.

Just like the "*flattening the pandemic curve*" which explains the deceleration of the transmission rate of the coronavirus in order to have enough hospital bed, ventilators, and enough time to find the cure, and patients can be properly treated, there can be a flattening curve of "*economic infection*". The basic objective of "*flattening the curve*" is to limit the economic damage of the inevitable output of lack of production during the economic shutdown and slowdown (40). To flatten "*the economic infection curve*", governments all over the world have announced fiscal measures to control their local economies. Hong Kong declared the largest package of measures amounting to 4% of GDP. European countries such as Italy, Spain, and the UK have initiated programs of about 1.5% of GDP, mostly targeting fiscal support for households and companies (Figure 7). Some of the measures are income subsidies for affected workers, debt repayment holidays, tax deferrals, social security deferrals, and state loans or credit guarantees for companies (1).

In the early months of the pandemic, some fiscal precautions were taken initially. The fiscal stabilizers such as increasing transfers were expected to be helpful to decrease the negative effect of support economic downturn on households and firms. Some measures were taken to ensure the workers' positions even during the quarantine period. Some governments provide rent, utilities, and insurance support to their citizens. To protect the firms, governments also provided some easiness waving tax, payroll payments, suspended loan payments and provided direct assistance. To support the financial system they also took some measures (40). A well-developed financial system can do much to mitigate the negative impacts of the pandemic on the real economy. By doing so, there may be a new operation with the environment and contribute to the recovery process. Lines of credit and credit guarantees may be helpful to provide additional financing to boost investment. Exporters and firms that are integrated with macro prudential exploit the export financing, factoring, and credit insurance supports. Financial sector measurements for financial stability should also be broad, transparent, and easy to understand. Macro prudential measures should provide capital space for banks to resume lending. Countries can initiate regulatory forbearance measures. Temporary, well-planned moratoriums on loan regulatory repayments are some of the economic measures. On the other hand, freezing classification and provisioning measures should be temporary and closely monitor second-round to avoid risks for banks and customers. Besides, central banks and economy authorities need to monitor financial soundness in terms of credit and liquidity trends more precisely. To prevent second round effects of the pandemic on the economy, insolvency, and financial safety frameworks will be critical. Some of the countries' central banks have already cut their policy rates and introduced liquidity support programs for banks through repo and swap transactions. Reserve requirements can be also applied for restructured and sound financial system (31). Besides, governments should provide liquidity in emerging markets to support trade finance flows and working capital expectations of the private sector. Also, the governments should support investments that can accelerate the recovery process. Also, the demand side of the financial, manufacturing, infrastructure, retail, and agriculture sectors should be supported (19).

However, many countries have already great economic problems, large budget deficits and it is hard for them to continue a long time of economic shutdown. Sharp declines in demand and supply should be handled. Households and businesses who are hit by a great shutdown should be supported more by cash transfers, wage subsidies, and tax relief to meet their needs and businesses to stay continue. For example, Italy extended tax deadlines for companies in deeply affected areas and broadened the wage supplementation fund to provide income support to laid-off workers. Korea initiated wage subsidies for SMEs and increased allowances for homecare and job seekers. China waived the social security contributions of businesses. Unemployment insurance duration can be extended, and governments can provide extra support for unwell workers or their caregivers to stay home without losing their jobs during the pandemic. VAT for SMEs was exempted for a certain period, the social contributions of the employees were exempted or halved, and municipalities are encouraged to waive urban land-use taxes and landlords to reduce or waive the rents. The cost of utilities was reduced. The government also subsidized the local and international airlines (16,41).

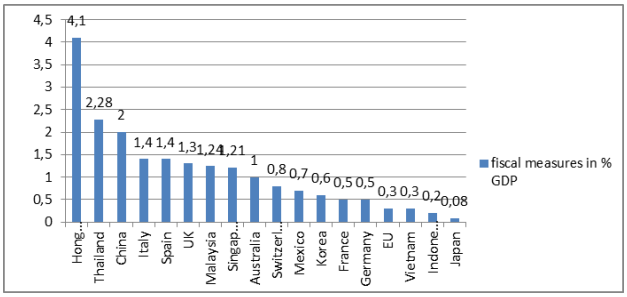

Figure 7. Announced fiscal measures of countries as % of GDP. Source: Baldwin and di Mauro (1)

While providing policy suggestions, some specific features of the countries should be encountered. For example, oil-exporter developing countries should have a different model of support strategy. Since the late 2010s, there have been declining oil prices. This process has already negatively affected these countries since their economies are highly dependent on one single resource export. These countries need to get help to ease the burden of external public debt servicing. IMF and World Bank declared a "debt service standstill", a time-bound suspension of debt service payments for the least developed countries on 25 March 2020 (42). Similar action was taken by the finance ministers and central bankers of the G7 countries on 14 April 2020. This is a very critical strategy for these countries to have immediate liquidity. However, this is just a short-term solution since it does not waive the repayment of the principal debt. Therefore, efforts for the long run should be provided. The strategies should be launched as country-based. Until August 2020, no requests to private creditors have been made. Besides, private creditors can be applied.

Broader monetary policies such as policy rate cuts and asset purchases can be supportive in the financial sector since there is an increased risk of sizable constraints in financial conditions. Furthermore, the policies and actions of large central banks may generate favorable spillover effects for vulnerable countries. In addition, broad fiscal policies consistent with available fiscal space can support lifting aggregate demand. Business operation normalization will be more effective in this process. Besides, the international community should support countries with limited health capacity. IMF declared support to vulnerable low-income and emerging countries with an amount of up to $50 billion (16).

Different from the other countries, China implemented industry policies focusing on large infrastructure investment projects and supply chains. To expand domestic demand, by the participation of many ministries, the government tried to stimulate infrastructure investments. Specific projects those are related to energy, IT, and transportation have been initiated and financed by special local government bonds (41). China also increased foreign trade credits, extend debt rollovers, and loan payments for SMEs. Commercial insurance companies were also encouraged to provide short-term credit insurance and lower fees for trading firms (41).

And finally, for successful management, political leadership is also important (43). Admitting and learning from mistakes and improvement and re-arranging macroeconomic policies depending on the current improvements are critical in managing the process. The timing is important. Doing write policies at the right time is more effective than time lagging policies. Economic supports and measures are accurately needed during crisis periods. Strict health policies can be useful to slow down the spread of the pandemic. These protections provide a larger part of the population unexposed to the disease. Hence, if governments continue the strict containment measures for a longer time, the spread of pandemics can be taken under control. China and Taiwan applied such strategies (40).

There are also new trends for real sector support for the post-pandemic period. Table 3 shows these trends.

CONCLUSION

The COVID-19 pandemic has been having devastating effects both on advanced and emerging economies. Not only healthcare services but also almost all other sectors are affected by the pandemic. Although there has been more than a year passed since the pandemic had been detected, there is neither a proper treatment nor a perfect vaccination to slow down its spread. This dark screen also affects the macroeconomic performances of the countries. Since there is interdependence between healthcare services and economic activities, both of them affect each other. While lockdowns and curfews could not stop the pandemic, opening the economic activities may provide a perfect incubation for the virus to be spread. This dilemma seems to continue at least one more year. Vaccinating whole societies can be helpful to break up this vicious circle. Meanwhile, aside from traditional macro prudential policies, some alternative policies could be initiated. Particularly health managers and economy authorities should work together to overcome the pandemic period. All parties should be aware of interdependence. Authorities should forecast the short-term future demand in critical sectors such as healthcare, education, and food. Besides, an interdependent supply chain may cause

Table 3. New trends in real sector in the post-COVID-19 period. Source: IFC (44).

Trend	Key features
The global supply chain shifts towards localization and diversification	• The strategic sectors such as healthcare, personal protective staff, food packaging, etc. get more intention. For the products that need complex value chains such as different processes of production in different countries, companies diversify their supplier base in order to have flexible sources for production. • This process is good for emerging countries such as Turkey, Morocco, and Mexico which have suitable capacities in certain sub-sectors. As an example, Chinese manufacturing shifted to Africa for local manufacturing even before the pandemic. No doubt that the pandemic process will accelerate this process.
Increasing digital transformation	• More digital applications are needed in business in the middle and long run. The technological application will be more important for efficiency and competitiveness. • More interest in digital platforms and innovative digital business models. Digital platforms will provide stronger supply chains by reducing the necessity of intermediaries. This model is beneficial for also price transparency and market-wide cost reduction. • More digital consumers and teleservices both in food purchases and health services.
More interest in impact-oriented investments	• Health and logistic sectors get more interest during and after the pandemic period. • More economic and environmental concerns. • More private sector funding in education, health investments

unexpected bottlenecks in sectors. Also, innovative technologies should be courageous both for improving new techniques for working and finding alternative treatment models. There has to be international cooperation among all countries to cope with the pandemic. NGOs and international prestigious institutions should also take part to fight the pandemic. International coordination and global cooperation are very important for fighting both economic and coronavirus infections.

Ethics Committee Approval: Since our study was a review, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: NDÇ, AG, SE; Design: NDÇ, AG, SE; Data Collection/Processing: NDÇ, AG, SE; Analysis/Interpretation: NDÇ, AG, SE; Literature Review: NDÇ, AG, SE; Drafting/Writing: NDÇ, AG, SE; Critical Review: NDÇ, AG, SE.

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Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.860733

Duzce Med J, 2021;23(S1):61-70
Düzce Tıp Fak Derg, 2021;23(S1):61-70

The Effect of COVID-19 Pandemic on Health Management and Health Services: A Case of Turkey

COVID-19 Pandemisinin Sağlık Yönetimi ve Sağlık Hizmetleri Üzerine Etkisi: Türkiye Örneği

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Received / Geliş Tarihi : 14.01.2021
Accepted / Kabul Tarihi : 02.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 13.03.2021

ABSTRACT

Aim: The coronavirus disease 2019 (COVID-19) pandemic is a global issue that every country has begun to change its economic and social policies due to sustaining public health in the long term. The aim of this study is to investigate the effects of the COVID-19 pandemic on health management and health services in Turkey.

Material and Methods: This study follows a qualitative research methodology and used secondary data sources. The study used open access data based on The Turkish Statistical Institute (TurkStat) and the Republic of Turkey Ministry of Health. Data were analyzed by Qualitative Content Analysis.

Results: According to the findings obtained, the study provides two main parts as findings. First, the study presents a current profile for the Turkish health sector including 2010-2019. Secondly, the study provides key elements indicating the effect of the COVID-19 pandemic on health management and health services in Turkey. With the help of classification, tables, and figures, the study provides original findings for the area of health management by giving what kinds of changes have occurred in health policies during COVID-19.

Conclusion: When considering the effect of the COVID-19 pandemic on health management and health services in Turkey, it can be said that Turkey has managed this pandemic period sufficiently. As a sample case, Turkish health policies and new management strategies can guide other developing and developed countries that were unsuccessful to manage the COVID-19 pandemic. This study shows that adaptable and sustainable health policies will keep public health in the long term.

Keywords: COVID-19 pandemic; health management; health services; health policy.

ÖZ

Amaç: Koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisinin küresel bir mesele olmasından dolayı, her ülke halk sağlığını uzun vadede koruyabilmek için ekonomik ve sosyal politikalarını değiştirmeye başlamıştır. Bu çalışmanın amacı COVID-19 pandemisinin Türkiye'deki sağlık yönetimi ve sağlık hizmetleri üzerindeki etkisini incelemektir.

Gereç ve Yöntemler: Bu çalışma, nitel araştırma metodolojisini izlemiş ve ikincil veri kaynaklarını kullanmıştır. Bu çalışmada, Türkiye İstatistik Kurumu (TÜİK) ve Türkiye Cumhuriyeti Sağlık Bakanlığı'na dayalı olarak açık erişim verileri kullanılmıştır. Veriler Nitel İçerik Analizi ile analiz edilmiştir.

Bulgular: Elde edilen bulgulara göre, çalışma 2 temel bölümde bulguları sağlamaktadır. İlk olarak, çalışmada 2010-2019 yılları arasını kapsayan dönemler için Türkiye'deki sağlık sektörüne ilişkin güncel bir profil sunmaktadır. İkinci olarak, çalışma, COVID-19 pandemisinin Türkiye'deki sağlık yönetimi ve sağlık hizmetleri üzerindeki etkisini belirleyen temel faktörleri vermektedir. Bu çalışma, sınıflandırma, tablolar ve şekiller yardımıyla, COVID-19 sırasında, sağlık politikalarında meydana gelen değişimleri göstererek, sağlık yönetimi alanı için orijinal bulgular vermektedir.

Sonuç: COVID-19 pandemisinin Türkiye'deki sağlık yönetimi ve sağlık hizmetleri üzerindeki etkileri göz önünde alındığında, Türkiye'nin bu süreci uygun şekilde yönettiği söylenebilir. Örnek bir vaka olarak, Türkiye'nin sağlık politikaları ve yeni yönetim stratejileri, COVID-19 pandemi sürecini yönetmede başarısız olan diğer gelişmekte olan ve gelişmiş ülkelere yol gösterebilir. Bu çalışma, uyarlanabilir ve sürdürülebilir sağlık politikalarının uzun vadede halk sağlığını koruyacağını göstermektedir.

Anahtar kelimeler: COVID-19 pandemisi; sağlık yönetimi; sağlık hizmetleri; sağlık politikası.

INTRODUCTION

Health management including sub-components as patient, healthcare professionals, hospital structural capacities, financial and insurance systems, has very complex management content that having the systematic of providing full capacity health care services to the patient in the interaction of procurement services. The healthcare system includes primary care with pharmacists, dentists, community nurses; it consists of secondary care with hospitals and clinics, and tertiary care with special units and rehabilitation services (1). As stated by Zwetsloot et al. (2), health represents a basic human value, a work value, the foundation of healthy organizations that so health and work are the most important values of employers. Although the health sector is the most beneficial and respected profession area for the society in terms of content, its working conditions are the most challenging area. For this reason, the success of human resources management in health management is the most critical issue, especially in the periods of crisis. Key components of the best practice approach in human resources can be listed as creating an atmosphere of respect and trust, the ability of employees to influence decisions, adequate reward structures and the importance of shared responsibility (3). Besides the position of health management in public administration and human resource management, financial dimension is an important area of budget planning of countries. Many providers in healthcare delivery are organized as non-profit company structures, unlike other investor-owned areas. However, in most countries' health systems, payments for services are made by third parties rather than patients receiving services (4). Healthcare financing is divided into three sections: income collection, fund pooling and purchasing. The types and combinations of these distinctions vary by country (5).

Coronavirus disease 2019 (COVID-19) pandemic process has put health, business and management systems into a big challenge. Risk and crisis management are among the cornerstones of a sector where urgent decisions such as health management are required. Risk managers in health institutions, deals daily with highly sensitive and confidential information that directly affects the public image and financial standing of the organization. The risk management specialist is responsible for coordinating risk management activities with healthcare staff members, managers at all levels of the organization, employees and external stakeholders (6). It is vital to implement operations management tools and make effective predictions for the future to assist decision making in health crisis situations (7). The COVID-19 pandemic, like other public health crises, presents organizational and managerial challenges as well as clinical difficulties (8). During the COVID-19 pandemic and possible future health crises, hospitals are required to prepare guidelines for crisis management, trainings and simulations to prepare for crises, and the establishment of teams for effective use of resources (9). Health service planners and managers, need to be aware of the potential benefits around flexibility of bed capacities, especially in allocation between acute and intensive care beds (10). Rationalizing and optimizing available resources are some of the most important lessons learned during the crisis (11). The pandemic, like every crisis management, offered long-term opportunities besides the great disasters it caused. In this respect, the most important opportunity created by the pandemic is making developments in digital health services faster and more applicable. It has made a great contribution to the self-management of the population and the protection of these patients from the pandemic, especially in mental health services (12). Pandemic management has confronted governments, managers and professionals with a significant crisis regarding the limits of health management systems. In particular, digitizing data on citizens' COVID-19 status has become an important tool in preventing the spread of the pandemic (13). Digital healthcare creates better care opportunities at a more sustainable cost while enhancing the current healthcare system (14). Along with digital health services, telehealth services also have an important place in pandemic management. Communication of all healthcare needs is important when patients need to be isolated. It is an effective tool to use telehealth as a valuable way to support both physical and psychosocial needs of all patients, regardless of geographic location (15). The telemedicine revolution will be a vital factor in future healthcare delivery (11).

COVID-19 pandemic is the worst global public health threat since 1918 influenza epidemic (16). Planning in epidemic situations and predicting the capacity to increase in the number of patients and medical management are priority issues (17). Aside development of digital systems, joint initiatives such as sharing data and findings on the pandemic with international cooperation as a type of crisis management, healthcare professionals are the main actors of pandemic management. Effective strategies are needed to support healthcare workers exposed and infected with COVID-19 to ensure effective and sensitive staff management and to build trust in the workplace (18). The pandemic has led to the neglect of general and regular health services worldwide (19). The biggest challenge hospitals face in pandemic processes is to ensure the uninterrupted operation of the system in the surgery and treatment processes of critical diseases such as cancer (20). The Ministry of Health, who served as health authorities in Turkey, have been organized in conjunction with the start of the pandemic process and has taken the necessary measures (17). Turkish Health Care Quality and Accreditation Institute (TÜSKA) examine developments in health services in Turkey is having accreditation to institutions of authority. Health accreditation standards used by TÜSKA are based on The International Society for Quality in Health Care (ISQua, 21).

In Turkey, first case was reported by Ministry of Health in March, 2020. In March 2020, World Health Organization (WHO) declared the new type of coronavirus pandemic (global epidemic). Since then Turkey has entered into a pandemic management process. In this point, this study aims to analyze the current open access data on COVID-19 pandemic and health management by descriptive findings. Thus, it is thought to provide new perspective for the impact of COVID-19 pandemic on health management and services in the context of health policies. The main contributions of this study can be examined as below:

Firstly, there has been an emerging literature on the link between COVID-19 pandemic and health management. The literature gives a few studies on COVID-19 and health management. We thought to contribute the missing area in the related literature by giving descriptive findings.
Secondly, COVID-19 pandemic is a global issue and both of developed and developing countries have challenged with COVID-19 pandemic. Successful health policies can help countries to fight against pandemic crises. In Turkey case, we aim to provide successful health implications to guide other countries during COVID-19 pandemic.
Thirdly, we used an alternative research method and give original findings based on open access data. This study can guide future studies to develop empirical studies. Giving key elements for successful health policies and sufficient health management approach will be important and so useful.

MATERIAL AND METHODS

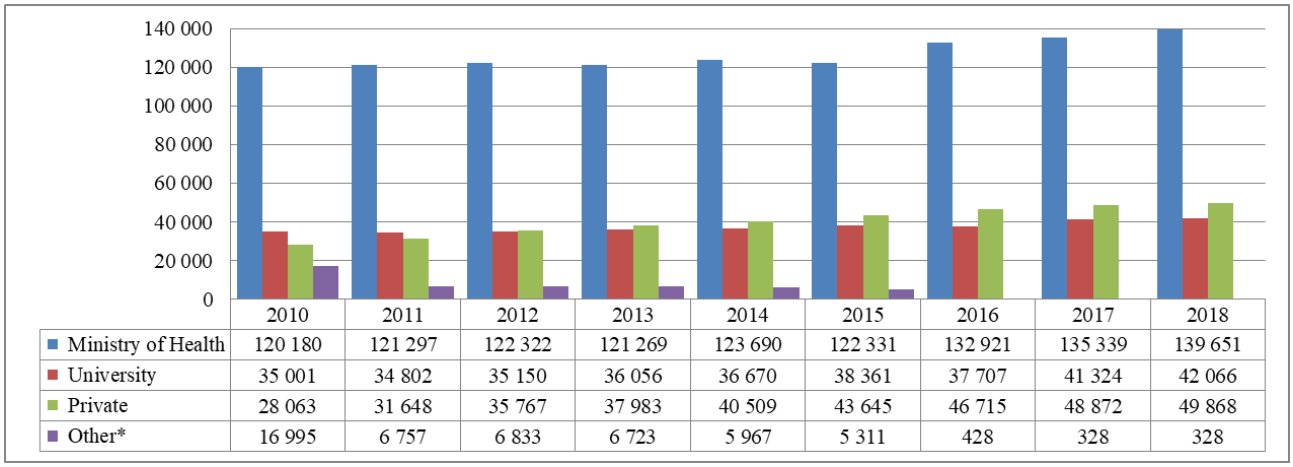
The study employs qualitative research model. The study used open access data based on The Turkish Statistical Institute (TurkStat) and Republic of Turkey Ministry of Health. Then, the study analyzed the data by Qualitative Content Analysis. Qualitative content analysis represents a systematic means of describing and explaining a phenomena by creating tables, categories, themes, contents or models etc. (22). Qualitative research models are very popular in the research areas of health sciences. Especially, complex issues and new phenomenon can be investigated by qualitative models in general (23). At this point, we prefer to examine what kind of changes has occurred in health management and services during COVID-19 pandemic by using qualitative research model. This study provides classifications, tables and figures to understand the effect of COVID-19 pandemic on health management and services.

RESULTS

This study provides two main parts as descriptive findings. First part includes the brief profile for Turkish health sector until COVID-19 pandemic and second part includes the effect of COVID-19 pandemic on Turkish health management and health services.

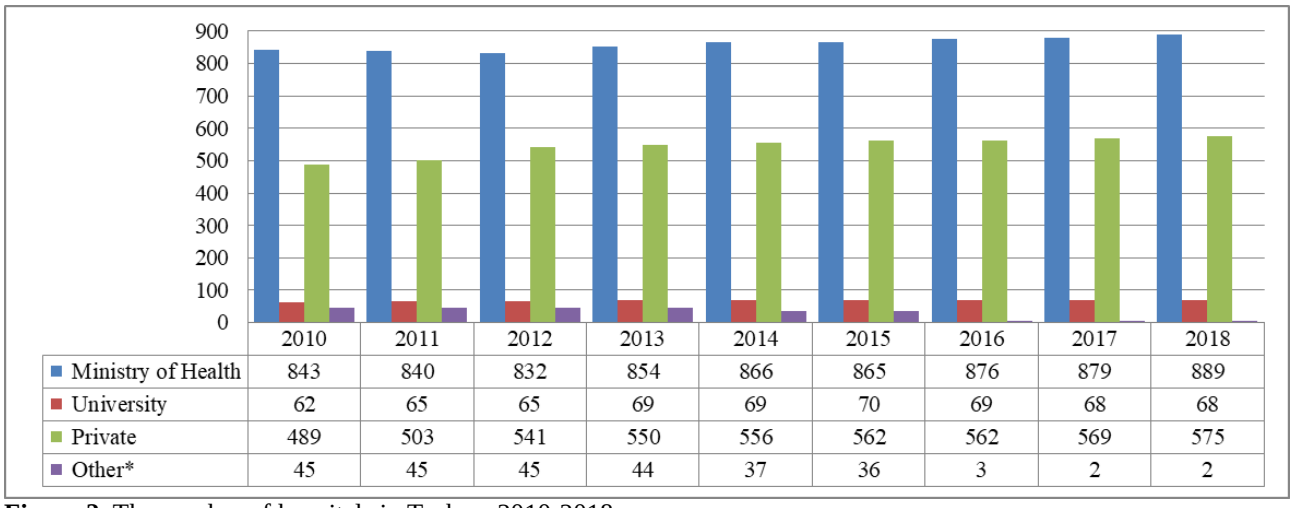
The Current Profile of Turkish Health Sector until COVID-19 Pandemic

First part of the results includes the current conditions of Turkish Health Sector until COVID-19 pandemic. To determine the current profile of Turkish health sector, we selected the periods between 2010 and 2018/2019. Accordingly, almost last 10 years can give more current findings for the health sector development. Figure 1 shows the number of hospital beds in Turkey between 2010 and 2018. Based on TurkStat data on the number of hospital beds, we selected the data of 2010 and 2018 and then made a graphic in details. In Turkish health sector, it was seen that the most of the hospital beds belonged to hospitals of Ministry of Health. Then, university hospitals and private hospitals had efficient numbers of beds.
According to TurkStat (24) data, total number of hospital beds counted as 231 913 by 2018 in Turkey. It can be said that the number of hospital beds increased almost 16% compared to 2010 (200 to 239). The numbers of hospital beds increased in keeping with the numbers of hospitals in Turkey over the time. As seen Figure 2, from 2010 to 2018 the number of hospital beds increased in Turkey. It was observed that the number of hospitals which were owned by Ministry of Health increased as 5% in 2018 (889) compared to 2010 (843). In addition, the number of hospitals increased as 17% in 2018 (575) compared to 2010 (489).
Figure 3 shows total health expenditure (million TL) in Turkey between 2010 and 2019, based on TurkStat (25). The health expenditure increased from 2010 to 2019. For example, total health expenditure was calculated as 201 031 million TL by 2019. In 2010, total health expenditure was 61 678 million TL. It can be said that Turkey has invested in health sector since last decades. As seen in Figure 4, total health expenditures were classified into some categories. According to TurkStat (25), the current health expenditure was calculated as 187 673 million TL and investment was calculated as 13 357 million TL. As it was expected, the most of expenditures was belonged to hospitals and then retail sale and other providers of medical goods had the second largest shares in current health expenditure.



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ministry of Health	120 180	121 297	122 322	121 269	123 690	122 331	132 921	135 339	139 651
University	35 001	34 802	35 150	36 056	36 670	38 361	37 707	41 324	42 066
Private	28 063	31 648	35 767	37 983	40 509	43 645	46 715	48 872	49 868
Other*	16 995	6 757	6 833	6 723	5 967	5 311	428	328	328

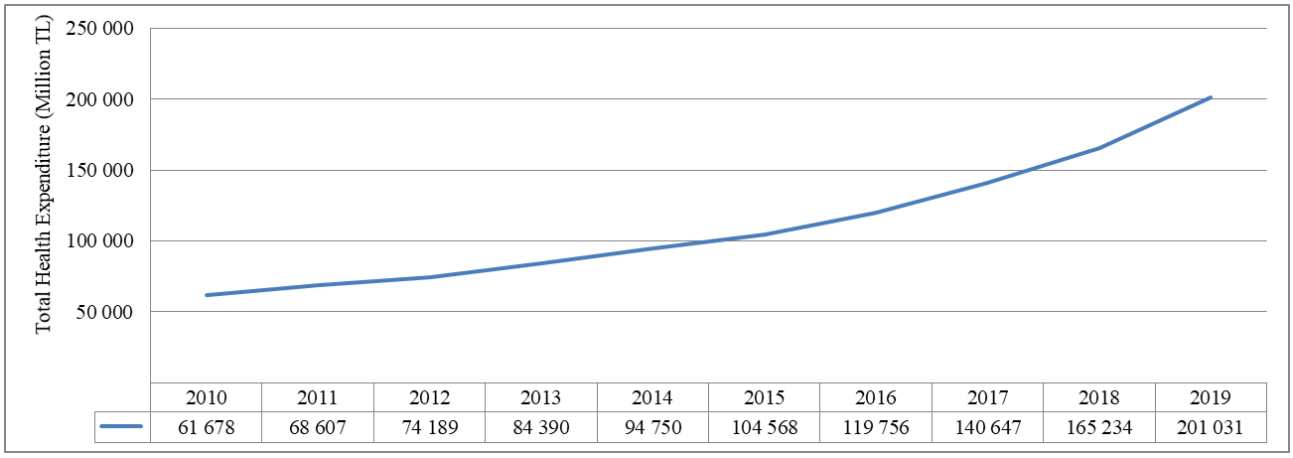
Figure 1. The number of hospital beds in Turkey, 2010-2018
*: Hospitals owned by Ministry of National Defense and municipalities between 2002-2015. Hospitals affiliated to Ministry of National Defense were transferred to Ministry of Health in 2016.



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ministry of Health	843	840	832	854	866	865	876	879	889
University	62	65	65	69	69	70	69	68	68
Private	489	503	541	550	556	562	562	569	575
Other*	45	45	45	44	37	36	3	2	2

Figure 2. The number of hospitals in Turkey, 2010-2018

*: Hospitals owned by Ministry of National Defense and municipalities between 2002-2015. Hospitals affiliated to Ministry of National Defense were transferred to Ministry of Health in 2016.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	61 678	68 607	74 189	84 390	94 750	104 568	119 756	140 647	165 234	201 031

Figure 3. Total health expenditure, 2010-2019

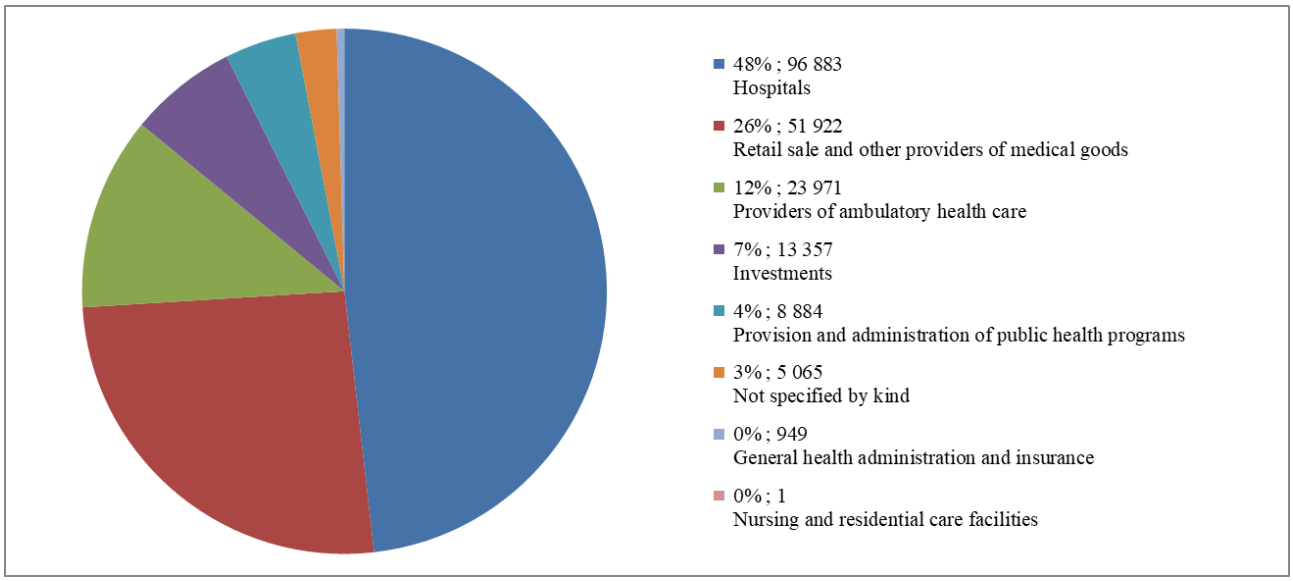


Figure 4. The distribution of health expenditures by 2019

Health expenditures are important main indicator to determine the growth of health sector in general. TurkStat (25) gave key indicators for health expenditures by years. To provide current information, we selected key indicators on health expenditures by 2019 presenting in Table 1. The biggest share of the total health expenditure

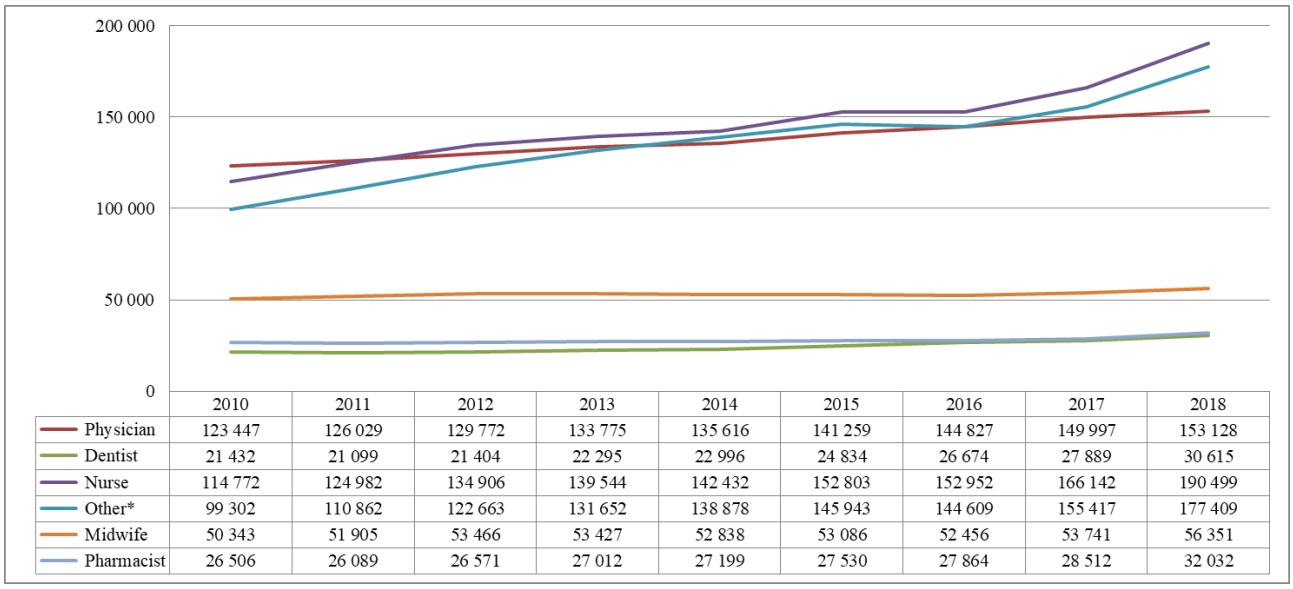
is belonged to public health (78%) that keeping public well-being and sustainable health in the long term is so important for health policies.

The number of health care professionals is also important indicator to determine the growth of health sector. Figure 5 shows the number of health care professionals between 2010 and 2018 in Turkey, based on TurkStat (24). It can be observed that the number of all kinds of health care professionals increased from 2010 to 2018. The number of other health personnel (including every kinds of technicians that working in health care services) had the highest share in total employment in Turkish health sector by 2018. Then, the number of physician and nurse had the highest share in total employment in Turkish health sector by 2018.

According to data of TurkStat (26), health care benefits increased from 2010 to 2019. By 2019, health care benefits as social protection expenditures were calculated as 146 035 million TL (Figure 6). Social protection expenditures are also important indicator for health development that health care expenditures and benefits will support health issues and public health in the context of 2030 Sustainable Development Goals.

Table 1. Key indicators on health expenditures by 2019 (24)

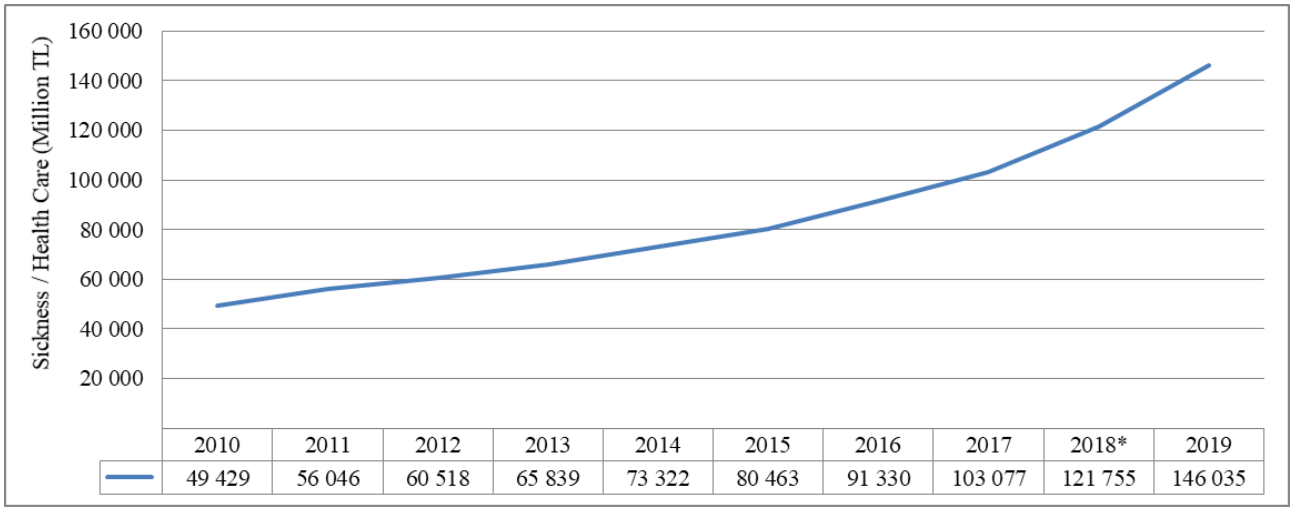
Total health expenditure (Million TL)	201 031
Health expenditure per capita (TL)	2 434
Ratio of total health expenditure to gross domestic product (%)	4.7%
Ratio of general government health expenditure to total health expenditure (%)	78%
Ratio of private sector health expenditure to total health expenditure (%)	22%



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Physician	123 447	126 029	129 772	133 775	135 616	141 259	144 827	149 997	153 128
Dentist	21 432	21 099	21 404	22 295	22 996	24 834	26 674	27 889	30 615
Nurse	114 772	124 982	134 906	139 544	142 432	152 803	152 952	166 142	190 499
Other*	99 302	110 862	122 663	131 652	138 878	145 943	144 609	155 417	177 409
Midwife	50 343	51 905	53 466	53 427	52 838	53 086	52 456	53 741	56 351
Pharmacist	26 506	26 089	26 571	27 012	27 199	27 530	27 864	28 512	32 032

Figure 5. The number of health care professionals, 2010-2018

*: Other health personnel represents healthcare professionals including every kinds of technicians that working in health care services



	2010	2011	2012	2013	2014	2015	2016	2017	2018*	2019
	49 429	56 046	60 518	65 839	73 322	80 463	91 330	103 077	121 755	146 035

Figure 6. Health care benefits as a social protection, 2010-2019

*: Revised data for 2018

The Effect of COVID-19 on Turkish Health Management and Health Services

As a main purpose, this study present main findings that examining key changes in health management and health service for Turkey. According to Ministry of Health, it can be said that new approaches in public relations has developed during COVID-19 pandemic. In other words, Republic of Turkey Ministry of Health developed a new service concept for COVID-19. As Koca (Minister of Health) determined and many studies showed (27-31), Turkey has been accepted as a successful country to fight against COVID-19 pandemic in the world. Both of health employees and citizens can access useful information's about COVID-19 by Republic of Turkey Ministry COVID-19 Information Page (covid19.saglik.gov.tr, 32). Based on Turkey Ministry COVID-19 Information Page, we can summarize key changes in health management during COVID-19 pandemic as below:

- ***Public relations:*** It can be said that health management and health policies changed for strengthening public relations to prevent COVID-19 pandemic. In this context, Ministry of Health, set an open access web site for COVID-19. This web site is an important to step to close public during COVID-19 pandemic. The case information is also shared daily in Republic of Turkey Ministry COVID-19 information page.
- ***Access to health information:*** During COVID-19, the most important key element is accessible health information. Ministry of Health provides open access web site for public usage and also health care professionals. By Republic of Turkey Ministry COVID-19 Information Page, people can access main information about COVID-19. When people access the main page, there is a title as COVID-19 and this title gives basic issues about COVID-19. These basic issues include definition of COVID-19, treatments, guides, presentations, algorithm, forms for COVID-19, case query page and the lists of authorized diagnosis laboratory of COVID-19.
- ***Access to help for COVID-19:*** Ministry of Health has managed health care professionals coordinately and other public professionals and local management such as municipalities have all participated into health duty during COVID-19 pandemic.
- ***New health procedures for COVID-19:*** Ministry of Health provided new health procedures for public, health professionals and industries.
- ***A guide for public usage:*** Some detailed brochures for public were presented to guide them. There are useful measures in these brochures to guide public.
- ***A guide for health care professionals:*** Some detailed brochures/forms/documents etc. for health care professionals were presented to guide them.
- ***Digitalization:*** During COVID-19 pandemic, most of sub-services linked to healthcare management and health care services has transformed into digital platforms. In Turkey, the most important digital service is thought to be a HES Code (Hayat Eve Sığar/ Life Fits Home) Application by mobile appliances.

COVID-19 pandemic shows the importance of the coordination between public and health management and health policy makers to end this pandemic. Access to information and useful guides can help citizens to keep their healthy and well-beings in the long term. Based on Republic of Turkey Ministry COVID-19 Information Page, this study summarizes key connection tools and materials for public in Table 2. We categorizes main tools to inform public for COVID-19 as Brochures, Billboards, Social Media Videos, Public spots, Expert videos, Green Crescent (Yeşilay) Radio spots, and Web site (Table 2).

According to data from Republic of Turkey Ministry COVID-19 Information Page, this study made key points for health management and COVID-19 pandemic. Table 3 shows key elements guiding public for COVID-19 pandemic. This study summarizes main brochures for public during COVID-19. Like as access to information, brochures also help public to fight against COVID-19 and also adapt their life for new normal. On the other side, Table 4 shows main guidance for health care professionals during COVID-19. It can be determined that, COVID-19 pandemic made health policy makers to be more open to public communication and new health management strategies has begun to give more importance to share information during pandemic.

Ministry of Health provides basic guides and measures separately for every kind of industries/sectors via Republic of Turkey Ministry COVID-19 Information Page. In addition, there is a different guide for health institutions. New working conditions, new rules and measures both of health employees and patients are provided during COVID-19 pandemic. Table 5 shows main guides for health care professionals. As seen Table 5, during COVID-19 pandemic, new implications and measures guide health care professionals.

Table 6 shows main digital healthcare applications during COVID-19 pandemic in Turkey. These applications are developed to support the fight with COVID-19 pandemic. In fact, HES code, e-Nabız, COVID-19 information page, COVID-19 vaccine information platform helps citizens during COVID-19 pandemic in Turkey.

Turkey has accelerated investments in health sector during COVID-19. As mentioned above, Turkey increased the number of hospitals, beds and health care professional since 2010. During COVID-19, every country understands that having sufficient and qualified hospitals, medical equipment and health care professionals are so vital to survive from the global pandemic. In this point, Turkey keeps its investments during COVID-19 pandemic. For example, Turkey finished the buildings of 17 largest city hospitals by 2020 (33). Table 7 shows built hospitals during COVID-19.

Table 2. New Implications to inform public for COVID-19

Category	Health Management
Brochures	Brochures are main guides for public during COVID-19 pandemic.
Billboards	Billboards help public to take measure for COVID-19 pandemic.
Social Media Videos	Social media videos examine COVID-19 pandemic and measures for pandemic.
Public spots	Public spots influence public to adapt for new normal.
Expert videos	Expert videos examine COVID-19 pandemic and measures for pandemic.
Green Crescent (Yeşilay) Radio spots	During COVID-19 pandemic, Green Crescent Radio spots also guide public to measure for COVID-19.
Web site	The main information tool is Republic of Turkey Ministry COVID-19 Information Page. This page gives key issues on COVID-19 pandemic and also everybody can access daily case and information.

Table 3. Key elements guiding public for COVID-19 pandemic

New Brochures	Main Measures
For citizens returning from Umrah	Citizens who returned from Umrah, should stay in isolation for 14 days. During this period, they should keep personal hygiene. Mask should definitely be used in indoor environment.
The homecare of confirmed and suspected cases of COVID-19 (for people who take care of cases at home)	Companion care is important during COVID-19 pandemic. People who give companion care at home should take measures at home. These people are responsible both for own well-being and cases' well-being. Stay in isolation, personal hygiene and keeping medical treatment are need to be sustained. Mask should definitely be used in indoor environment.
Basic guidance for Homecare	During COVID-19, confirmed or suspected cases should stay in isolation until the recuperation. During this period, it is important to keep medical treatment that offering by physicians. In addition, keeping personal hygiene is also important. Mask should definitely be used in indoor environment.
Measures for indoor workplaces	Three are some measures for workplaces. There should be at least 1-meter distance between employees. The workplace must be ventilated frequently. Confirmed or suspected cases (employees) should not come to the workplace until they have recovered. Mask should definitely be used in indoor workplaces. When working, every positive cases should be notified to City / Local Health Directorate of Communicable Diseases Unit.
Measures for provinces where hosting Seasonal Agricultural Workers	Healthy drink water should be supplied by employers. Without permission, workers should stay in a same workplace. During working, attention should be paid to social distance or the mask should be used. Hands should be washed with soap for at least 20 seconds.
Measures for tax customers	Do not take more than 3 people (crowded) in the taxi. The mask should be used during the journey. Do not make unnecessary contacts in the taxi. Call a taxi from the station and use POS device and payment methods if possible.
The usage of Hydroxychloroquine	The usage of Hydroxychloroquine is examined in details in a brochure. The brochure includes the picture of the medicine and steps how this medicine should be used.

Table 4. Key elements guiding health employees for COVID-19 pandemic

Elements	Guiding for
A guidance for usage of masks including N95/FFP2	There is a brochure for health care professionals that guiding for usage of masks including N95/FFP2.
COVID-19 Algorithms	There are 3 main algorithms in Republic of Turkey Ministry COVID-19 Information Page: • Adult treatment algorithm. • COVID-19 home monitoring: algorithm: non-complicated patient or light-medium pneumonia. • COVID-19 inpatient algorithm: heavy pneumonia.
COVID-19 documents/forms	Two main forms for health care professional: • Case Information Form • Case Tracking Form
Presentations	There are main presentations for Health care professionals: • Supportive Therapy-1 in COVID-19 Patients; Presentation of General Approach, Patient with Severe Pneumonia, ARDS, Sepsis, Septic Shock • Supportive Therapy-2 in COVID-19 Patients; Anti-cytokine and Anti-inflammatory Therapy, Coagulopathy Management • Presentation of COVID-19 Contact Follow-up, Home Patient Follow-up, Morgue Burial Procedures • COVID-19 Infection Control and Isolation • COVID-19 Epidemiology, Diagnosis, Treatment
For outpatients: Possible COVID-19 case inquiry guide	There is a guide for Possible COVID-19 case inquiry guide.
Main banners	There are some banner that explaining basic standards and measures for health care professionals: • Standard measures • Isolation of touch • Isolation of droplet • Isolation of respiration • The usage of personal protective equipment • Nasal sampling

Table 5. Main guides for health care professionals during COVID-19

Main guides	Content
Working Guide and Infection Control Measures (developed by Scientific Advisory Board, 2020a)	In health institutes, how health care professional work and what kinds of measures should be kept are all explained in this guide.
COVID-19 (SARS-CoV-2 INFECTION): General information, Epidemiology and diagnosis (developed by Scientific Advisory Board, 2020b)	In this guide, the definition, epidemiology and case process (case detection, case tracking and case management) are explained.
Adult patient treatment (developed by Scientific Advisory Board, 2020c)	This guide explains the process of adult patient treatment.
Child patient management and treatment(developed by Scientific Advisory Board, 2020d)	It includes child patient management process and treatment process during COVID-19.
Antitoxin -anti-inflammatory treatments, coagulopathy management (developed by Scientific Advisory Board, 2020e)	It includes main recommendations for the treatment of hyperinflammatory and the management of coagulopathy during COVID-19.
Contact monitoring, Outbreak management, monitoring patient at home and filiation(developed by Scientific Advisory Board, 2020f)	It explains the process of contact monitoring excluding health care professionals. This guide includes also pandemic management, filiation process and monitoring patient at home.
Infection control and isolation (developed by Scientific Advisory Board, 2020g)	It includes the process of infection control and isolation.
Morgue and burial services (developed by Scientific Advisory Board, 2020h)	It includes process of morgue and burial services through main measures during COVID-19.
Obstetrics services during COVID-19 pandemic (developed by Scientific Advisory Board, 2020i)	This guide explains the process and the management of respiratory infections during pregnancy and postpartum.

Table 6. Main digital healthcare applications and services during COVID-19

Applications and Services	The usage for
HES Code (a)	HES code can be accessible code via mobile phones. This code is given to every citizens freely. This code provides main information about risk/safety degrees of areas and personal risk information when using public transportation vehicles or public places such as shopping mall, schools, hospitals, banks etc.
e-Nabız (b)	e-Nabız is a Turkish Government Health services. During COVID-19 pandemic, e-Nabız platform includes a new sub-services as a platform of test or report of COVID-19 for patients.
COVID-19 Information Page (c)	COVID-19 Information page is set by Ministry of Health in Turkey. It gives every kinds of information, guides, presentations, daily case reports etc.
COVID-19 Vaccine information platform (d)	This platform is currently set to inform citizens for COVID-19 vaccine.

(a): hayatevesigar.saglik.gov.tr/index.html, (b): enabiz.gov.tr/PcrTestSonuc/Index, (c): covid19.saglik.gov.tr, (d): covid19asi.saglik.gov.tr

Table 7. New hospitals and service buildings during COVID-19 (adapted from Usul, 33)

Open Date	Hospitals
March 6, 2020	Mersin University Oncology Hospital
March 30, 2020	The Okmeydani Training and Research Hospital
April 8, 2020	Marmara University Pendik Training and Research Hospital Basibuyuk Additional Service Building
May 18, 2020	Erzurum City Hospital
May 21, 2020	Basaksehir Cam and Sakura City Hospital
May 29, 2020	Prof. Dr. Feriha Oz Emergency Hospital
May 31, 2020	Yesilkoy Prof. Dr. Murat Dilmener Emergency Hospital
May 31, 2020	Dr. Ismail Niyazi Kurtulmus Hospital
June 20, 2020	Marmara University Prof. Dr. Asaf Ataseven Hospital
July 4, 2020	Kartal Dr. Lutfi Kirdar City Hospital
Sept. 5, 2020	Goztepe Prof. Dr. Suleyman Yalcin City Hospital
Sept. 6, 2020	Bilecik State Hospital
Oct. 2, 2020	Konya City Hospital
Nov. 13, 2020	Tekirdag Ismail Fehmi Cumalioglu City Hospital
Nov. 15, 2020	Lefkosa Emergency Hospital
Nov. 30, 2020	Bayburt State Hospital
Dec. 7, 2020	Giresun University Training and Research Hospital
Dec. 16, 2020	Batman Training and Research Hospital
May 16, 2020	Mentese State Hospital (renovated)
July 25, 2020	Ferizli District State Hospital's new service building
Aug. 5, 2020	Andirin State Hospital
Sept. 21, 2020	Adana Ceyhan State Hospital
Nov. 4, 2020	Kirklareli Luleburgaz State Hospital
Nov. 23, 2020	Vezirkopru State Hospital
Dec. 18, 2020	Sason State Hospital

DISCUSSION

Based on qualitative content analysis, we can provide main issues for health management and health services during COVID-19 pandemic. Health management and health policies have been changed via new health policies. For example, health policy makers have been aware of the importance of the coordination between public and health management to end or decrease COVID-19 pandemic in a country. Successful health management is based on coordination between health care professionals and management and also communication between public and health management. The key points for successful health management can be determined as public relations, guides-brochures, measures, digitalization, and accessible information. On the other side, health sector development will spur the performance of health management. In other words, the number of hospitals, hospital beds, health care expenditures, social benefits, and the number of health care professionals are all contributes the performance of health management.

This study can suggest these issues to adapt health management strategies and health policy makers to fight against global pandemic such as COVID-19:

- ***Economic issues in health management:*** Sustainable health and well-being of public is an important issue both for developed and developing countries in the world. Health development will spur economic growth and social development in the context of sustainable development (34). The COVID-19 pandemic proves the importance of having sufficient healthcare services and health sector in a country. Accordingly, countries having sufficient quantity of hospitals and hospital beds with sufficient number of health care professionals can survive and manage global pandemic crises more efficiently. Turkey case has showed that healthcare investments are vital for sustainable healthcare system.

- ***Social issues in health management:*** It was observed that citizens wanted to access information and healthcare services whenever they need. In this context, it is so important to provide sufficient health institutes with healthcare professionals in every city in a country such as Turkey.
- ***Management issues in health management:*** The management of pandemic is a vital process in healthcare management. Turkey case shows that healthcare policies should be sufficient and adaptable for new conditions and citizens need.
- ***Digitalization issues in health management and services:*** During pandemic, healthcare services have transformed into digital healthcare services as possible as it is. In addition, patients, citizens and healthcare professionals access the current information via digital platforms during COVID-19. This period shows that health care services and information management should be adapted for online platforms and mobile tools.
- ***2030 Sustainable Development Goals (2030 SDGs) and Health management issues:*** It is a fact that the COVID-19 pandemic is the most effective global crises that ever happened. Not only health issues and also, economic, social and political issues are all influenced by this pandemic. Accordingly, achieving 2030 Sustainable Development Goals is a big challenge since the COVID-19 pandemic (35). Accordingly, countries which accepted 2030 SDGs should keep sustainable healthcare policies in the long term both in government and local levels (36).

CONCLUSION

This study provides a new perspective for the effect of COVID-19 pandemic on health care management and health care services. Turkish health management system is found to be successful when considering meeting public health needs and demands during COVID-19 pandemic. This study provides descriptive evidences for Turkish health management system during COVID-19 pandemic and it is thought that Turkey can guide other economics to fight against COVID-19 pandemic. In addition, this study proves that keeping sustainable health system is an important issue in the long term to meet emergency needs and demand during pandemics.

Ethics Committee Approval: Since our study was not an experimental study including human or animal subject, ethics committee approval was not required. The study used open access data based on The Turkish Statistical Institute and Republic of Turkey Ministry of Health.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: SY, SB; Design: SY, SB; Data Collection/Processing: SY; Analysis/Interpretation: SY, MAÖ, Literature Review: SB; Drafting/Writing: MAÖ, SY, SB, FE; Critical Review: SY.

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Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.859119

Duzce Med J, 2021;23(S1):71-77
Düzce Tıp Fak Derg, 2021;23(S1):71-77

Club Convergence in Cigarette Consumption and Health Policies in Pre-Pandemic Period

Pandemi Öncesi Dönemde Sigara Tüketimindeki Kulüp Yakınsaması ve Sağlık Politikaları

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Received / Geliş Tarihi : 12.01.2021
Accepted / Kabul Tarihi : 02.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 13.03.2021

ABSTRACT

Aim: Turkey introduced price and non-price measures in recent years to reduce smoking. The government banned smoking in all enclosed workplaces and public places. Then, they extended the ban to include all restaurants, cafeterias, and the hospitality sector in 2009 and increased the Special Consumption Tax dramatically on tobacco products by 20 percent in 2010. This study aims to examine regional disparities in cigarette consumption across Turkish cities employing provincial-level data by utilizing a club convergence test.
Material and Methods: We report some descriptive results for the smoking trend for sub-regions of Turkey. Then, we explore regional disparities in smoking across Turkish provinces, employing monthly provincial-level data, through a club convergence test in pre-pandemic period, 2009-2017.
Results: Our results suggest that the initial effects of the anti-tobacco policies resulted in a substantial decline in smoking. It seems that distinct regions behave differently to the policy changes in a way that some areas reduce their cigarette consumption considerably while some regions did not. Club convergence test results demonstrate that it is not proper to conduct a common tobacco control policy in Turkey since there is more than one convergence club in the analyses.
Conclusion: We encourage authorities to decentralize power by including local agencies and municipalities in enforcing the anti-tobacco law. We urge authorities to take different policy measures for different regions. Besides, from a pandemic perspective, one can argue that the regional disparities in cigarette consumption is also a signal for the need of diversified health policies across regions in Turkey.
Keywords: Cigarette consumption; club convergence; tobacco control; Turkey; COVID-19.

ÖZ

Amaç: Türkiye son yıllarda tütün talebinin azaltılmasında özellikle fiyat önlemleri ve fiyat dışı önlemler olmak üzere iki çeşit politika uygulamıştır. Hükümet, öncelikle kapalı tüm işyerlerinde ve halka açık yerlerde sigara içilmesini yasakladı. Sonrasında, 2009 yılında yasağı tüm restoranları, kafeteryaları ve konaklama sektörünü kapsayacak şekilde genişleterek tüm ülkeye yaydı. 2010 yılına gelindiğinde ise tütün ürünleri için özel tüketim vergisi yüzde 20 arttırıldı. Bu çalışma, bir kulüp yakınsama testi kullanarak Türkiye'deki şehirler arasında sigara tüketimindeki bölgesel farklılıkları incelemeyi amaçlamaktadır.
Gereç ve Yöntemler: Bu çalışmada, Türkiye'deki sigara tüketiminin yıllık değişimleri betimsel sonuçlar halinde bölgesel bazda rapor edilmiştir. Daha sonra ise sigara tüketimindeki bölgesel farklılıklar, aylık il düzeyinde veriler kullanılarak ve kulüp yakınsaması analizinden faydalanılarak, pandemi öncesi dönemi kapsayacak şekilde 2009-2017 yılları için araştırılmıştır.
Bulgular: Bu çalışmadan elde edilen sonuçlar tütün karşıtı politikaların ilk etkilerinin sigara kullanımında önemli bir düşüşe neden olduğunu göstermektedir. Ayrıca, farklı bölgelerdeki tüketicilerin politika değişikliklerine aynı tepkileri vermediği görülmüştür. Kulüp yakınsaması sonuçlarına göre tüm Türkiye için ortak bir tütün politikasını takip etmek doğru olmayacaktır çünkü Türkiye'deki sigara tüketimi ortak bir değere yakınsamamaktadır.
Sonuç: Elde edilen sonuçlara göre merkezi otoritenin yetki paylaşımı yapması ve yerel yönetimlerin tütün karşıtı politikalar konusunda inisiyatif alabilmesinin kolaylaştırılması sağlanmalıdır. Politika yapıcılara farklı bölgeler için farklı politika uygulamaları başlatmaları gerektiğini tavsiye etmekteyiz. Dahası, pandemi perspektifinden bakıldığında, sigara tüketimindeki bölge bazlı trendlerin pandemi döneminde uygulanacak politikaların bölgesel olarak farklılaşması gerekliliğini ortaya koyduğu söylenebilir.
Anahtar kelimeler: Sigara tüketimi; kulüp yakınsaması; tütün kontrolü; Türkiye; COVID-19.

INTRODUCTION

Tobacco consumption is one of the most harmful habits of human beings, which leads to numerous diseases such as cardiovascular diseases, chronic obstructive pulmonary diseases, and lung cancer (1). Tobacco use can give rise to an increase in health expenditures, which becomes a heavy burden that both smokers and governments must bear. Besides, heavy smokers were much more likely to be unemployed after some time in the private sector (2).

All these pave the way for governments' interventions to implement distinct national anti-tobacco policies to reduce cigarette consumption, such as anti-smoking campaigns, health warnings, smoking bans in public and workplaces (3). World Health Organization (WHO) indicates that there are two types of reduction policies regarding tobacco consumption (4). The first one is the core demand reduction, which consists of (i) price and tax measures and (ii) non-price measures. The second one is the core supply reduction policies, including illicit trade, sales to and by minors, and provision of support for economically viable alternative activities.

WHO initiated the first health treaty Framework Convention on Tobacco Control (FCTC) in 2005, which urged member countries to take precautions in order to reduce both supply and demand for tobacco-related products. After signing the treaty, Turkey implemented two fundamental tobacco control policies. First, as a non-price measure, in May 2008, the government banned smoking in all enclosed workplaces and public places, then in the second phase, the smoking ban was extended in July 2009 with the expansion of the smoke-free law to include all restaurants, cafeterias, Turkish tea houses, and the hospitality sector. Second, in 2010, as a price measure, the government increased the Special Consumption Tax on tobacco products by 20 percent (1,5,6). These anti-tobacco policy interventions have shown a significant reduction in cigarette sales in Turkey (6).

Turkish Statistical Institute (TurkStat) reports the share of never-smokers over the total population, only 37 percent in 2016 (7). On the other side, the share of daily smokers is 27 percent in Turkey, of which 40 percent of males are daily smokers, while females' share is only 13 percent. Also, Turkey is the seventh most cigarette-consuming country regarding total consumption in the world, with 105,762 billion cigarettes in 2016. Besides, Turkish citizens consumed about 2 percent of the world's total cigarette consumption. China, Indonesia, and Russia are the top three cigarette-smoking countries with 41.9%, 5.6%, and 5%, respectively (8). All these show that tobacco consumption is a crucial phenomenon for serious health problems in Turkey. According to the Tobacco Atlas data, 26.06% of the deaths in Turkey are caused by tobacco in 2016. Smoking depends on distinct social and economic factors. For instance, in 2016, the distribution of reasons behind why people start smoking can be listed from highest to lowest share as follows: desire, peer effect, interest, personal problems, family problems, and fun (7).

On the other hand, the burst of the coronavirus disease 2019 (COVID-19) pandemic also increased concerns for the detrimental impact of smoking on public health. Beyond it is adverse individual and public health effects, disparities in smoking behavior can also be a signal for the need for diversified health policies in the COVID-19 period.

In this study, we examine regional disparities in cigarette consumption across Turkish cities employing provincial-level data by utilizing a club convergence test developed by Phillips and Sul (9). To the best of our knowledge, this is the first study investigating whether per capita cigarette consumption across Turkish cities converges or not. We do the same analysis for 12 and 26 regions of Turkey. One of the most distinctive advantages of this methodology is that it enables the determination of the convergence to a common steady state, divergence, and club convergence (10).

The organization of this paper is as follows. In the 2nd section, an overview of cigarette consumption in Turkey is provided. Section 3 presents a literature review on tobacco consumption. Section 4 provides the data and methodology, while Section 5 presents the empirical findings of the paper. The last section concludes the study.

AN OVERVIEW OF CIGARETTE CONSUMPTION IN TURKEY BEFORE AND AFTER THE ANTI-TOBACCO POLICY CHANGES

In this section, the study presents some quantitative data on cigarette consumption in Turkey based on both regional and provincial bases.

Cigarette Consumption by 26 Subregions of Turkey

Figure 1 presents the yearly pattern and percent changes for average cigarette consumption by 26 subregions of Turkey for the years 2009 and 2010. Turkey introduced comprehensive anti-tobacco policy changes in July 2009 with extending smoke-free environment to the hospitality sector and all enclosed workplaces and public spaces, and in January 2010 by increasing special consumption tax on tobacco products by 20 percent. After these significant anti-smoking policies, cigarette consumption in Turkey for all subregions declined. Notably, the Istanbul subregion (-13.40%), Adana subregion (-8.06%), Van subregion (-7.85%), and Sanliurfa subregion (-13.70%) had seen large impacts on reduced cigarette consumption after the policy changes.

When we make the comparison between 2009 and the recent year 2017 for 26 regions (Figure 2), we still observe the reduced impact of anti-tobacco policies on cigarette consumption for all subregions except for the Konya subregion (1.30%) and the Erzurum subregion (0.20%). However, it appears that the impact of policies has declined over time for the Istanbul subregion (-6.83%), Adana subregion (-2.49%), Van subregion (-3.72%), and Sanliurfa subregion (-5.13%).

Cigarette Consumption by Provinces

In this section, we present the results for the five highest cigarette consuming provinces in 2017. Figure 3 shows the trend for the average cigarette consumption by the five highest cigarette consuming provinces based on the recent values in 2017. What stands out in the figure is that after comprehensive smoke-free legislation in July 2009 and a tax increase in January 2010, average cigarette consumption went down for all provinces. While the declining impact continues to hold for some provinces (Istanbul, Izmir, Kayseri) until the end of 2011, at the end of 2017, we observe that the reduced effect of policy changes faded away, and even for some provinces average consumption slightly went up.

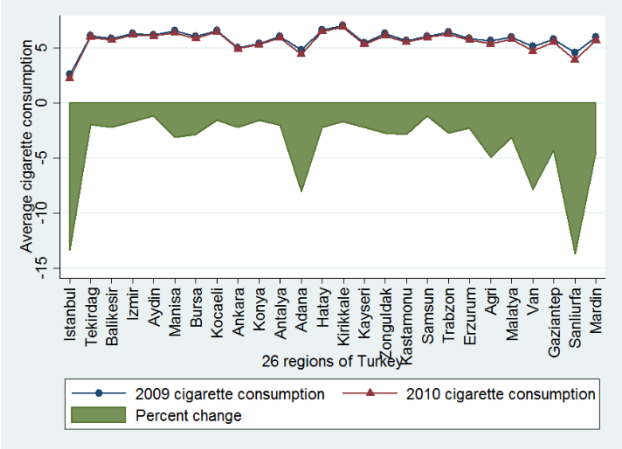

Figure 1. Average cigarette consumption by 26 subregions of Turkey, 2009-2010
Source: Department of Tobacco and Alcohol. Authors' calculations

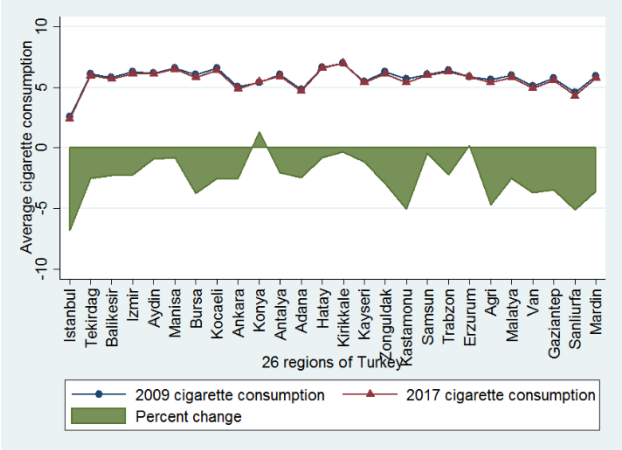

Figure 2. Average cigarette consumption by 26 subregions of Turkey, 2009-2017
Source: Department of Tobacco and Alcohol. Authors' calculations

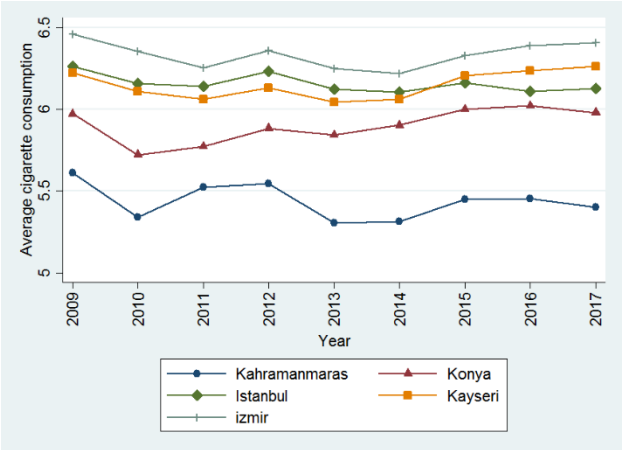

Figure 3. Average cigarette consumption by five highest cigarette consuming provinces
Source: Department of Tobacco and Alcohol. Authors' calculations

Table 1 shows percent changes in average cigarette consumption by the five highest cigarette consuming provinces. Results suggest that the highest declining impact after the combined anti-tobacco policies, including smoke-free public places and workplaces and a 20% increase in special consumption tax, occurred in Kahramanmaras and Konya provinces by 5% and 4%, respectively, right after the policy changes. However, the impact does not last for long, and in some instances, percent changes become even positive. When we come to 2017, it seems that the effect of anti-tobacco policies faded away for three of the provinces, including Izmir, Kayseri, and Istanbul.

Table 1. Percent changes of average cigarette consumption by five highest cigarette consuming provinces

Year	Izmir	Kayseri	Istanbul	Konya	Kahramanmaras
2010	-1.64	-1.82	-1.71	-4.19	-4.88
2011	-1.55	-0.75	-0.29	0.87	3.42
2012	1.69	1.13	1.52	1.94	0.47
2013	-1.76	-1.43	-1.79	-0.70	-4.36
2014	-0.45	0.31	-0.31	1.03	0.14
2015	1.71	2.35	0.95	1.66	2.53
2016	1.02	0.49	-0.82	0.36	0.13
2017	0.25	0.40	0.27	-0.69	-0.99

Source: Department of Tobacco and Alcohol. Authors' calculations

LITERATURE REVIEW

Since cigarette consumption is one of the serious health problems around the world, there are many studies examining cigarette consumption and demand. The literature on this issue might be divided into two strands. The first set of studies aims to explore various factors affecting cigarette demand. Of the preliminary studies, Hondroyiannis and Papapetrou (3) estimated the short-run and long-run price and income elasticities of cigarette consumption in Greece over the period 1960-1990. They used cointegration techniques and estimated vector error correction mechanisms to estimate the elasticities. They found that the price elasticity is negative, while the income elasticity of cigarette consumption is positive. They also showed that the long-run elasticities are higher in magnitude relative to short-run elasticities. Cameron and Collins (11) found that cigarette consumption, real GNP per capita, real cigarette price, and the school enrolment ratio have a long-run relationship in Turkey, and the 1981 health warning is significant on the cointegrated relationship.

Hsieh et al. (12) estimated elasticities for domestic and imported cigarettes in Taiwan during 1966-1995. Their study employed seemingly unrelated regressions methodology. They showed that domestic cigarettes are price inelastic, while the demand for imported ones is price elastic. Their findings also demonstrated that health regulations had a significantly negative impact on cigarette consumption. Nikolaou and Velentzas (13) analyzed the cigarette demand elasticities in Greece over the period between 1960 and 1990. Their findings showed that the magnitude of long-run price and income elasticities are higher than the short-run elasticities. They also provided a piece of evidence favoring the role of health warning packages in reducing cigarette consumption in Greece.

Fallahi et al. (14) examined the relationship between human development indicators and cigarette consumption in Malaysia throughout 1980 and 2012. They used Autoregressive Distributed Lag (ARDL) model and showed that education, income level, and the price of the cigarette is insignificant on cigarette consumption while the life expectancy at birth has a significantly negative impact on cigarette consumption. By employing household survey data and utilizing the two-stage least square model, Kidane et al. (15) found that the effect of the price changes is significantly negative in all income groups in Tanzania. They also demonstrated that age and education level are other significant factors explaining cigarette consumption. In another attempt to estimate the price and income elasticity of cigarette demand, Martinez, et al. (16) focused on Argentina and used monthly data over the period between 1994 and 2010. They found that the cigarette is a normal good with a positive income elasticity, and the cigarette demand is price inelastic in the long run. They also confirmed that the long-run elasticities are higher than the short-run elasticities in Argentina.

By employing the probit model, Sáez et al. (17) examined the impact of health expenditures, life expectancy at birth, income level, education level, marital status, occupational status, and social relationship on tobacco mortality in Spain. They confirmed that most of these factors are significant and are of the expected sign. In another existing study, Chang et al. (18) examined the causal relationship between cigarette consumption and happiness index in Japan, France, Germany, the UK, and the United States covering the period between 1961 and 2003. They utilized the panel causality and found the way of a causal relationship in each sample countries. Their findings demonstrated that the way of causality differs in sample countries. They found that there is a bidirectional causal relationship between cigarette consumption and happiness index in France, while the causality runs from happiness to cigarette consumption in Japan and the UK. However, their findings exhibited no causal relationship between cigarette consumption and happiness in Germany and the US. Zheng et al. (19) attempted to find the relationship between tobacco products by using a two-stage budgeting demand model in the United States. They found that the price elasticity of all tobacco products is negative. Also, they confirmed that e-cigarettes are substitutes for cigarettes, while smokeless tobacco is a complement for cigarettes.

Rodríguez-Iglesias et al. (20) aimed to estimate the price and income elasticity of cigarette demand and to examine the impact of tax increases on cigarette consumption and government tax revenues in Argentina. They employed cointegration tests and used the vector error correction mechanism. The price elasticity of demand seems to be inelastic, and the cigarette is found to be a normal good for Argentinian consumers in the long run. Their simulation results also confirmed that a hundred percent increase in the price of cigarettes via taxes results with a decline in cigarette consumption, but the government revenue would increase. Of the more recent studies, Jovanovic et al. (21) aimed at estimating the price and income elasticity of tobacco products in Serbia for the period between 2002 and 2016. They demonstrated that the price elasticity of tobacco products is inelastic, while the income elasticity seems to be positive. Besides, Tingum and Parrott (22) examined the price and income elasticity of domestic and imported cigarettes in Rwanda. They used both ARDL and the seemingly unrelated regression models. They estimated that the price elasticity of cigarette demand for imported ones is greater in magnitude than the domestic cigarettes. They also found that an increase in tax rates on cigarettes have a significantly negative impact on cigarette consumption. Lastly, Yıldız (23) found that income level, urbanization, and anti-tobacco policies increase cigarette consumption in Turkey, covering the period between 1960 and 2016. Moreover, his empirical results suggested that an increase in cigarette prices and education level mitigate cigarette consumption.

The second group of studies investigated the effectiveness of smoking banks and regulations on reducing cigarette consumption. Of these studies, Reinhardt and Giles (24) evaluated the impact of the tax increases on cigarette consumption in Canada. They argued that tax hikes seem to be more useful to reduce the number of cigarettes consumed than smoking bans. Adda and Cornaglia (25) investigated the role of taxes and smoking bans to mitigate passive smoking in the United States. They found that taxes are more effective than smoking bans. Warren et al. (6) examined the role of smoking banks in mitigating cigarette sales in Turkey. They confirmed that smoking banks decreased cigarette sales in the first six-month period.

Jones et al. (26) aimed at examining the impact of smoking bans on the level of smoking in the United Kingdom and Scotland. They employed the difference-in-difference panel fixed effects model and found that there is no significant impact of the smoking banks on the level of smoking. In another study, Verguet et al. (27) argued that the rise in the price of cigarettes through an increase in taxes would increase life gains and a tax gain for a government in China. San and Chaloupka (1) investigated the impact of tobacco control policies on the spending patterns of Turkish citizens. They found that the rise in smoking expenditures creates a crowding-out effect on food, durable, non-durable, and education expenditures. Lastly, Gonzalez-Rozada and Ramos-Carbajales (28) found that the rise in cigarette taxes does not result in a more significant decline in the smoking of relatively low-income families in Peru. Thus, these results imply that an increase in cigarette taxes are regressive in Peru.

MATERIAL AND METHODS

We utilize provincial monthly cigarette sales (in billions) data provided by the Department of Tobacco and Alcohol (TADB). We proxy monthly net cigarette sales data of producers for aggregate cigarette consumption, which covers the period of January 2009 through December 2017. Our primary outcome of interest here is per capita tobacco consumption across provinces, which we found by dividing monthly cigarette consumption by population using the annual population estimates from TurkStat. All the data are in logarithmic forms.

Phillips and Sul (9) propose a new technique on convergence analysis; namely, club convergence. There are some significant advantages of this test (9,29-31):

- It considers the full sample average and measures its relative convergence.
- It takes into account heterogeneities, which are based on a non-linear time-varying factor model.

- It considers heterogeneities, which is hinged on a non-linear time-varying factor model.
- It is robust to the unit root properties of the series.
- The results are unbiased and consistent.
- It eliminates the necessity of the ex-ante sample separation since it has a new data-driven algorithm to determine convergence subgroups' clusters.

Y_{it} is a variable for panel data where $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$. N is the number of cross-section units, while T is the sample size. Generally, Y_{it} is decomposed into two components:

$$Y_{it} = g_{it} + a_{it} = \left(\frac{g_{it}+a_{it}}{u_t}\right) u_t = \vartheta_{it} u_t \quad [1]$$

where g_{it} is systematic, a_{it} is transitory components. Also, ϑ_{it} is a time-varying idiosyncratic element, while u_t is a common element. ϑ_{it} measures the distance between Y_{it} and u_t. So, one can test the convergence by testing whether ϑ_{it} converge to a constant, ϑ, by taking ratios. For this purpose, Phillips and Sul (9) define the relative transition parameter, h_{it}, that measures the loading coefficient relative to the panel average at time *t*:

$$h_{it} = \frac{Y_{it}}{\frac{1}{N}\sum_{i=1}^{N} Y_{it}} = \frac{\vartheta_{it}}{\frac{1}{N}\sum_{i=1}^{N} \vartheta_{it}} \quad [2]$$

The above equation also shows that h_{it} converges to unity, and the cross-sectional variance (H_t) converges to zero in the long-run (30,32). The procedure offered by Phillips and Sul (9) allows us testing the null hypothesis of the convergence against the alternative of non-convergence through *Log t* regression:

$$\log\left(\frac{H_1}{H_t}\right) - 2\log\{\log(t)\} = a + b\log(t) + \varepsilon_t \quad [3]$$

If the coefficient of the log(t) is greater or equal to zero, the convergence exists. On the other hand, if b is smaller than zero, the divergence of the full panel exists. It can be tested through a t-test. If the convergence is rejected for the full sample, one should investigate for the clubs (30).

Statistical Analysis

In this paper, Stata 14 is used to make a descriptive and empirical analysis. For this purpose, we also use the Stata code of Du (30) to conduct the club convergence analysis.

RESULTS

In this study, we examine the convergence of per capita cigarette consumption in Turkey to determine provincial/regional disparities. For that purpose, this study employs club convergence analysis proposed by Phillips and Sul (9). This paper considers 81 provinces, 26 subregions, and 12 regions in the analyses, respectively. Empirical findings of the study show that the full sample does not converge to a common value in Turkey regarding cigarette consumption per capita. However, it can be the case that subgroup convergence might exist across provinces, subregions, or regions. Thus, we also investigate the club convergence in cigarette consumption and find that relevant cities of a club move from their disequilibrium positions to their club-specific steady state. We do not report the all the econometric steps of the club convergence analysis including log t-test, club merging test, and log t-test after club merging because of page limits. However, they can be provided upon request.

Figure 4, Figure 5, and Figure 6 display club classifications of Turkey regarding per cigarette consumption for Nomenclature of Territorial Units for Statistics (NUTS) 3, NUTS 2, and NUTS 1, respectively. It is seen that two clubs exist considering 81 provinces (NUTS 3), while there are four convergence clubs and one club which is not converging in the NUTS 2 analysis. Besides, there are two convergence clubs and one club which is not converging in the NUTS 1 analysis. According to the empirical findings of club convergence in Turkey may exhibit

Figure 4. Club convergence results for 81 provinces (NUTS 3)
Source: Department of Tobacco and Alcohol. Authors' calculations

Figure 5. Club convergence results for 26 subregions (NUTS 2)
Source: Department of Tobacco and Alcohol. Authors' calculations

Figure 6. Club convergence results for 12 regions (NUTS 1)
Source: Department of Tobacco and Alcohol. Authors' calculations

distinct social and economic factors across provinces, while geographical factors have a limited effect.

According to the empirical findings, it is seen that policymakers should not conduct a common tobacco control policy in Turkey since more than one convergence club exist, which converges to different equilibriums.

In detail, our empirical findings provide some curious results. For instance, Istanbul and some other eastern and south eastern cities belongs to the same convergence clubs (e.g., Adiyaman, Agri, Igdir, Van). One of the main reasons behind this fact is that people who live in these cities have similar economic or cultural structures. Even though one can think that Istanbul is one of the major cities in Turkey regarding economic conditions, it is a major migration hub in the country. The cultural and economic level of the people varies across districts because of multiculturalism and income distribution. Therefore, its convergence pattern of cigarette consumption can show some similarities with other cities. Indeed, it can be better to utilize district-based data for Istanbul for such analyses; however, we cannot employ it due to data unavailability.

DISCUSSION AND CONCLUSION

In this study, we investigated cigarette consumption trends by regions after the two significant anti-tobacco policies in Turkey, including extending smoke-free public places and workplaces and a tax increase. We analyzed how different regions behaved concerning declining cigarette consumption after comprehensive smoke-free legislation.

Results from our analyses suggest that the initial effect of the expanded smoke-free environment and the tax increase has yielded a significant decline in cigarette consumption in different parts of Turkey. It seems that distinct regions behave differently to the policy changes in a way that some regions reduce their cigarette consumption considerably while some of the regions did not. What appears to be the most significant outcome to convey our message here is that the initial effect of the policy changes led to a considerable decline in cigarette consumption in regions of Turkey.

It is of utmost importance to note that having smoke-free legislation will not be enough to reduce smoking ill unless the authorities enforce the laws. Based on the empirical results, it was found that, since the regions in Turkey, even at the province level, show different patterns to anti-tobacco policies, we encourage the authorities to give more power to the local agencies and municipalities in enforcing the law in fighting against tobacco consumption. For this purpose, they can introduce policies to encourage people to reach healthier lifestyles and increase public awareness of smoking-associated health risks.

It is also important to note that what we are doing in this paper does not yield a causal analysis. Also, we cannot disentangle the effects of the two significant policy changes, including extended smoke-free environment and the 20% increase in special consumption tax on tobacco products. We also know that there could be other factors affecting the tobacco consumption pattern in distinct provinces and regions.

Our findings also provide some inferences for pandemic period health policies. The obvious link between cigarette consumption and the spread of the COVID-19 is likely to demonstrate the usefulness of different health policies and health services across regions. In other words, our results are likely to indicate that the need for more health services might be critical in heavy smoker regions. These findings also imply that instead of common policies across regions, different health policies might be more effective to prevent the spread of the COVID-19 in Turkey.

Having said that, Turkey's action against tobacco consumption has reduced cigarette consumption considerably. Although the long-term positive impact of these anti-tobacco policies will be seen in the future, we could certainly state that Turkey has made its movement toward declining premature deaths related to tobacco consumption. In Turkey's case, the important thing is the strong enforcement of all tobacco control policies by all joining parties in order to keep the initial declining effect of anti-tobacco policies. Furthermore, Turkey's experience is relevant for low- and middle-income countries, which aim to introduce nationwide anti-tobacco programs.

Limitations and Directions for Future Research

Further research should be undertaken to investigate the convergence of disaggregated tobacco products such as pipe tobacco, cigarette, cigar, electronic cigarettes, and hookah. Hereby, more detailed policies on tobacco products can be designed and implemented. Also, in addition to club convergence analysis, unit root and cointegration analyses can be employed to find the convergence pattern of tobacco consumption both in time series and panel setting.

Ethics Committee Approval: Since our study was not an experimental study including human or animal subject, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: AT; Design: MŞG; Data Collection/Processing: AT, MŞG, ÖÖ; Analysis/Interpretation: AT; Literature Review: AT, MŞG, ÖÖ; Drafting/Writing: MŞG, ÖÖ; Critical Review: MŞG, ÖÖ.

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Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.862324

Duzce Med J, 2021;23(S1):78-85
Düzce Tıp Fak Derg, 2021;23(S1):78-85

The Role of Media in the COVID-19 Pandemic Period in terms of Effective Health Care Management

Etkin Bir Sağlık Yönetimi Açısından COVID-19 Pandemisi Döneminde Medyanın Rolü

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 02.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 13.03.2021

ABSTRACT

Aim: In this study, it was aimed to handle the role of the media from a sociological point of view focusing on the management of the coronavirus pandemic and the crisis caused by this pandemic, with an effective health management.
Material and Methods: In this study, the qualitative method has been adopted, and online ethnography and visual document analysis techniques have been used. For this purpose, visual and written materials, and mottos were examined in cyberspace and in conventional media.
Results: Media has a significant role in managing health care effectively during the pandemic since it has the instruments to influence individuals and public. However, both conventional and new media ignores the social and economic disparities but underlines the personal dimension instead by creating an infodemic situation and using the pandemic as a source of info-tainment in their representations regarding coronavirus disease 2019 (COVID-19).
Conclusion: It is concluded that mass media has been a very frequently used tool for getting and sharing information since the very beginning of the pandemic. Therefore, it is clear that objective and correct information provided by the media is vital for an effective health care management during the pandemic. However, the manipulative facade of media is very vivid on especially the issues of ignoring inequalities, burdening the individual with the whole responsibility of his/her health behaviors, conveying conspiracy theories and leading to an infodemic.
Keywords: COVID-19; pandemic; health care management; media; infodemic; info-tainment.

ÖZ

Amaç: Bu çalışmada, koronavirüs pandemisi ve bu pandeminin yol açtığı sağlık kriziyle mücadelenin etkin bir sağlık yönetimi ile yürütülmesinde medyanın sahip olduğu rolün sosyolojik bir bakış açısıyla ele alınması amaçlanmıştır.
Gereç ve Yöntemler: Bu çalışmada, nitel yöntem benimsenmiştir ve çevrimiçi etnografi ve görsel doküman analizi teknikleri kullanılmıştır. Bu amaçla hem konvansiyonel medyadaki hem de yeni medyadaki görsel ve yazılı materyaller ve sloganlar incelenmiştir.
Bulgular: Bireyleri ve halkı etkileyecek araçlara sahip olduğu için medyanın pandemi sürecinde sağlık hizmetlerinin etkili bir şekilde yönetilmesinde de büyük bir role sahip olduğu görülmüştür. Bununla birlikte, hem konvansiyonel hem de yeni medyanın sosyal ve ekonomik eşitsizlikleri göz ardı ettiği, bunun yerine sorunun kişisel boyutunu öne çıkardığı, kirli bilgi akışına yol açan infodemik bir durum yarattığı ve koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) ile ilgili sunumlarında pandemiyi bir hab-eğlence kaynağı olarak kullandığı ortaya konulmuştur.
Sonuç: Pandeminin başlangıcından beri kitle iletişim araçlarının bilgi almak ve bilgi paylaşmak için çok sık kullanılan araçlar olduğu sonucuna ulaşılmıştır. Bu bağlamda, pandemi sürecinde etkin bir sağlık yönetimi yürütülebilmesi için medyanın objektif ve doğru bilgilendirme yapmasının oldukça önemli olduğu sonucuna varılmıştır. Bununla birlikte, medyanın manipülatif yönü, özellikle eşitsizlikleri görmezden gelme, sağlık davranışlarının tüm sorumluluğunu bireye yükleme, komplo teorilerini yayma, aktarma ve bir infodemiye yol açma konularında çok belirgindir.
Anahtar kelimeler: COVID-19; pandemi; sağlık yönetimi; medya; infodemi; hab-eğlence.

INTRODUCTION

The coronavirus disease 2019 (COVID-19) epidemic disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has emerged as an unprecedented health problem in the modern world and was declared a pandemic (global epidemic) by the World Health Organization (WHO) on March 11, 2020. Since this date, all countries have enforced lockdowns for certain periods due to the epidemic that has turned into a pandemic that affects all countries in the world. While many people lost their lives because of this epidemic, the world has faced a multidimensional crisis in social, economic, political and cultural aspects. In the face of the suddenly exploding, rapidly growing and widespread effects of the COVID-19 pandemic, many issues, which are taken for granted and not questioned before in our daily life, have been started to be discussed. It is seen that this pandemic, which affects our individual lives one by one, has an unlimited domain from the regulation of our daily life to the macro level of public health policy and economic crisis. With this unlimited impact, the global pandemic has made many historically and structurally disadvantaged nations, classes, women, the elderly and other people become more isolated and vulnerable to the effects of the crisis. This pandemic, which has turned into a global crisis, demonstrated how widespread social exclusion in the society can be and how it is, and how insufficient social inclusion policies are.

This study discusses how the COVID-19 pandemic and related issues are represented in the media. The main purpose in dealing with these media representations is to try to understand how the social aspects of the pandemic are presented to the public and what functions these presentations have. In our world surrounded by information technologies, mass media appears as the most frequently applied source of information of almost anything and everything. Therefore, it should not be surprising to observe people turning to media tools in order to catch a glimpse of the reasons and results of this worldwide health crisis. Having this precious data always in their mind, mass media utilizes all its means in the urge of conveying messages related to the virus to the public. The main claim of the study at this point is that the representation of the COVID-19 pandemic in the media has a certain politics of representation. In accordance with this representation policy, it will be tried to reveal how the pandemic and the issues related to it, which are represented in conventional media and new media channels. Within this framework of providing insights on the media tools' impact on different layers of societal issues during the COVID-19 pandemic, the study handles the issue under the headings of "ignoring disparities", "science versus infodemics", "is it something personal", "the pandemic as info-tainment". The issues to be mentioned one by one below constitute the different manifestations and parts of the general discourse that dominates the representations of COVID-19 in the media, and each should be understood in conjunction with each other, not separately because none of them is independent of the other. Each subtitle is closely related to deceptive nature of media sources.

This study handles the coronavirus pandemic from a sociological point of view focusing on the role of media in terms of managing this health crisis effectively.

MATERIAL AND METHODS

This paper discusses how the situation that emerged after the COVID-19 pandemic is represented in the media. In doing so, the politics of representation which includes how this pandemic is presented in the media and the ways of presenting this epidemic, is problematized by using the news, shared contents and other materials on conventional media and social media platforms. For this purpose, a wide range of literature concerning the theoretical and applied studies has been searched and the socio-economic data about the social dimensions of the pandemic since its global emergence last year have been analyzed. However, the main point of interest here was how the media produced social messages through the presentation of conventional and visual culture products on the pandemic. Here, visual cultural products were handled both as a one-sided cultural industry product and as products produced with the joint participation of people (1).

In addition, this study has a qualitative research design and for this purpose the visual products were scanned by online ethnography technique. In this way, it could be seen what the prominent and popular posts and visuals were among the virtual communities in cyberspace, and what was included in the COVID-19 representations (2). Here, an assumption like "Act of vision is not innocent" among virtual communities in cyberspace is relied on. Therefore, the political and cultural messages behind the representations of the pandemic have been examined, based on the assumption that every look and every image presented has a policy and cultural background (3). Online ethnography on the representation of COVID-19 in the media aims to understand the behavior and ways of seeing of a group of people in the virtual environment. For this purpose, both visual materials and written materials and mottos were examined. Considering that today many people spend a considerable part of their day online and more and more people are online during the pandemic, it makes more sense to conduct an online ethnographic study. The main purpose of this study is to examine the COVID-19 representations in the media with these methods and techniques and to reveal the political and cultural meanings behind these visual and written representations.

RESULTS

Ignoring Disparities

News regarding health on TV and printed media has been following an increasing path recently. This increase in conveying of health information has two main points to be thought on; one of which is the translation of this information of scientific nature in an appropriate format that it can be understood by the public. However, since there exists plenty of channels and actors in the media sector targeting different layers of societies, it is not easy to control the misunderstandings of health information. The second challenge is providing all people with the essential health information they require without falling into the trap of social inequality (4). The issue of social inequality not only occupies a considerable place in terms of making health information distributed via mass media understood by all layers of the society but also about the portrayal or ignorance of social inequalities in media organs especially during a global health crisis such as the

one of COVID-19. The debate here accommodates for whole the inequalities that vary according to variables such as race, ethnicity, region, gender, class and age throughout the pandemic. In this context, it constitutes a great importance to analyze how the representation policy that covers the inequalities that already exist in all societies on a global scale works during the pandemic.

Despite the unconcealable nature of these social inequalities which have been exacerbated during the corona virus pandemic, they do not seem to be handled frequently enough in mass media. That is to say, the representation policy in the media tries to ignore these inequalities determined in the market conditions and instead to base the representation of COVID-19 on concepts such as "good management" and "governance". It is observed that mottos such as "Life fits into home", "Stay at home", "Mask, distance, hygiene" have actually functioned as part of a liberal governmentality discourse such as the management of the pandemic and the good management of the crisis in all media representations, especially in public spot advertisements. Thus, along with the orientation of the rising fear of the crisis, it is one of the important functions of the media to process the feeling that social life, which in fact included many inequalities in "normal" conditions before the pandemic, is as if it is fair, equal and as it should be.

Media certainly has a vital impact on our pictures of the world. Especially today's era of global village provides mass media with all the equipment to convey its messages all around the world. Without doubt, this constitutes a great potential of power in itself and this power is willingly used by media tools. Schiller (5), one of the leading critics of American media, asserts that our minds are managed by authorities via productions delivered by different media organs. He depicts mass media as a tremendous tool of manipulation adding the fact that "the means of manipulation are many, but, clearly, control of the informational and ideational apparatus at all levels is essential". From a technologic deterministic point of view, one can claim that the information technologies making possible the progress in communication systems are of a core importance for all social issues. That is to say, the information produced and delivered by media organs have the potential to divert public attention from one point to another. Therefore, it is a natural outcome that mass media plays a big role in reflection of such a devastating health crisis as the corona virus pandemic. As it is highlighted above, media is mostly criticized for being manipulative and for sweeping the reality under the rug. The period of pandemic is no different from this general understanding of media in the way that an indispensable social problem such as inequalities has been ignored in most programs digging the crisis and all segments of the society have been expected to obey the curfews and other limitations during this period. In other words, the socioeconomic components of health care seem to be neglected. Engels's- one of the pioneers to delve into the economic disparities in the society- affirmation is a vivid questioning of the connection between inequality and health: "How is it possible, under such conditions, for the lower class to be healthy and long lived? What else can be expected than an excessive mortality, an unbroken series of epidemics, and a progressive deterioration in the physique of the working population? Let us see how the facts stand" (6).

Despite Beck's (7) famous quote saying that poverty has a hierarchical nature whereas air pollution is democratically distributed all over the world, the virus, which is a flesh and bone form of modern risks, doesn't follow an equal pathway of influence among people of all segments. However, this realm is seemed to be neglected in mass media. Whereas "being poor is in itself a health hazard" (8), media's inclination is directly in line with the neoliberal approach to health issues which is an understanding putting forward the idea that individuals are the one and only responsibility holders of their own status of health.

Despite the huge number of works in the literature indicating that the coronavirus pandemic has exacerbated the inequalities in the society (9-11) not only conventional but also new media channels are full of messages implying that everyone should stay home regardless of their occupation, age, gender etc. One of the items in this long list is celebrities' images having fun at home either alone or with their families. These faces of influencers from the high socio-economic classes have been tried to be instrumentalized for the aim of showing people that it is possible to stay at home and have fun at the same time (12,13). However, the place they call "home" is most of the time different from the one of low social classes. To put it differently, being economically advantaged brings together several chances one of which is living in a large house and survive for a long period of time even without actively working by leaning on previous savings. As opposed to these rich people, low socio-economic groups usually do not have the chance of "having fun" at home because of a plenty of reasons such as not having a private space of their own, poor heating conditions, crowded families, and a mind occupied with the obligation of going out to work and make money for survival. In addition to these images, people with happy faces and alternative socializing ways and the photos of ordinary people who manage to stay home and still inventing new ways of adaptation to the curfews by playing an instrument on their balconies or playing games together with their neighbors from one balcony to the other have been distributed via different media channels (14,15). No doubt, these are only short instances of these people's lives which continue under harsh conditions which have resulted from the corona virus restrictions. However, mass media representations of the COVID-19 pandemic are mostly covering these short instances while ignoring the social disparities of the real life behind these bits and pieces.

The elderly is another disadvantaged social group of the pandemic since being infected by the virus is a greater risk for the people aged 65 and over. In addition to the great fear of the virus that is created mostly by media, the restrictions to curb the spread of the virus have also been targeted to the elderly for the majority of this period. This situation has led to several ageist behaviors towards people of old age who have been humiliated and stigmatized by these attitudes. In opposition with this negative picture regarding the elderly, media representations of them depicts the atmosphere they are living in as a pleasant one most of the time (16,17).

Science versus Infodemic

The proliferation of conspiracy theories is one of the most common cases of COVID-19 representation in the media. First of all, modern rational societies have returned more towards conspiracy theories that claim to explain everything after the emergence of this pandemic. For example, in the period prior to the virus's first appearance in Turkey some medical doctors awkwardly claimed that "this virus doesn't infect the people who have the Turkish gene" or some others offered strange measures and treatments under the name of alternative medicine. In this process mediatic representations regarding COVID-19 became very functional. Bestselling books and programs that deal with many conspiracy theories that this virus and the vaccines planned to be made as a result are part of a global experiment or conspiracy aimed at minimizing the population, robotizing and enslaving humanity started to show. The society, which has experienced a complete anomic situation about what is right or wrong, what is "real science" and what is "pseudoscience" began to frequently see conspiracy theorists in their roles as a strategist, futurologist, communication consultant etc. COVID-19 is different from previous pandemics in that it is the first pandemic of the post-truth period. Post-truth era is a period when objective facts and scientific facts are much less effective than emotions and personal convictions in shaping public opinion. Therefore, the COVID-19 pandemic, which emerged under post-truth conditions and created great uncertainties in such an environment, pushed people into a panic. The greatest promise of modernity to humanity and one of its greatest achievements was that it enabled the modern individual to predict her own future by virtue of the scientific progress. However, it is witnessed that public belief in modern science has been shaken by such a global pandemic processes that create great uncertainty and panic, and this situation is abused by the media that directs the public opinion.

In this process, some politicians and mediatic celebrity figures all over the world have displayed an anti-scientific attitude in public discourse. For example, the statements of Brazilian President Bolsonaro or US President Trump can be cited as examples of this (18). Especially in the case of Trump, this anti-science attitude was managed with a post-truth effect built with the messages he gave to the public on social media channels such as Twitter (19). For example, he wrote "we learned to live with "flu season", just like we are learning to live with COVID-19, in most populations far less lethal!!!" (20). This type of messages is totally manipulating because these messages are completely contrary to the facts scientists have put forth about COVID-19. In a short time, anti-science discourse was created, which paved the way for the writing of many popular books based on conspiracy theories rather than scientific facts, and similar news programs in the media. Another dimension of the anti-science discourse built with conspiracy theories is that some "expert" people frequently appear in the media with titles such as oracle, astrologers, life coach, strategists, and spiritual leader. These people, whom we can generally call prophecy masters, take part in both news programs and the health, daily life and magazine programs of televisions throughout the day. At the beginning of 2020, in one of the most-watched mainstream television channels in Turkey, astrologers commented on which events will happen in 2021. The "predictions" of these astrologers for 2020 were presented to the public in the media as a truth prophecy. People are now feeling psychologically helpless and exhausted in the face of the long-lasting effects of the pandemic (deaths, illnesses, concerns about people's families and relatives, the stress caused by the lockdown), and they have started to believe in prophecies.

As mentioned before, these kinds of prophecies, and their representations in media do not address reason and knowledge, but emotions like fear and hope in accordance with the spirit of the post-truth era. For example, the following headline in an Indian newspaper and a prophecy show very well how their masters position themselves: "Soothsayer VS Doomsayer - Astrologers back in demand as anxiety mounts in pandemic times". According to this news "seasoned astrologer P. Khurrana says: I did not make any prediction about COVID-19 as my calling is to be a soothsayer and not a doomsayer" (21). As it can be seen, the news language in the media represents this astrologer as a soothsayer that gives people good news. According to this astrologer, scientists, politicians or doctors do not know when the epidemic will end, and here astrologers step in at the point where science ends. The soothsayer (in his interview dated as March 2020) claims that only astrologers can know when the epidemic will end, and that the pandemic may only end by November 2020. The astrologer here is actually none other than the media that represents COVID-19 in a certain way. The media answers to the question "when this epidemic will end" by using astrology without the need for any scientific evidence and thus appeals to people's fears and hopes.

However, in any case, the result is that people are exposed to information pollution due to the representations about COVID-19 on social media (22). While the increase of information pollution constitutes an important factor that threatens public health on the one hand, it also serves the dominance of conspiracy theories against science. Considering in which areas infodemic is located, first of all, the issue of whether this disease exists is the most important question of the information epidemic. Numerous social media posts saying that the disease never actually existed and that it is just an ordinary flu like other flu, lead many people to believe it, just like self-fulfilling prophecy. In this case, it can be said that the representations of COVID-19 in the media almost create a hyper-reality. The virus, and also disease perception created in people's minds is now completely disconnected from reality, and thus the representations of COVID-19 function as simulacra (23). As a result of all these, both conventional media (newspaper, television etc.) and new media channels have created a new genre from this situation. This uncertainty, despair and fear caused by COVID-19 have been turned into a self-help literature genre in media. This genre should be understood as a style of media presentation in general, not just as a genre limited to literature. Especially TV shows and daytime programs tried to function as a general self-help guide during COVID-19 days (24). They claim to answer the question, "how an average middle-class person can manage daily life problems and eventually can survive these COVID-19 days?".

Is It Something Personal?

Soon after the burst of COVID-19, mass media showed a drastic change in terms of its core issues of debate and corona virus effect both in national and international level has become the leading agenda (25). All these issues depicting the COVID-19 process as if it is something that the individual is bound to fight by himself/herself remind the neoliberal transformation in all layers of public life including the one of health. In the neoliberal understanding of health, human beings bear the whole responsibility of their deeds and they are to face all the consequences of their behaviors or choices that are giving harm to their health. Therefore, the informative and imperative language that is directed to individuals during the pandemic is burdening people with a heavy load which has the potential of bursting out with social, economic or psychological problems in return. This is a step which transforms the leading powers' responsibilities onto the self. That is to say, pushing the individual to shoulder the burden of his/her status of health eases the situation for society in the way that the individual is seen as the sole responsible one for the public health problems and the deviations regarding the "tears in the social fabric" become obsolete (26). In order to dig into the depths of this debate in the framework of its representation in mass media, the intersection of individualism and health should be shed a bright light onto. Bauman (27) asserts that being individual appears as a task to be fulfilled in modern societies. Among plenty other requirements of the modern world from the self, acting, feeling and living as an individual stands as an umbrella on top of many vital issues. Different from the classical era, individual is "embroidered" with an appraisal of having the opportunity to take the helm of his/her life with only a "tiny" expense which is taking the responsibility of all the positive and negative outcomes of this courageous attempt on his/her own. This promise of freedom remains seemingly on several occasions leaving the modern man with the gloomy atmosphere of harsh self-evaluations. If there exists an unwanted situation about the individual's deeds, s/he appears as the one to be blamed setting aside all the socioeconomic background of the individual's choice. The neoliberal approach embraces the idea that the victim and the ones defining the problem are different sides and, moreover, the problem belongs only to the individual who appears as being the victim and guilty at the same time. Following this standpoint, the people with the problem are depicted as the reasons for the problem to occur which is a lively example of labeling them with being not only the creator of problems but also the ones that deviate from social rules since they do not have enough capacity to adapt the system. Additionally, the authorities of this system are put on a higher scale since they are the ones without the problem (26). In other words, "those who fail to satisfy the conditions prescribed by policymakers can be characterized as morally irresponsible, personally culpable for their failure to take responsibility for their conduct, and as such undeserving of the benefits and opportunities afforded the "law abiding citizen" (28). This heavy burden on the individual has been so vividly reminded via mass media tools from the very beginning of the corona virus pandemic that not only broadcast media but also print, outdoor and new media are all dominated by several campaigns highlighting the importance of staying at home and taking care of their individual well-being. It is known that the opportunity of accessing to the Internet and mobile communication much easier than before and with the vast usage of social media which conveys public health messages to more people, more quickly and directly than ever (29). For that reason, lay people have been living a life surrounded by images and voices telling and showing them what to do in order to take care of their individual selves at all times during the pandemic.

It is for sure that a health crisis on such a devastating scale requires not only public authorities' but also individuals' trying to do their best on all terms. However, staying at home and leading a healthy life is a way of life for some segments of the society whereas it is just a sweet dream or a luxury for others. As it has been illuminated under the previous headings of the manuscript, inequalities have always been a part of social problems, they have been exacerbated during the pandemic, though. However, the programs presented in mass media mostly focus on staying at home regardless of the different socioeconomic status of different segments of the society. Moreover, the health authorities, who are the almost every day seen faces in each and every media organ, support this attitude. Another vital point here is that experts' constantly taking part in media in programs handling the different strategies of living in a world haunted by a virus (30). This attitude of giving tips on "dos" and "don'ts" is another way of portraying the precautions against the virus as if they are something "personal".

The Pandemic as Infotainment

As we mentioned previously, this is the first post-truth pandemic and post-truth means addressing not to reason and facts but to people's emotions like fear and hope. From the very early days of pandemic, people want to believe that this pandemic will end soon and they will return to the old normal days. This expectation of people has become the primary target of the media. This has changed both the media's representation of COVID-19 and the daily broadcast flow. In this process, the general framework of this change in the media caused by COVID-19 is the presentation of the pandemic as a kind of infotainment. Infotainment is a word which combines the information and entertainment and meaning the presentation of all news as in the form of entertaining material. Especially on mainstream televisions or hashtags and trending topics on different web applications such as Twitter or Instagram we can observe the influence of this infotainment style of journalism during pandemic days (31). This is one of the symptomatic consequences in terms of the important effects of COVID-19 on the media, apart from the representations in the media. For example, considering the rhetoric presented and disseminated in the media after the epidemic, it has been said that the return to normal days will occur as soon as possible. But unfortunately, later, it was stated that the normal days to be reached in the summer days when the epidemic subsides, will be actually a new normal, it is not possible for us to live as in the old days, but ultimately this is also a "new" normal. This feeling of "nothing will be same after the COVID-19 pandemic" created the nostalgia which means the impossibility of return to those good old days, and bittersweet longing for the past. In fact, media addressed

this feeling of nostalgia, which is very strong in people during the COVID-19 pandemic process, and built its infotainment strategy on this.

In connection with this, it is seen that interesting developments are observed when the broadcast flow in the media is examined. For example, the "nostalgia" films that lasts almost all day has started to be broadcasted on televisions and especially on state television TRT. TV series and other TV programs from the early 2000s, 1990s and even 1980s were presented to the audience in. In addition, the general view of the representation of COVID-19 in the media in the morning and evening news and prime-time debate programs, magazine shows, game shows, religious programs and many other programs have created a language that both expresses nostalgia for the normal and insist that this will no longer be possible. In this context, the topics that are known as the daytime zone of mainstream television channels and that are mainly covered during the broadcast hours of the programs for women were adapted to the COVID-19 process. For example, personal care and cleanliness, horoscopes and all kinds of individual fortune issues related to it, healthy eating, prayers to be done against the epidemic, love life and relationships during the epidemic, and as a result of all these, the cleansing, nourishment and purification of the whole body and soul. All these actually show the representation of the "wellness" culture and life coaches who are the bearers of that culture in the media in the context of COVID-19, which aims to spread and adopt the new subjectivity that emerged in the neo-liberal period towards the middle classes through the upper-middle class and which claims to include not only physical health but also a spiritual health feeling. The frequent use of this feeling of nostalgia and wellness culture in the media constituted the content of the infotainment.

In the sphere of infotainment where news is blended with entertainment, we can see that news is commodified in such a manner that it creates an industrial cultural content. This created a new space for culture industry. Within this culture industry, the presentation of news in the form of entertainment basically serves two purposes. On the one hand, it calms people's anxieties and fears by softening a very heavy and harsh news content. On the other hand, it produces a plastic cultural product that is no longer relevant to the facts by presenting news content that is too perfected and aestheticized to be true (32). People are now watching information about the epidemic not only as news but also as a visual spectacle and entertainment in the morning magazine programs, health programs and evening prime-time news programs. Middle-class people who were at home during the lockdown process have also increasingly become a part of this spectacle (33). For example, inviting people to applaud healthcare professionals by going out on their balconies in the early days of the epidemic has become an integral part of the media's epic praise for the altruistic efforts of healthcare professionals and using it as an infotainment material.

The perception of news as entertainment and the birth of infotainment is not unique to COVID-19, but since COVID-19 is the first post-truth pandemic, the use of news about the epidemic in social media channels has created a new effect. This effect is the feeling of alienation created by people watching scientific facts or even the extremely serious death and disease news about the epidemic as if watching an entertainment program on television or social media in the face of a deadly epidemic. For example, sarcastic images are shared regarding the horoscope comments on the epidemic mentioned in the previous section. In a visual about the horoscope interpretations of COVID-19, it is said as the horoscope interpretation of all the signs on that day: "You will be spending time in your home" (34). Or, in some other images, famous people who look like a Chinese man after getting the Chinese vaccine are depicted. These images actually contain a discourse that implicitly questions the reliability of the Chinese vaccine and implies that China is involved in the conspiracy regarding the vaccine, which is claimed to be a remedy for the virus, as well as in the conspiracy to spread the virus.

In Italy, where the number of cases and deaths was high in the first days of the epidemic, people going to the balconies of their homes and singing the song Ciao Bella or the national anthem and accompanying other people with these songs and marches with their flags was one of the most used images of the media's COVID-19 representations. This image of people having fun and trying to cope with life's difficulties at the same time is the most convenient image for the infotainment spectacles of media. Because this image creates a myth that will exactly be liked by the media and reflecting the expectations and hopes of the audience: "Despite all the difficulties, troubles and evils, life continues and who knows, maybe someday the good old days will come back" (35). Every image has rhetoric and certain significations made with images refer to certain representations. What depicted here is a re-praising of an ideal happy middle-class life, a sense of solidarity and unity, and in this way overcoming the challenges of the pandemic. Thus, an infotainment environment is created in which the feeling of nostalgia, which expresses longing for the good old days, is kept alive and strong, and around this feeling, way of coping with hardships of life is created by softening the heaviness of the death news and turning it into a spectacle.

DISCUSSION

Health care management is a vital issue which covers a wide range of fields some of which are medicine, economics, sociology, psychology etc. In parallel with the advances in information technologies, channels of communication have also occurred as the stakeholders of this significant effort. Starting from the last years of the 20th century, there has been a great change in not only the production but also the delivering of information in each and every issue worldwide. As a reflection of that, a considerable amount of information on health is delivered today thanks to the developments in both biomedical sciences and telecommunication systems. Apart from the routine issues, times of drastic health phenomena appear as periods in which media acts as a shining star in terms of building the ways of connection between lay people and experts in the course of health care management. Epidemics are extraordinary periods portrayed with chaos on several realms. In the blurred atmosphere of the days with a horrible crisis people turn to media with the hope to get some information and draw their road map. The COVID-19 pandemic stands as one of the striking

examples of the role of media in this period. This manuscript has handled the intersection of media and health care management during the COVID-19 pandemic under four headings via a deep survey of related documents and conventional and new media tools and it has revealed that the news and programs conveying via these tools mainly perpetuate the neoliberal understanding of health which gives the individual the whole responsibility of his/her health behaviors. Doing this, the media seems to ignore inequalities such as gender, age or social class which actually lie behind health status of people in many cases. Not only health authorities but also voices of other fields such as the ones of astrology, spirituality, etc. appear on screens or social media channels and keep giving people advice of getting over this chaotic period smoothly. However, the study has shown that these programs are inclined to follow a neoliberal approach which seems to erase the socio-economic determinants of health and to ignore social inequalities while giving advices about staying home, having fun at home, behaving their body and soul in a good manner by providing them with the necessary material and spiritual goods. The core point that is swept under the rug here by the media is that all these advices are in direct relation with social determinants such as age, wealth, gender, etc.

The spread of infodemic is an important drawback for the effective health care management. The negative function of the media in this process is the spread of fake news and the emergence of an infodemic along with the pandemic. In the post-truth era, fake news can become widespread much more easily. Because fake news turns into a propaganda tool with COVID-19 representations in the media, especially in such crisis periods and in a global society where communication opportunities are so abundant. As famous stage actor Coluche says, “the only thing true in a newspaper is the date of that day”. So, media also manipulates scientific and factual facts about COVID-19 together with fake news. This manipulation can take place in different ways. For instance, televisions address the feelings of people who are worried about the epidemic and actually use the basic weaknesses of the post-truth era. In the chaos environment created by information pollution, the efforts of global health authorities such as WHO and national public authorities to truly combat the epidemic are weakening and facing a greater challenge. Thus, the first struggle was the struggle against the epidemic and the second was the struggle against the infodemic that produced fake news about the epidemic. Social media channels in cyberspace are places where fake news is produced easily, and the content produced here is sometimes for the purpose of making fun, providing false information or propaganda. Therefore, these media channels should be used in a positive way for effective health care management.

CONCLUSION

The concluding remarks of the article indicates that media has played a vital role during the corona virus pandemic and that this role is in direct parallel with the issue of health care management. Media tools’ standpoint during this period acts as the mitigator of the ways that are and should be followed in the path of health management during the COVID-19 pandemic. The prominent impacts of both conventional and new media can be summed up under four main points which are the manipulative approach towards depicting the crisis in the framework of individuality; paving the way for an infodemic; transforming this health crisis into infotainment; ignoring the inequalities which exacerbated during the pandemic. As it is the case for each and every issue regarding media, media literacy should be a helpful pathway to be followed while acquiring and distributing information through mass media tools. As we mentioned above, the nature of the media today is based on distortion and deception. Therefore, the manner in which news about COVID-19 is presented in the media has similarly led to the rise of conspiracy theories and un-scientific types of information that try to marginalize scientific knowledge. In addition, it has been seen that the media used the COVID-19 news as an infotainment material, just like the war news, and thus tabloidized the horrors of reality.

Ethics Committee Approval: Since our study was not an experimental study including human or animal subject, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: EK, AB; Design: EK, AB; Data Collection/Processing: EK, AB; Analysis/Interpretation: EK, AB; Literature Review: EK, AB; Drafting/Writing: EK, AB; Critical Review: EK, AB.

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Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.879572

Duzce Med J, 2021;23(S1):86-93
Düzce Tıp Fak Derg, 2021;23(S1):86-93

Is Health Management of the COVID-19 Pandemic a Cause of Agricultural Commodity Prices? New Evidences From Bootstrap Fourier Causality Test

COVID-19 Pandemisinin Sağlık Yönetimi Tarımsal Emtia Fiyatlarının bir Nedeni midir? Bootstrap Fourier Nedensellik Testinden Yeni Kanıtlar

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 12.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 23.03.2021

ABSTRACT

Aim: Coronavirus disease 2019 (COVID-19) pandemic have included negative consequences both in health management and economic life at national and international level. The aim of this research is to examine the causal relationship between COVID-19 pandemic and agricultural commodity prices for the world.
Material and Methods: To this end, we employ Toda-Yamamoto and Fourier Toda-Yamamoto causality tests for the period of January 24, 2020 to January 22, 2021. Before testing the causal relationship between variables, we apply augmented Dickey Fuller (ADF) and Fourier ADF unit root tests to each series to determine maximum order of integration.
Results: The findings show that all variables are stationary in their first difference and the maximum order of integration is determined as 1. The results obtained from causality tests show that COVID-19 new cases Granger cause to coffee, sugar, cotton, corn, and soybean prices while COVID-19 new cases do not cause wheat and oats prices. It was also concluded that new deaths based on COVID-19 Granger cause to coffee, sugar, and cotton whereas COVID-19 new deaths do not cause to corn, soybean, wheat and oat prices.
Conclusion: In this study, time series analysis based on Toda-Yamamoto and Fourier Toda-Yamamoto causality tests highlight that the COVID-19 total new cases and total new deaths in the world has predictive power to predict further prices of agricultural commodities. Therefore, in terms of health management, policy makers should give substantial significance to the implementation of COVID-19 related health policies and agricultural policies together during the COVID-19 pandemic period.
Keywords: Coronavirus; public health; commodity markets; Granger causality.

ÖZ

Amaç: Koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisi ulusal ve uluslararası düzeyde hem sağlık yönetiminde hem de ekonomik hayatta olumsuz sonuçlar doğurmuştur. Bu araştırmanın amacı, COVID-19 salgını ile dünya için tarımsal emtia fiyatları arasındaki nedensellik ilişkisini incelemektir.
Gereç ve Yöntemler: Bu amaçla, 24 Ocak 2020 - 22 Ocak 2021 dönemi için Toda-Yamamoto ve Fourier Toda-Yamamoto nedensellik testleri kullanılmıştır. Değişkenler arasındaki nedensellik ilişkisini test etmeden önce, maksimum entegrasyon derecesini belirlemek için her bir seriye augmented Dickey Fuller (ADF) ve Fourier ADF birim kök testleri uygulanmıştır.
Bulgular: Bulgular, tüm değişkenlerin ilk farklarında durağan olduğunu ve maksimum entegrasyon derecesinin 1 olarak belirlendiğini göstermiştir. Nedensellik testlerinden elde edilen sonuçlar, COVID-19 yeni vakalarının kahve, şeker, pamuk, mısır ve soya fiyatlarının Granger nedeni olduğunu gösterirken COVID-19'a bağlı yeni vakaların buğday ve yulaf fiyatlarının Granger nedeni olmadığını göstermiştir. Ayrıca COVID-19'a bağlı yeni ölümler kahve, şeker ve pamuk fiyatlarının Granger nedeni olurken COVID-19 ölümlerinin ise mısır, soya fasulyesi, buğday ve yulaf fiyatlarının Granger nedeni olmadığı sonucuna varılmıştır.
Sonuç: Bu çalışmada, Toda-Yamamoto ve Fourier Toda Yamamoto nedensellik testlerine dayalı zaman serisi analizi dünyadaki COVID-19 toplam yeni vakalarının ve toplam yeni ölümlerin tarımsal emtia fiyatlarını tahmin etme gücüne sahip olduğunu vurgulamaktadır. Bu nedenle sağlık yönetimi açısından politika yapıcılar, COVID-19 pandemisi döneminde COVID-19 ile ilgili sağlık politikaları ve tarım politikalarının birlikte uygulanmasına büyük önem vermelidir.
Anahtar kelimeler: Koronavirüs; halk sağlığı; emtia piyasaları; Granger nedensellik.

INTRODUCTION

The world has faced an unprecedented pandemic crisis to date. Coronavirus disease 2019 (COVID-19) emerged in China, spread all over the world quickly, and caused great damage to the economies in a very short time. After China informed the World Health Organization (WHO) on December 31, 2019, the disease spread rapidly to Europe, Asia, and America. The first cases were seen in the US and France on January, 21 and January, 24 in 2020, respectively. WHO announced that it described the coronavirus disease as a pandemic on March 11, 2020 (1), and after this date, social and economic lives in countries began to slow down. The disease was transmitted very quickly, the deaths it caused increased day by day. At the beginning of the pandemic, there was no vaccine or drug developed to control it. Therefore, the most effective method of dealing with the virus was to reduce social mobility. Since the circulation of people, capitals, goods and services together with the developments in communication and transportation technologies in recent years has led to the rapid spread of the pandemic, maintaining social distance was the most effective method to reduce the transmission rate of the disease (2-4).

Countries without rich natural resources (oil, natural gas, precious metals, etc.), a reserve currency, and high government debts have been severely affected by COVID-19 pandemic. Measures taken to maintain social distance after the outbreak started deeply affected these countries. Working from home, not traveling very often, closing schools, shutting down the borders led to a decrease in consumption and production of goods and services in some sectors. This process caused economies to come to a standstill. Households working from home and not going out caused demand to slow down, and thus contractionary demand and curfews led to the firms to decrease supply. Therefore, the COVID-19 pandemic emerged as an external shock not caused by the dynamics of the economy itself and the measures taken against the pandemic caused a decrease in both consumption and production. As a result of the slowdown in supply and demand, the households' income and firms' profit decreased. The deterioration of cash flows of individuals and companies started to affect financial markets gradually. Increasing volatility in financial markets raised the fragility of economies in the next period and increased the risk of entering into recession. Economic policies such as tax cuts and credit expansions were implemented to increase the demand and supply against the external health shock and aimed at reducing costs of pandemic. However, decline in both supply and demand due to the COVID-19 outbreak revealed that traditional economic policies to stimulate supply and demand were insufficient. The rapid spread of the disease in countries substantially forced economy administrations to take extraordinary measures. Developed and developing countries started to carry out unconventional monetary and fiscal policies in order to both prevent decrease in supply and provide stimulation in demand. Direct cash supports were provided to low-income households, corporate and social security taxes were postponed, unemployment insurance and paid leave to families with children were continually given (5-7).

COVID-19 has put an extreme burden on the health systems of countries and these burdens have negatively affected health management. Lack of good governance, inadequacy in finance, reduction in service delivery, insufficiency in equipment and workers have been the most adversely influenced components of health managements (8-10). Furthermore, information has special place in health management (11). With regard to coronavirus pandemic, a lack of information about COVID-19 cases and deaths leads to inefficient decision-making process in economic and social policies (12). The deterioration in health management systems due to the COVID-19 pandemic has also affected the agricultural products market through complex structure of the world economy (13,14). Hence, the question of whether COVID-19 cases and deaths in the world provide considerable information about agricultural commodities needs to be answered.

It is argued that coronavirus has had an impact on commodity markets and has been one of the hot debated topics among policy makers (15). From economics perspective, aggregate supply and demand shocks affect commodity prices severely and cause to disruption in quantity supplied and demanded. Commodity prices fluctuate and deviate from equilibrium prices when external shock hit to the open economies. Accordingly, the price adjustment mechanism operates instantaneously in commodity markets and commodity prices are adjusted until which quantity supplied is equal to quantity demanded (16,17). One of the main concerns for policymakers from the beginning of COVID-19 has been to provide food supply security and price stability (18-20). In terms of supplying food, the COVID-19 disease has created difficulty in agribusiness industry, in particular supply channels for agricultural products have been interrupted due to the closed borders between countries and lockdowns in cities (20,21). In light of these developments for agricultural commodities and COVID-19 pandemic, it is very essential to quantify how COVID-19 pandemic has an influence on agricultural commodities. We therefore investigate the impact of new cases and deaths caused by COVID-19 in the world on agricultural commodity prices.

There is large body of literature examining the relationship between COVID-19 and economic-financial variables. The discussion about the effect of COVID-19 pandemic has centered on stock markets (22-31), gold and oil prices (32-36), and volatility (37-41). Considering the impact of COVID-19 spread on the economic-financial variables, the empirical results of these studies mostly vary across countries, methods, and periods. The recent study (42) probes the determinants of inflation for European Union member states in the COVID-19 pandemic period. Using spatial panel data analysis, this study concludes that inflation in European Union countries has been affected by member states and internal market and thus cooperation and coordination in macroeconomics in European Union are crucial to mitigate the adverse effects of COVID-19 pandemic. Contrary to the immense analysis of the COVID-19 effect on macroeconomic and financial indicators, the impact of COVID-19 pandemic on agricultural commodity markets has received little empirical attention. One of these studies (43) examined the causal relationship between COVID-19 total deaths and agricultural commodity prices.

This research includes corn, oats, rapeseed, soybeans, wheat prices and employs vector error correction model (VECM) and Granger causality test based on continuous wavelet transform. According to the results of VECM based Granger causality test, COVID-19 deaths granger causes to corn, oats, and rapeseed spot prices, which direction is running from deaths to spot prices. However, it was found that there is no causality from COVID-19 deaths to soybean prices. Another research (16) examined the effect of COVID-19 induced economic uncertainty on the volatility of S&P GSCI commodity index, crude oil, and gold prices by using vector autoregressive (VAR) model. The results of this study show that one standard deviation increase in world pandemic uncertainty leads to about 1.9% decrease in commodity volatility. Positive COVID-19 uncertainty shock causes to 270 basis points reduction in oil price volatility. On the other hand, one standard deviation shock in world pandemic uncertainty leads to approximately 30 basis point decrease in gold price volatility. One study (44) analyzed the potential impact of COVID-19 on the prospects of agricultural markets by utilizing on IMF economic growth forecasts with global-multi-commodity agricultural market model. The findings of this study indicate that decrease in the economic growth is expected to a 7-18% decrease in meat prices, 4-7% reduction in dairy products, 3.5-7% decline in grains, and 5-9% fall in oilseeds, respectively. On the other hand, COVID-19 pandemic is expected to a 1% or 50 million tones decrease in greenhouse gases based on agricultural production. One of the recent studies (45) inspected the impact of oil and global demand on volatility of commodity prices during the COVID-19 pandemic. The empirical results of this study suggest that positive shock in oil prices lead to positive response of wheat and corn prices while response of soybeans and rice price are negative. Positive shock in oil price volatility causes to negative agricultural price returns. Gold and silver give negative response to oil shock whereas copper prices respond positively to oil shock. Furthermore, aluminum price responds positively to oil price shock. Other research (46) examined the relationship between sugar price and financial uncertainty in times of COVID-19 pandemic. According to the results of this study, since 2008 global economic crisis, there is a significant and negative relationship between sugar price and financial uncertainty. However, the results obtained from regression analysis present that during the COVID-19 term, there is no structural change between sugar price and financial uncertainty.

By reviewing literature, it is obvious that there is lack of empirical studies concerning the relationship between COVID-19 pandemic and agricultural commodity prices. Hence this research is reasonable initiative to fill this gap by examining the impact of COVID-19 new cases and new deaths on coffee, sugar, cotton, corn, soybean, wheat, oats prices. There are also two other contributions of this research: first, the period is extended and covering from 24 January 2020 to 22 January 2021; second, we utilized the Fourier based causality test (hereafter Fourier Toda-Yamamoto) newly introduced by Nazlioglu et al. (47). The advantage of using Fourier Toda-Yamamoto causality test is to consider the structural changes in data since conventional causality tests in time series analysis assume no sharp and smooth changes. In addition, studies investigating the association between COVID-19 cases or deaths and agricultural commodity prices (43,44) do not consider the smooth structural changes. Thus, one of the important contributions of this study in the COVID-19 literature is to employ Fourier Toda-Yamamoto causality test in examining the link between COVID-19 deaths and cases and agricultural commodity prices. The expected new insight gained by applying the Fourier Toda-Yamamoto causality test is to find a causal link running from COVID-19 cases and deaths to agricultural commodity prices.

MATERIAL AND METHODS

Causality Tests

Since Wald statistic does not follow a chi-square distribution if the series are integrated, we utilize Toda and Yamamoto (TY) test (48) instead of Granger (49) causality test. Because this approach overcomes the problem by using level data and estimating $VAR(p+d)$ model where d represents the maximum integration order of variables. They define $VAR(p+d)$ model as

$$y_t = Z_t + J_1 y_{t-1} + \cdots + J_{p+d} y_{t-(p+d)} + \varepsilon_t \quad [1]$$

where Z_t represents the deterministic terms, y_t consists of endogenous variables, *J* shows the coefficient matrices and ε_t are independent and identically distributed errors. TY approach does not consider any structural changes in data. Enders and Jones (50) show that the Granger causality analysis may provide misleading inferences if structural changes in data are improperly modelled or ignored. Nazlioglu et al. (47) extends the TY approach by considering smooth structural breaks using Fourier approximation. They define the deterministic terms with single frequency as follows:

$$Z_t \cong \alpha_0 + \alpha_1 t + \alpha_2 sin\left(\frac{2\pi kt}{T}\right) + \alpha_3 cos\left(\frac{2\pi kt}{T}\right) \quad [2]$$

where α_2 and α_3 measures the amplitude and displacement of the frequency, respectively and k represents the Fourier frequency. Then, we can write the $VAR(p+d)$ model as

$$y_t = \alpha_0 + \alpha_1 t + \alpha_2 sin\left(\frac{2\pi kt}{T}\right) + \alpha_3 cos\left(\frac{2\pi kt}{T}\right) + J_1 y_{t-1} + \cdots + J_{p+d} y_{t-(p+d)} + \varepsilon_t \quad [3]$$

Nazlioglu et al. (47) utilizes Wald statistic to test the null hypothesis of Granger non-causality based on zero restrictions on the first p parameters. Since Wald test depends on the Fourier frequency, *k*, it may not have a chi-square distribution. To overcome this problem, they obtain bootstrap distribution of Wald statistic.

The standard Toda-Yamamoto and Fourier Toda-Yamamoto causality tests require determining the lag lengths (*p*) and the number of Fourier frequency (*k*). Following Nazlioglu et al. (47), we benefit from Schwarz information criterion to determine the optimal number of lags and the number of Fourier frequency. Specifically, we set the number of lags to p^{max} and the number of Fourier frequency to k^{max} and select the optimal number of *p* and *k* that yields the smallest information criterion value.

Data

To investigate the relationship between COVID-19 pandemic and agricultural commodity prices in the world, this research employed a dataset involved of 252 daily observations for prices of coffee, sugar, cotton, corn, soybean, wheat, and oats. The period covered in this study is from January 24, 2020 to January 22, 2021. COVID-19 confirmed new cases and new deaths were retrieved from Our World in Data database (ourworldindata.org/coronavirus). Agricultural commodity prices, expressed in US Dollars per bushel, were obtained from Macrotrends database (macrotrends.net).

Statistical Analysis

Statistical analysis was performed by using GAUSS v.19.2 software. All variables are used in their natural logarithms. Figure 1 displays the natural log of our variables and their Fourier approximations. As it is shown in Figure 1, the Fourier approximation mimics the dynamics of the series very well.

RESULTS

Before applying the causality tests to investigate Granger causality linkage between agricultural commodity prices and COVID-19 caused new cases and new deaths, we employed the Augmented Dickey Fuller (ADF) unit root test proposed by Dickey and Fuller (51) and Fourier ADF unit root test suggested by Enders and Lee (52) to determine the maximum order of integration for TY approach. The unit root test results for the constant and trend model are reported in Table 1. According to the results, variables of COVID-19 new cases and new deaths reject the null of hypothesis of unit root at 1% significance level in their level, while all commodities do not reject the null hypothesis in their level. Since whole variables are stationary in their first difference, we determine the maximum order of integration as 1.

After finding the maximum order of integration, next step for this study is to detect direction of causality among variables. The results from TY causality test are presented in Table 2. The results show that the null hypothesis of no-Granger causality from new cases to commodity prices is rejected for coffee, cotton, corn, and soybean. The results support information transmission from COVID-19 to commodity prices. The null hypothesis of no-Granger causality from new death to commodity prices is rejected for coffee, sugar, and cotton.

Table 3 shows the results from Fourier TY causality test. The findings from Fourier TY causality test are similar to that of TY test except causality from new cases to sugar price. This evidence implies that the causal relationship between COVID-19 and commodity prices are robust to structural changes in data. Besides, the Fourier TY causality test helped us confirm the robustness of the results with the TY causality test. Combining results from both tests, the findings provide evidence for COVID-19 information having predictive power for agricultural commodity prices except wheat and oats.

DISCUSSION AND CONCLUSION

COVID-19 pandemic have included negative consequences both in health management and economic life at the national and international level. The contamination of coronavirus and measures taken to relieve the adverse impacts of pandemic have transformed

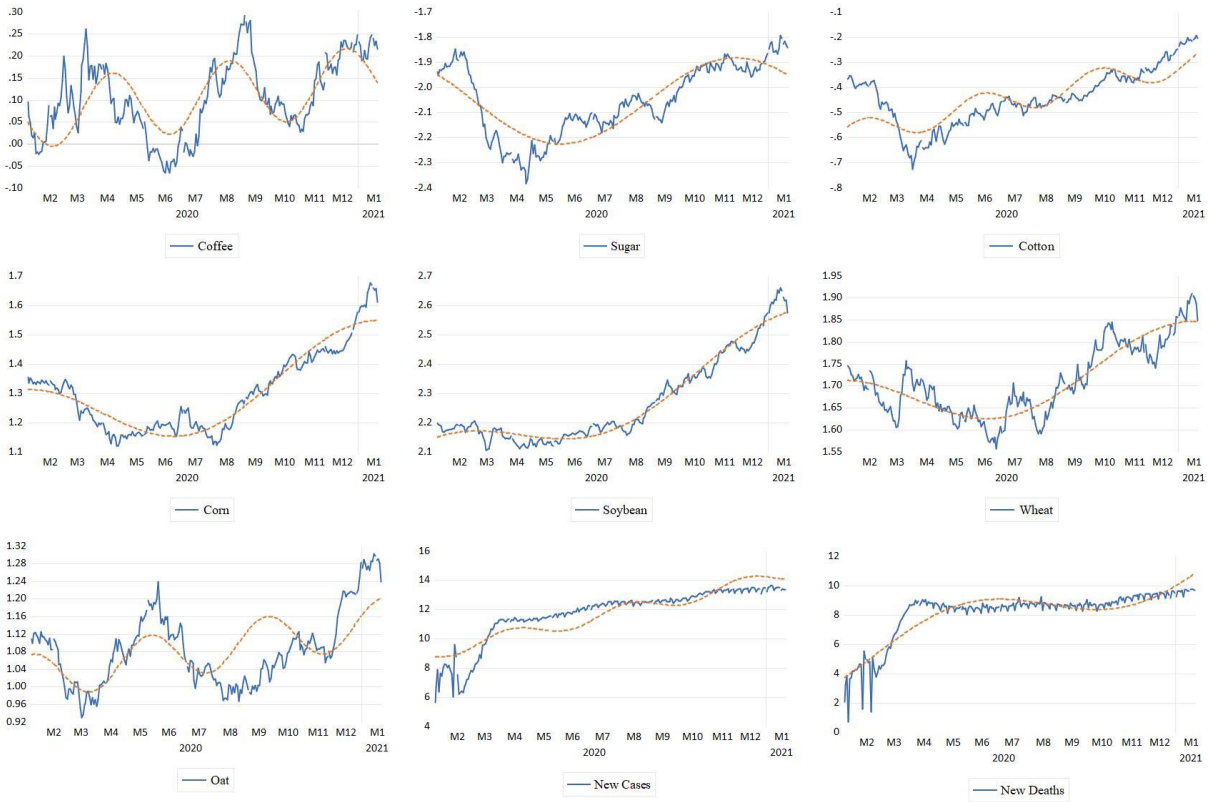

Figure 1. Dynamics of agricultural commodity prices and their Fourier approximations

Table 1. Results from unit root tests

Variables	Level			First Difference		
	ADF	FADF	*k*	ADF	FADF	*k*
coffee	-2.377	-3.047	3	-14.712 ***	-15.013 ***	3
sugar	-1.983	-2.344	3	-15.786 ***	-16.132 ***	3
cotton	-2.399	-2.646	3	-15.069 ***	-15.215 ***	3
corn	-1.343	-1.524	3	-13.602 ***	-13.807 ***	3
soybean	-1.764	-3.655	1	-13.066 ***	-13.068 ***	1
wheat	-2.502	-3.637	1	-16.393 ***	-16.382 ***	2
oats	-1.691	-1.942	3	-14.763 ***	-15.082 ***	3
new cases	-4.597 ***	-5.681 ***	3	-5.106 ***	-5.679 ***	1
new deaths	-7.705 ***	-7.153 ***	1	-5.667 ***	-6.633 ***	1

***, **, and * represent significance level at 1, 5, and 10 percent, respectively. *k* denotes Fourier frequency. The maximum number of Fourier frequency set to 3 and is selected by the minimization of sum of squared residuals as in Enders and Lee (51). The optimal lag(s) were determined by Schwarz information criterion. The critical values for ADF test are -3.970 (1%), -3.420 (5%) and -3.130 (10%) and the critical values for FADF test are -4.870 (1%), -4.310 (5%), -4.020 (10%) for k=1; -4.620 (1%), -4.010 (5%), -3.690 (10%) for k=2; -4.380 (1%), -3.770 (5%), -3.430 (10%) for k=3 (51, p.197).

Table 2. Results from Toda-Yamamoto causality test

Commodity	Wald	Asymptotic p-value	Bootstrap p-value
	$H_0: New\ cases \neq> commodity$		
coffee	61.267***	0.000	0.000
sugar	25.229	0.237	0.271
cotton	30.671*	0.079	0.092
corn	41.075**	0.016	0.046
soybean	39.107*	0.027	0.060
wheat	21.886	0.586	0.601
oats	27.165	0.297	0.298
	$H_0: New\ deaths \neq> commodity$		
coffee	54.870***	0.000	0.000
sugar	29.693*	0.075	0.090
cotton	32.409*	0.039	0.070
corn	27.239	0.129	0.165
soybean	15.387	0.754	0.723
wheat	14.417	0.809	0.806
oats	14.546	0.802	0.782

***, **, and * show 1, 5, and 10 percent level of statistical significance, respectively. $\neq>$ denotes the null hypothesis of Granger non-causality. Bootstrap p-values are based on 1000 replications. The optimal *p* are determined by Schwarz information criterion.

Table 3. Results from Fourier Toda-Yamamoto causality test

Commodity	Wald	Asymptotic p-value	Bootstrap p-value	*k*
	$H_0: New\ cases \neq> commodity$			
coffee	61.184***	0.000	0.000	1
sugar	35.135**	0.027	0.048	3
cotton	36.103**	0.021	0.046	1
corn	45.728**	0.001	0.011	1
soybean	42.548**	0.004	0.018	1
wheat	22.420	0.554	0.525	1
oats	18.787	0.599	0.577	1
	$H_0: New\ deaths \neq> commodity$			
coffee	51.684***	0.000	0.000	3
sugar	30.169*	0.050	0.090	3
cotton	32.726**	0.026	0.047	1
corn	25.834	0.135	0.157	3
soybean	16.403	0.630	0.612	1
wheat	21.013	0.336	0.341	3
oats	13.284	0.824	0.801	1

***, **, and * show 1, 5, and 10 percent level of statistical significance, respectively. $\neq>$ denotes the null hypothesis of Granger non-causality. Bootstrap p-values are based on 1000 replications. The optimal *p* and *k* are determined by Schwarz information criterion.

the socioeconomic life in the world. At the same time, COVID-19 cases and deaths have affected demand and supply in the agricultural sector and thereby agricultural commodity prices have demonstrated severe fluctuations throughout the year. This study was an attempt to examine the impact of COVID-19 spread on agricultural commodity prices. Particularly, we analyzed the causal relationship between COVID-19 pandemic and coffee, sugar, cotton, corn, soybean, wheat, and oats prices. We employed TY and Fourier TY Granger causality methods to test this relationship. The findings of our study demonstrated that there is a causal relationship leading from COVID-19 cases to coffee, sugar, cotton, corn, and soybean prices while there is no causality from COVID-19 new cases to wheat and oats prices. Moreover, we found that COVID-19 new deaths granger causes to coffee, sugar, and cotton whereas no causality is existing between COVID-19 deaths and corn, soybean, wheat, and oats prices. Our results are consistent with the previous study (43) covered in the literature part, which found that there is a causality running from COVID-19 deaths to corn prices. However, we reached the result of no causality from COVID-19 based new cases and deaths to oats and wheat prices. This result is different when compared to results of another research (45), which found that positive changes in oil prices during the COVID-19 period leads to positive response of wheat and corn prices. A potential explanation for these findings is that there is an evidence of causal relationship between COVID-19 and agricultural commodity prices beyond the nexus between stock markets, energy prices and COVID-19 pandemic. Whereas estimating the impact of COVID-19 spread on stock markets, energy prices, and exchange rates has some merits, ignoring agricultural commodities such as coffee, sugar, and corn and their interaction with COVID-19 pandemic remains controversial. Overall, our findings can be interpreted to mean that COVID-19 cases and deaths are associated with agricultural commodity prices in the world and COVID-19 information is having predictive power for agricultural commodity prices except for wheat and oats. There are some probable threats for agricultural markets owing to the COVID-19 cases and deaths. First, changes in COVID-19 new cases and deaths in the world may have changes in coffee, sugar, cotton, corn, and soybean prices whereas no changes might be observed in wheat and oats prices. New cases and deaths due to the COVID-19 pandemic may affect labor supply in the agricultural markets and thereby supply chain in the agricultural products. Indeed, the spread of COVID-19 pandemic cause to shortages in coffee, sugar, cotton, corn, and soybean production and therefore the prices of these products might be influenced by these changes in the COVID-19 health management. Second, not only the supply side of agricultural market has been affected by the novel COVID-19 virus-based cases and deaths but also demand side of agricultural products are affected. COVID-19 crisis might lead to disruption in countries' macroeconomic conditions. Slow-down in economic activities might cause to drop in income and thereby affecting the demand of coffee, sugar, cotton, corn, and soybean. Because of changes in demand, the prices of coffee, sugar, cotton, corn, and soybean might be affected. The COVID-19 process caused profound changes in health systems management. As COVID-19 related cases and deaths increased, health management began to have more difficulties. However, this process also led to significant changes in economic and social life, especially in the agricultural sector. In addition to the curfews in countries and the decrease in total demand, the supply chain management was adversely affected by the pandemic and the virus spread rapidly among economic actors in the agricultural market. Because of the fact that there is a causal relationship between COVID-19 caused new cases and new deaths and agricultural commodity prices, policymakers should design the COVID-19 related health and agricultural commodity policies together. Regarding the deficiencies in health management systems, the spread of COVID-19 diseases among employees should be reduced and vaccination priority should be given to economic actors in the agricultural sector. Moreover, supply chain management in the agricultural sector should be strengthened by providing economic and health support to producers. Hence, this topic should deserve further research.

Ethics Committee Approval: Since our study was not an experimental study including human or animal subject, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: ETK, MA; Design: ETK, MA; Data Collection/Processing: MA, ÇK; Analysis/Interpretation: ETK, MA, ÇK; Literature Review: ETK, MA; Drafting/Writing: ETK, MA, ÇK; Critical Review: ETK.

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Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.861559

Duzce Med J, 2021;23(S1):94-105
Düzce Tıp Fak Derg, 2021;23(S1):94-105

A Study in the Children's Health-Oriented Health Policies After COVID-19 Pandemic Period in Turkey

Türkiye'de COVID-19 Pandemisi Sonrası Dönemde Çocuk Sağlığına Yönelik Sağlık Politikaları Üzerine Bir İnceleme

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ABSTRACT

Aim: The coronavirus disease 2019 (COVID-19) pandemic revealed significant negative effects on children and people with disabilities who are classified as socioeconomically disadvantaged groups in addition to individuals in Turkey as in the whole world. Especially, children constitute the most disadvantaged group in families with low socioeconomic status. The situation of these children was analyzed in the study. Also, the performance of health policies for children in COVID-19 pandemic period has been evaluated.
Material and Methods: This study was used in the statistics published in Turkey and in various countries.
Results: Outbreaks are likely to cause significant physical and psychological problems, especially in children. In particular, the medium and long-term effects of being locked up at home on children when their parents have to work are not known in addition to the social distancing that they experience due to the inability of children to come together with their peers. In addition to the deaths in the near and distant environment due to the disease, the fear of getting sick has also a high risk to form negative effects on the psychological development of children. For this reason, to protect the health of future generations, policies implemented for the health of today's children gain importance.
Conclusion: The right to health and education should be universally given to every child. But in developing countries, families cannot provide adequate support to their children for reasons such as unequal income distribution and unemployment. Children are forced to work to support their families when the help of government and institutions is insufficient or cannot be done regularly.
Keywords: Health expenditures; epidemic; child development.

ÖZ

Amaç: Koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) pandemisi tüm dünyada olduğu gibi Türkiye'de de her sosyoekonomik düzeyde birey yanında dezavantajlı kesimler olarak adlandırılan çocuklar ve engelliler üzerinde de önemli olumsuz etkiler ortaya koymuştur. Özellikle çocuklar sosyoekonomik durumu düşük olan ailelerde en dezavantajlı grubu oluşturmaktadır. Çalışmada bu çocukların durumu analiz edilmiştir. Bunun yanında, COVID-19 pandemi döneminde sağlık politikalarında çocuklara yönelik olanlarının performansları da değerlendirilmiştir.
Gereç ve Yöntemler: Bu çalışmada çeşitli ülkelerde ve Türkiye'de yayınlanan istatistiklerden yararlanılmıştır.
Bulgular: Salgınların özellikle çocuklarda önemli fiziksel ve psikolojik sorunlara neden olabilme ihtimali bulunmaktadır. Bilhassa oyun çağındaki çocukların yaşıtları ile bir araya gelememesi nedeniyle yaşadıkları sosyal uzaklaşma yanında, ebeveynleri çalışmak zorundayken evde kilitli kalmanın orta ve uzun vadede ne gibi etkilere yol açacağı henüz bilinmemektedir. Buna ek olarak, hastalık dolayısıyla yakın ve uzak çevrede yaşanan ölümler olması yanında hastalığa yakalanma korkusunun da çocukların psikolojik gelişimleri üzerine olumsuz etkiler yaratma ihtimali oldukça yüksek görünmektedir. Bu nedenle gelecek nesillerin sağlığını korumak amacıyla günümüz çocuklarının sağlığına yönelik uygulanan politikalar önem kazanmaktadır.
Sonuç: Sağlık ve eğitim hakkı evrensel olarak her çocuğa verilmelidir. Ancak gelişmekte olan ülkelerde gelir dağılımındaki bozukluklar, işsizlik gibi nedenlerle aileler çocuklarına yeterli desteği sağlayamamaktadırlar. Devlet ve kurumların yardımları da yeterli gelmediğinde veya düzenli yapılamadığında çocuklar aileye destek olmak için çalışmak zorunda kalmaktadırlar.
Anahtar kelimeler: Sağlık harcamaları; salgın; çocuk gelişimi.

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Received / Geliş Tarihi : 14.01.2021
Accepted / Kabul Tarihi : 21.03.2021
Available Online /
Çevrimiçi Yayın Tarihi : 25.03.2021

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic harms children's health, social and financial well-being around the globe. Although children are not in a risk category medically, they are significantly affected by the pandemic. The focus of short-term policies is to reduce the risks of physical and psychological effects. However, even before COVID-19 affected the efforts against reducing global poverty, yields of economic growth were unevenly divided in developing economies. Providing access to healthy food and diet; providing emergency care and protection for children; reducing the inaccessibility of education for poor children are still major challenges.

As countries struggle with the pandemic, a rise in health expenditures and economic revitalization continues to be a source of anxiety for countries. These two major concerns have damaged the disadvantaged groups in countries even more, and quarantine measures have aggravated the already existing problems. Income and employment issues amplify the problems in services such as education and health care. While high-income families are less affected by these problems, low-income families are the most affected. Healthcare crises caused by funeral services and not having a health insurance policy are becoming impoverishing health expenditures.

From a purely medical point of view, it appears that children are relatively less affected by COVID-19. However, the economic and social impacts of the pandemic do not affect children equally. The growing inequality caused by the parents creates a permanent gap between advantaged and disadvantaged children in their future lives. As the pandemic spreads all over the world, it changes the daily lives of children. The disease and being stuck indoors caused by it, and the political responses to social distancing affect almost every aspect of the environment in which the children live. Services offered by schools and other organizations, such as education and leisure activities for children, are interrupted by lockdowns. Children are not the faces of this pandemic, but they risk being among the most prominent victims. Children who live in poorer families and neighborhoods, and who are currently in disadvantaged positions, are more likely to suffer further harm from the lockdowns.

Child labor in developing countries arises during poverty when families face financial difficulties. Poverty can be caused by individual shortcomings or by political and economic inequalities. The emergence of poverty can be a deep-rooted situation, but it can also be caused by the sudden illness or the loss of one of the parents. Family is the determinant factor in child labor. Thus, income, life, and employment inequalities should be tracked beforehand, the definition of poverty should be expanded and children's situation should be clarified as well. Although every study is explained with examples, such explanation is not sufficient due to the complex and overlapping reasons of the subject, and the existence of disadvantaged groups in societies still persists.

In this context, the purpose of this paper is to analyze the health policy performance of Turkey regarding children during the COVID-19 pandemic. It is an important field of study to analyze the health policies for disadvantageous groups such as women, children, and elderly people both in the World and in Turkey. We expect to provide a good contribution to the related literature by providing policy performance evaluation towards children in the pandemic period since the negative effects of the pandemic have not been fully understood and suitable policies regarding the outbreak were not yet created. To the best of our knowledge, Denmark is the first country that initiated specific health policies for children during the pandemic period. However, there is not scientific research or an academic paper that evaluated the performances of the health policies for children. Therefore, this paper will be one of the early papers analyzing this subject.

In the first part of the study, the evolution of health expenditures and literature survey is provided. Then, through a detailed analysis of the negative impacts of the pandemic, particularly on vulnerable children, the study will offer alternative policy recommendations to protect the children from the pandemic.

MATERIAL AND METHODS

This study was used in the statistics published in Turkey and in various countries. The study used open access data based on The Turkish Statistical Institute (TurkStat), International Monetary Fund (IMF) and European Community Statistical Office (EuroStat).

RESULTS

In this study, health policy and children were examined in Turkey. Outbreaks are likely to cause significant physical and psychological problems, especially in children. In particular, the medium and long-term effects of being locked up at home on children when their parents have to work are not known in addition to the social distancing that they experience due to the inability of children to come together with their peers. In addition to the deaths in the near and distant environment due to the disease, the fear of getting sick has also a high risk to form negative effects on the psychological development of children. For this reason, to protect the health of future generations, policies implemented for the health of today's children gain importance.

The Evolution of Health Expenditures

The level of health expenditure in a country and how it changes over time depending on a wide variety of demographic, social, and economic factors, as well as the financing arrangements and organization of the health system. Therefore, there are also differences in academic research.

Pre-pandemic health expenditures have been investigated in relation to economic growth. Health expenditures were mostly analyzed by private and public expenditures (1). When the ratio of health expenditures to GDP (an indicator of financial needs of a national healthcare system from a macroeconomic perspective) is studied, it is observed that in many countries health expenditures have increased faster than the GDP in the last 40 years. Public expenditures are of a first priority compared to private expenditures, and they hold an important place (2). Developing countries with limited resources will need to carefully reconsider how to allocate and use their resources more efficiently in the COVID-19 outbreak. Such resource allocation efforts form the basis of quality primary health care for all. They also aim to strengthen the already existing weak systems.

Studies that estimate the impact of COVID-19 on poverty show that the progress made in the past decade around the world has disappeared and the impact of the pandemic on poverty will be devastating. Limited access to healthcare spending is a factor that can worsen the spread of the virus. Increased health expenditures due to disease and diagnosis, employment without insurance coverage, unemployment, and the risk of disease transmission in low-income groups are areas that make it clear that the health expenditures should be increased. Especially densely populated areas, such as urban slum areas, are places where disease contamination increases. Therefore, preventive health expenses should be made for those living in crowded places. Health spending includes a comprehensive active macroeconomic policy in the form of financial and monetary support for struggling hospitals and healthcare institutions as well as preventive and mitigating health measures (3).

As shown in Figure 1, across the EU countries, per capita health expenditure increased by around 3.0% each year (adjusted for inflation) between 2013 and 2019, compared to an annual growth rate of only 0.7% between 2008 and 2013. There are large differences in the amount of health spending in the Euro area (4). There is a strong correlation between income and healthcare expenditures. Among EU member states, expenditure levels in Germany, Austria, Sweden, and the Netherlands are 50% above the EU average. Romania, Latvia, Bulgaria, and Croatia are among the countries with the lowest expenditure.

Following a period of slow and even negative growth in health expenditure in Europe following the 2008 economic crisis, growth rates are increasing again in almost all countries.

Healthcare expenditure across Europe in 2020 was significantly affected by the COVID-19 outbreak. The development of the crisis has resulted in the rapid transfer of resources to the health sector to improve testing and diagnosis facilities and to increase capacity for treating patients in the health sector. On the other hand, there have been sharp declines in many non-COVID-19 services, such as primary healthcare consultations and non-emergency surgeries.

The discovery of the vaccine and its introduction to the public raises the hopes for the termination of the pandemic, but the uncertainties created by the new waves of the virus on the economy continue. It is estimated that the global economy will grow by 5.5% in 2021. In order to achieve this growth, public support will need to continue intensively (5). The improvement in economies varies significantly between countries, depending on the effectiveness of the support brought by the implemented policies, the spread of the pandemic, and other significances that entered the crisis. Evaluating the effects of COVID-19 on societies, economies, and vulnerable groups, it is necessary to be prepared for the problems that will arise during and after the disease as well as the disease itself to get rid of the crisis.

The spread of the COVID-19 pandemic differs between disadvantaged groups in contact with factors such as the lockdown measures, the intensity of the disease, the level of exposure to the psychosocial and socio-economic crises people experience during the pandemic. According to the survey study conducted on 1,066 participants in Bangladesh, poor people feel more insecure due to the increase in the prices of basic needs, the prevention of formal education, and their inability to stock up on food. Those with high income can protect themselves compared to the poor (6). Elders, women, and children are more affected along with the poor as disadvantaged groups during the pandemic process.

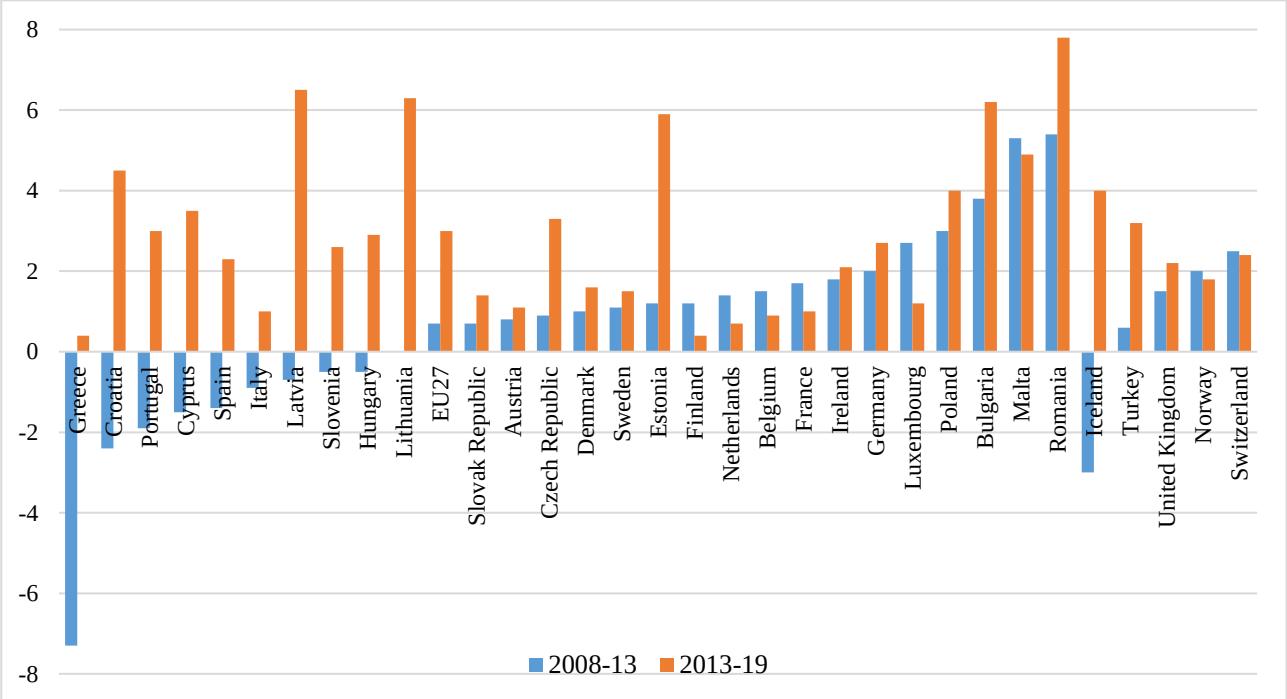

Figure 1. Annual average growth (real terms) in per capita health spending, 2008-19 (or nearest year). Note: The EU average is unweighted. Growth rates and time periods may have been adjusted by the OECD Secretariat to take account of breaks in series. Sources: OECD Health Statistics 2020, Eurostat Database

Literature Survey

COVID-19 caused not only great health problems but also large economic losses. Some papers in the literature indicating the economic and social problems as a consequence of the COVID-19 pandemic. Mayer and Lewis (7) investigated different policies applied in different regions. Ceukelaire ve Bodini (8) provided the statistical analysis on patients and deaths. The authors focused on elderly people and explained the economic effects as a consequence of the loss of old patients. Although children represent another disadvantageous group, there is not enough study in the literature addressing the risks they confront, how to cope with the pandemic, and how to educate the families and the children. One of the early study addressing to protect children from pandemic were initiated in 2007 (9). However, this study focused on just the pandemic but how to treat children and how to manage the fragile group of children was not explained. Saxena and Saxena (10) also explained how to protect children from the pandemic. There are also some studies pointing to the violence during the pandemic (11). There is also a limited number of papers on children in Turkey. İşlek (12), Kara (13) and Yorgancıoğlu (14) analyzed the policies towards children during the pandemic in Turkey. However, those studies were limited with the explanation of measures chronologically.

The Impact of COVID-19 on Children

In the first months of the COVID-19 pandemic, lockdown measures reduced the morality rates at an economic cost. It was implemented as going out only for essential needs, closing non-compulsory workplaces, minimizing others' work, and schools turning to online education. More parents had to work from home during the pandemic, and those who were unable to work lost their income. The fact that the effects of the pandemic are versatile and uncertain has led researchers to conduct various research on different topics regarding the COVID-19.

Comparing the effects of the pandemic on health inequalities in line with the Spanish flu pandemic of 1918 and the H1N1 epidemic in 2009, Bambra et al. (15) examined the potential consequences for health inequalities. In another study comparing previous epidemics and pandemics, the controlled and uncontrolled spread of the COVID-19 was examined by comparing it (16). COVID-19 has been found to be a more dangerous disease in comparison with others regarding the rate of spread (17). Due to the rapid transmission of the pandemic and the lockdown measures, there has been an increase in the cases of depression, stress, and anxiety. Since the unemployment rate with the COVID-19 in Australia increased three times more than expected, researchers have examined the relationship between psychological distress and selected health behaviors since the outbreak. Some people have a tendency for social withdrawal or psychological distress associated with the pandemic by participating in negative health behaviors such as smoking or consuming alcohol. It was observed that people with a past of severe depression are more affected by the lockdown and the pandemic. Almost half of the participants reported a decrease in physical activity. Only 20% had an increase in physical activities. Those with sleep problems also increased by 40%. In Australia, a striking number of 70% increase in alcohol consumption has been observed (18).

A very small group of 8 children in the UK showed symptoms of COVID-19, but 2 of them tested positive and were treated (19). Although children are largely relieved from the direct health effects of COVID-19 to date, the crisis has a profound effect on the well-being of children. Childhood and adolescence periods are essential stages of human development, where young people develop knowledge and skills to deal with critical aspects of their health, and it is also the first time they experience mental health problems.

The pandemic has significantly disrupted the daily lives of children and adolescents, creating health problems in their adulthood. 188 countries around the world have made schools mandatory, and this decision has affected more than 1.5 billion children and teenagers. Closures of schools, educational institutions, and social activity areas increase the risk of malnutrition, maltreatment, and domestic violence. It is important to acknowledge that the disease outbreak prevention methods will affect some groups of children more than others. These vulnerable groups of children include children living in poverty, children with disabilities, children in out-of-home care, and children at risk of child labor. Moreover, pandemics and measures have the potential to create new vulnerable children (20).

In general, the regions that will affect most of the economic reflections of the pandemic are estimated to be Africa, the Middle East, and South Asia, respectively. It is expected that 80 to 85% of all people who will be dragged into extreme poverty after the pandemic are going to be Sub-Saharan Africans or South Asians (21). The situation of the poor is similar in developed countries. It is not possible for low-income families to comply with quarantine i.e. not going to work and food stocking. Low-income jobs such as couriers, cleaning staff, and cooks are occupations that cannot be done remotely. Low-income earners who are less medically insured often work in informal, insecure jobs. It is not possible for these people, who do not have a regular income, to stock up food during the quarantine period. Particularly poor children living in such families experience nutritional problems since the institutions where they are provided daily nutrition are closed. While these children are directed to virtual learning with the closure of the schools, they do not have access to fast internet.

Children from countries with high-income levels, who carry risk factors for health, including smoking, alcohol consumption, illegal drug abuse, unhealthy diet, lack of physical activity, and obesity, were also adversely affected by COVID-19. Quarantine also made them suffer from poverty, lack of education and loss of income, etc. Although alcohol and tobacco control policies have made progress in reducing overall consumption, heavy alcohol consumption continues to be a problem for a significant portion of adolescents and adults. Drug abuse also reaches 15% among EU country youth. There are large socio-economic inequalities for most health risk factors. For example, rates of overweight and obesity among children and adolescents are 50% higher in wealthier families compared to those living in poorer families (22). As an example, children and youth in EU countries have weight problems. On average, one in five adolescents is overweight. Weight problems caused by unhealthy eating

habits and lack of physical activity are expected to deepen with the closure of schools and quarantine processes.

The COVID-19 is the interruption of the implementation of routine vaccination programs. Families who fear exposure to the new virus implement restrictions that prevent children from getting vaccinated.

The Impact of the Pandemic on Poor Children

Poor children are more affected by the consequences of the pandemic, with increasing welfare deficits from the past. Children living in poorer households are at increased risk of contracting and transmitting the virus due to underlying health problems, weak immunity systems, and low prevalence of vaccination among children (4). Poor families are less financially robust. They are more fragile against job and earnings losses. Health, sanitation, housing, education are already a major problem in household and child poverty that occurs in poor regions, especially in countries with income inequality. When children are confined to homes due to the pandemic, they cannot participate in distance education nor they can play or study. The most important economic feature of the pandemic crisis is that it reveals structural inequalities worldwide. In economies where only growth prescriptions have been suggested for many years, it does not solve the poverty problem unless the continuity of growth and income distribution is balanced. Unless the income distribution is intervened, the poor are always poor. The income generated as a result of growth is shared among high-income groups. Figure 2 is illustrated: Poverty increases as income inequality increases regionally or globally. In Turkey, one of the countries with the highest income inequality in Europe, the 20% group with the highest income spends almost half of the total income, and the remaining 80% of the population spends the remaining 50% (23).

During the pandemic period, systematic inequalities began to become clearer. For the previous generation, it was possible to find a good job with a living wage once they obtained a high school diploma. There were also income support and social services programs provided for poor people. The involvement of one of the family members in employment was to solve the problem of poverty. However, today, more and more people are unable to find work, even though they are university graduates, and each family member is forced to work in several temporary, contractual, and freelance jobs to earn a living. In Turkey, the global labor force participation rate has increased by about 5% in the last 5 years.

Employment and economic activity have suffered significantly due to the outbreak. Those who have worked all their lives and suddenly found themselves dependent on reliefs have begun to question their beliefs that having a job is the best social program. Many people have been deprived of any kind of revenue assurance, paid sick leave, or worker protection. This has led to a worldwide catastrophe in the public health crisis.

Figure 3 illustrated that Turkey, Serbia, and Bulgaria share the top three, as they are similar to each other in the distribution of inequality within the European Union when examining those at risk of poverty or social exclusion (24). According to Figure 4 estimates, the global socio-economic crisis caused by the COVID-19 pandemic will have caused more than 117 million children to grow poor by the end of the year (25).

The harmful effects of the pandemic are not evenly distributed around the world. As it can be seen from the figure above, while the damaging effects occur less in Europe, it increases to the East and reaches its highest form in South Africa. Physical nutrition and mental nutrition, which are important aspects in the development of children, are interrupted by reasons such as families losing their income or parents losing their lives.

Besides, there is a correlation between low-income level and low employment and child abuse (26). Therefore, the expected increase in poverty and decline in employment may negatively affect the children more than the adults. Based on the previous experiences, increasing unemployment of

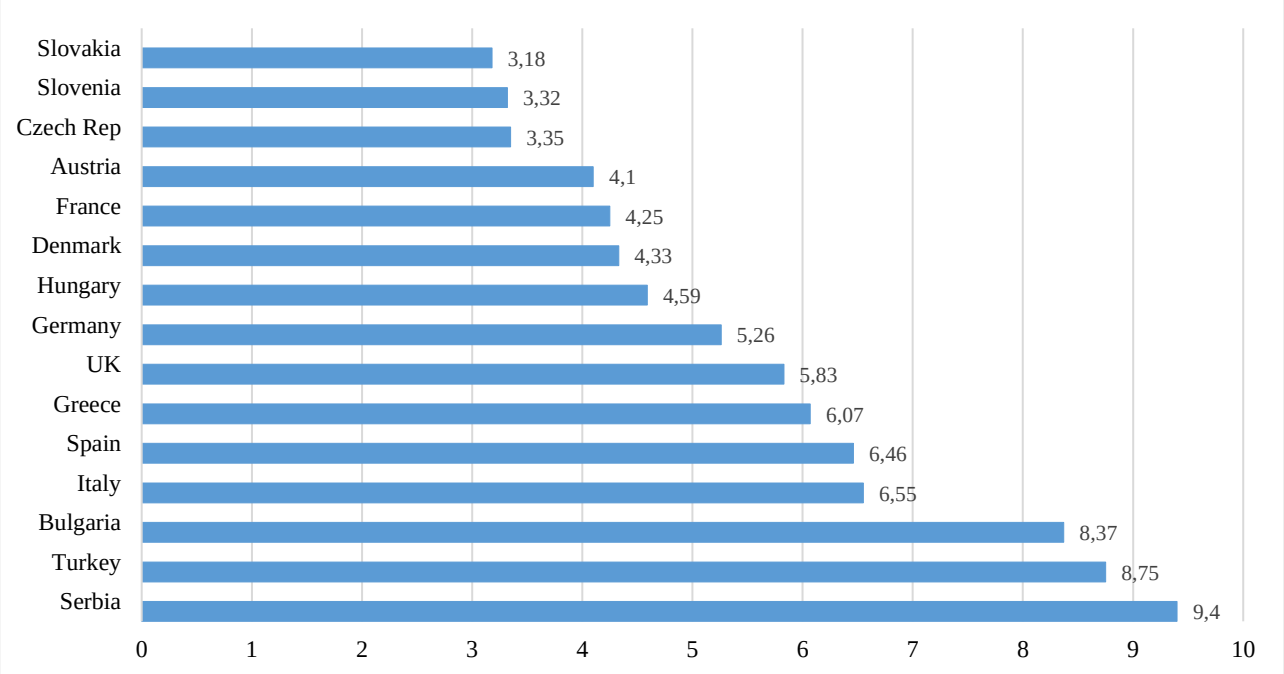

Figure 2. Income distribution inequality P80/P20, the population younger than 65. Source: Eurostat

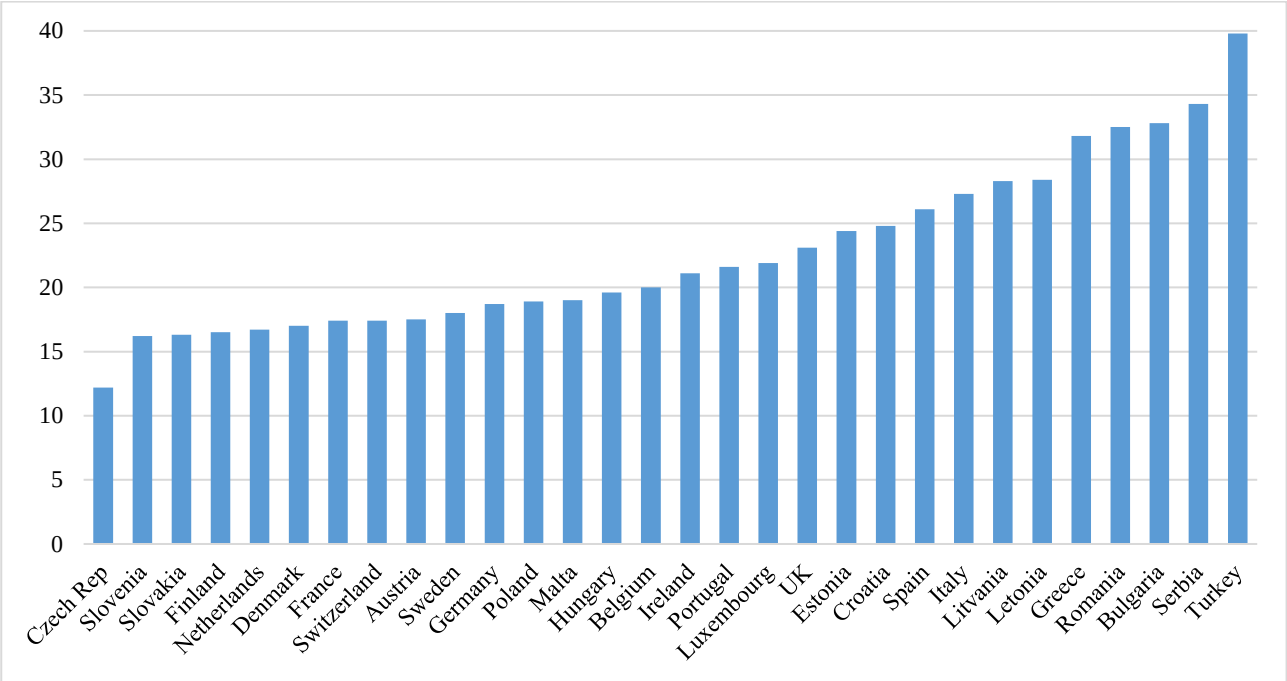

Figure 3. People under the risk of poverty and social exclusion. Source: Eurostat

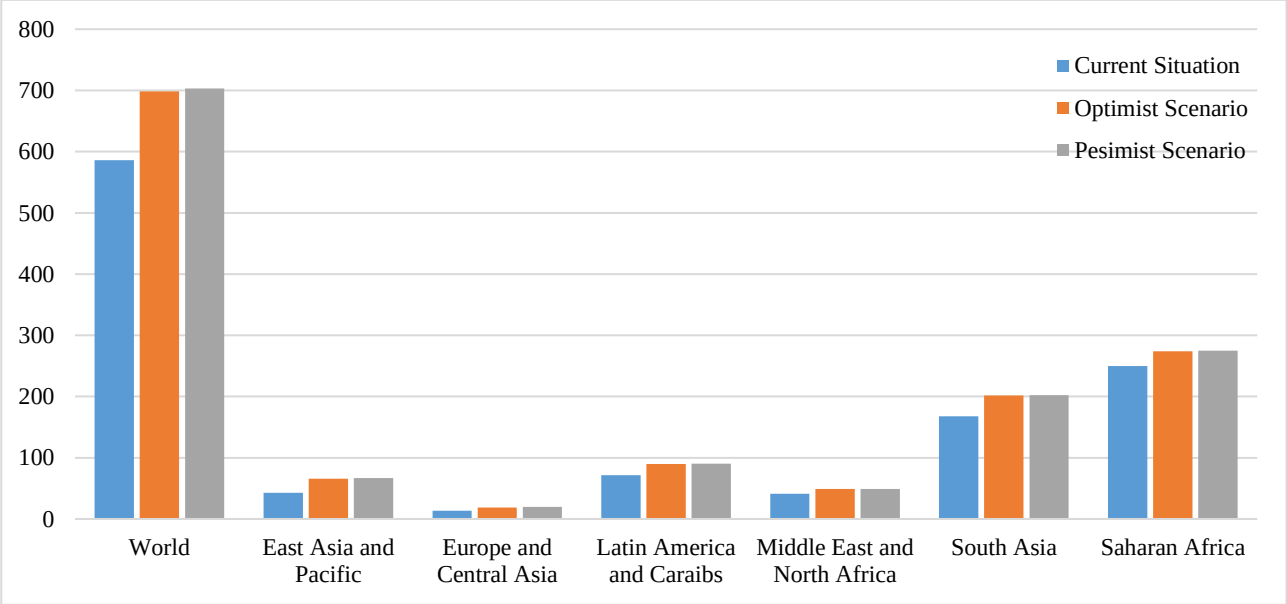

Figure 4. Number of children living in cash-poor households after the outbreak. Source: UNICEF

parents, loss of social security, and refusing the health services due to the pandemic may cause a higher level of physical and psychological violence towards children (27).

Risks Faced By Children during the Lockdown

With the spread of the pandemic and the application of containment methods, there is significant uncertainty about the future of the people in the crisis experienced, with the decrease in income with job losses, the allocation of resources to fight the epidemic, and the uncertainty of how the disease will progress. Especially in developing countries, there are commodity crises that interact with problems such as economic crises and employment declines. Even though there are not serious problems in developed countries as much as developing countries, the economy is shrinking in countries such as Japan and Germany (28). As families lose their income due to COVID-19 and the global economy slides into recession, more households fall into monetary poverty. As of the end of 2020, the crisis caused by the pandemic in developing countries has the possibility of dispatching 142 million more children to financially poor households (25).

Similar to adults, children and teenagers experience stress and depression with the lockdown measures. As the duration and the severity of the lockdown increase, many children experience depression and mental health problems. As children are educated about the importance of a healthy diet and social distance to prevent COVID-19, their anxiety levels increase during this period (29). Many studies have been conducted on anxiety in children, especially in developed countries. Children with problems

such as ADHD experience increased anxiety and executive dysfunction with the switch to online education. Children experience emotional meltdowns when there is not enough space at home, and when sufficient opportunities are provided at home and the family adapts to the child's rhythm, it is observed that their symptoms lower down (30). Lockdown measures have been applied worldwide to control the transmission of COVID-19. While the quarantine process is conducted to protect people from the disease, external conditions that are threatening or dangerous are taken into account. However, the pandemic is based on the thesis that there are no threats at home and that children are safe in there. However, as Figure 5 states, especially in countries where intense poverty and unfair (31).

Therefore, it is expected that COVID-19 increases the risks of children being exposed to abuse at home and malnutrition, while measures are taken for lockdown reduce children's opportunities to contact their teachers at school and access to the justice system and Child Protection Services (32). Disciplinary penalties involving familial abuse are less common in developed countries. It is applied to children outside the family, especially in schools. Violence in schools is rare. However, it poses problems in many countries. It is more common in rural areas.

Although violence on children is mostly observed in the regions where there are substantial poverty and inequality, it may also be observed in the developed regions. In Canada, every 1/3 of children are threatened with abuse, neglect, and violence within the family. Due to financial problems and hard to reach to subsidies abuse and violence cases are expected to increase during the pandemic in Canada (33).

Effects of the COVID-19 on Children in the Turkey

One of the expected impacts of the pandemic on children is an increasing number of child labor. According to the results of the 2019 Child Labor Force Survey, 4.4% (720 thousand children) of children in the age group 5-17 participate in economic activity. Figure 6 illustrates the age groups of working children (34).

While 79.7% of working children are in the 15-17 age group, 15.9% are in the 12-14 age group and 4.4% are in the 5-11 age group. Briefly, 20% of working children are below the age limit of 16 determined by ILO. When the ratio of working children is analyzed by gender, it is seen that 70.6% of working children are boys and 29.4% are girls. It should be noted here that young people and children work in developed and high-income countries as well. However, the situation of working children due to poverty or lack of income is of particular importance. While working under healthy conditions in developed countries or wealthy families to support education and develop their skills, it is seen that working children in developing countries are distanced from education due to poverty, work in unhealthy areas, and grow poor. Only a small number of 65.7% children working in Turkey continue their education. One out of every three working children withdraws from education. Another problem is that 30.8% of working children are in the agricultural sector, 23.7% in the industry, and 45.5% in the service sector (34). As expected, according to ILO (2020) report, child workers are at more risks. The report indicated that there is a great possibility to have worse working conditions and longer working times. Furthermore, since the pandemic negatively affects the parents' employment, there is an increasing tendency to have a higher rate of children workers (35).

With the closure of the services sector with the COVID-19 pandemic, the situation of children who did not attend their education regularly remains vague. Regarding the children coming or brought to the security units (the number has already been increasing over the years) as merely a number is a mistake.

Figure 7 shows that the number of incidents involving children who came or brought to the security units in 2019

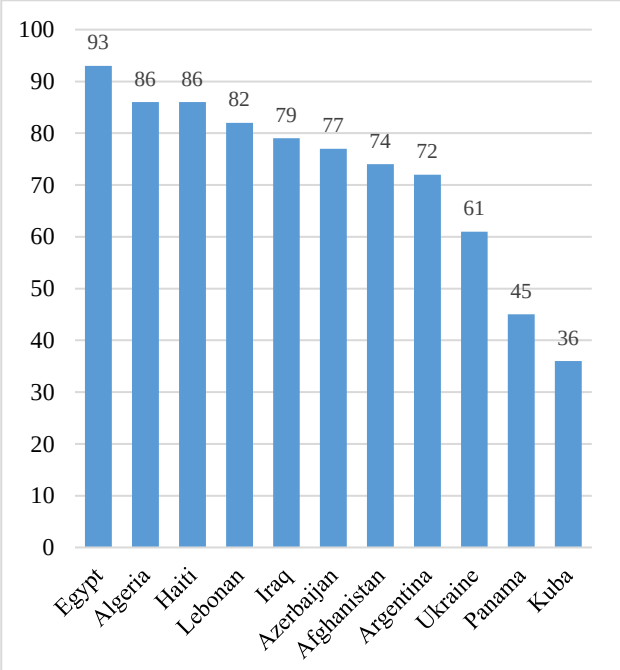

Figure 5. Rates of children that face domestic violence. Source: WHO

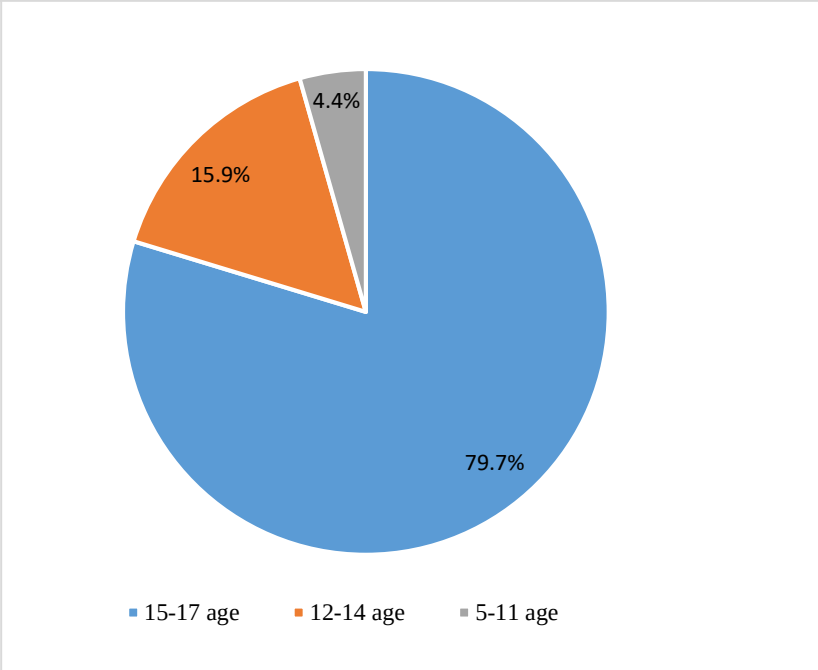

Figure 6. Children working in economic activities. Source: TurkStat

was 511 thousand 247. In these cases, 46.1% of the children came to the security units as victims and 32.9% of them allegedly committed an act defined as a crime in the law (being driven into crime) (34).
If the children dragged into crime are considered as victims because they are actually driven to crime due to poverty and lack of education, lack of family and state support, 80% of the children come as victims.
Figure 8 clearly shows the increase in the number of child victims. The rapid increase in the number of children dragged into crime is reaching remarkable dimensions (34). The number of incidents involving children increases every year between 5 and 6%. Children driven into crime are involved mostly in injuries. 31.7% of these children were involved in injuries, 25.6% committed theft, 8.1% opposed to the Passport Law, 6.9% participated in migrant smuggling, 4.6% interacted with drugs or stimulants (34). Opposition to the passport law and cases of migrant smuggling also point to the existence of children affected by the migration problem. Another type of migration that causes child labor is forced migration. The unsafe environment created by the war has led to the emergence of large migration waves from countries such as Syria, Afghanistan, Iraq to Turkey after 2011 (36). This led to the growth of children's problems and their exclusion from society.
Another problem of the pandemic on children can be a social exclusion. Social exclusion is defined as the partial or complete disappearance of individuals or groups from their society. When the social exclusion problem is evaluated in the context of poverty, the fact that individuals are below the income poverty line cannot even meet their basic needs prevents their existence in social life (37). Families and children cannot bond with other people and get help from their environment. Indeed, the separation of children from their teachers, who are often the first people to notice domestic abuse and report it poses a big problem.

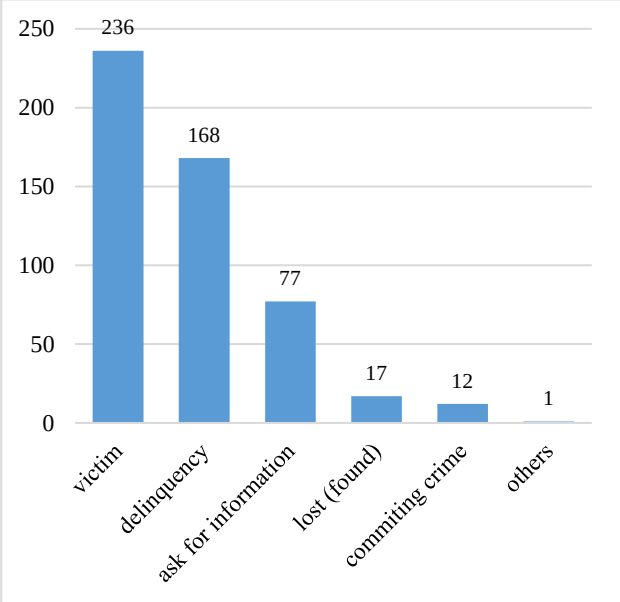

Figure 7. Number of incidence involving children coming to or brought to security unit by reasons. Source: TurkStat

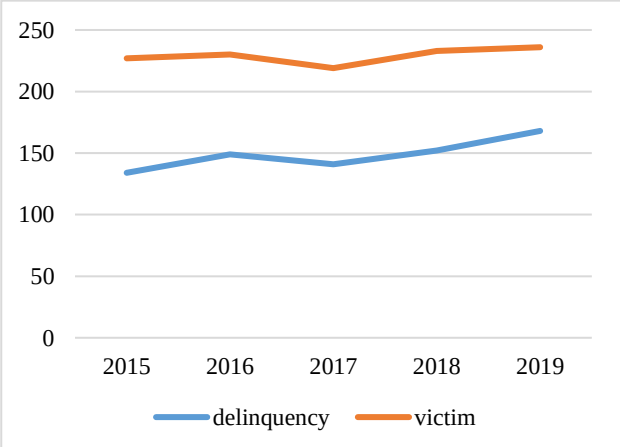

Figure 8. Coming to the security units according to the selected reasons, 2015-2019. Source: TurkStat

DISCUSSION

In Turkey, combating the COVID-19 pandemic has led to the isolation of social and economic life and has had significant effects. Important areas of the industry and service sectors have been partially or completely closed. Important economic and social consequences of this closure are also observed. In order to minimize the negative effects of the pandemic, loss assessments should be made frequently. However, sufficient data have not been announced during the outbreak in Turkey. Therefore, in this part, the analysis will be made using limited data.
Children make up about a quarter of Turkey's population. This figure 8 was 48.5% in 1970, 41.8% in 1990 and decreased to 27.5% in 2019. According to population projections, the child population rate is predicted to be 27.0% in 2023, 25.6% in 2030, 23.3% in 2040, 20.4% in 2060 and 19.0% in 2080 (34). Although its share in the population has decreased, there is a dependency relationship with family income due to the need for care of children who play an important role in the country's development process. It is not possible for children to take care of themselves as adults. For this reason, if the child lives in a poor family, they pass on their poverty to future generations and most likely live poor in the future as well. They raise their children poor. Children's poverty must be prevented to break the cycle (38).
It is easier for individuals and families with regular incomes to escape the cycle of poverty. In social states, they paid special attention to children by following a protective and preventative path for children to read and develop. Their assistance to family and children, the allowances and grants they offer are aimed at building society in a healthy way (39). For this reason, the share allocated to social protection in Turkey has increased rapidly over the years. It increased from 148 billion TL in 2010 to 542 billion TL in 2019. However, the child's share of protection expenses reached only 4.3% as of 2019 on a family basis. Considering that the share of pensioners and seniors is 48.5%, family/child reliefs remain extremely low (34).
Children of families who cannot earn income because their families cannot work or receive assistance live in poverty. Child labor present in undeveloped countries is also seen in Turkey. Of course, besides having many causes of child labor, these reasons are interrelated.

As a result of the prevailing COVID-19 pandemic, the problems of children may be worsened. Particularly security, violence, and child abuse may increase during the pandemic as a result of lockdowns. The children who are urged to commit crimes are also victims. As a universal law, the government should protect the children if the child is younger than 18 and cannot be protected by his/her own family. UNICEF points to the increased risk of sexual abuse and violence towards children during pandemics or epidemics. During the lockdown in the 2014-2016 period due to the Ebola virus epidemic, it was observed that there was a higher rate of violence applied to women and school girls. In the same period, the number of child-pregnant increased by twofold (40). Similar findings were observed in developed countries as well. For example, the violence within the families increased by 30% since the curfew started on March 17th (41). We could not reach the current data in Turkey. However, this may worsen the problems children have to face.

Health Policies Applied in Turkey

It is hard to control the pandemic because of the difficulty of control, treat and prevention processes. Furthermore, the pandemic is more than a single wave of the event. It brings growing and long-lasting risk as there is more number of cases (42). COVID-19 pandemic has all these features which caused global conflicts and struggles since March 2020 (43). In Turkey, the first COVID-19 case was seen on 11 March 2020. The Ministry of Health first transformed the regular hospitals into pandemic hospitals. In places where there is not pandemic hospitals, patients were isolated in the intensive care units. With the increasing number of patients, all hospitals started to accept COVID-19 infected patients. The citizens who come from different countries were considered expected patients. Therefore, those citizens were kept under quarantine in dormitories. Then international travels were limited. On January 10th, under the coordination of the Ministry of Health, Coronavirus Science Council and Operation Center was found. On March 12th, education was started online at all levels. Starting from March 27th, the daily number of cases were started to be announced (44). Starting from the first day of the pandemic observed in the country, Turkey combatted the pandemic very effectively. Besides, Turkey supported Iran, Italy, and Spain with medical devices and equipment (45).

Health Policies for Elderly People and Other Disadvantageous Groups in Turkey

Unfortunately, the COVID-19 pandemic may be dangerous for elderly people and people with chronic disease. Although the population in Turkey is younger comparing with the European population, the government took immediate precautions for the citizens above 65. Starting from March 21st, 2020, apart from the chronicle disease people, the citizens above the age of 65 were also limited to go out. However, staying at home for more than one and a half months caused both physical and psychological problems. Therefore, those people were allowed to go out around their community just on Sundays between May 5th, 2020 and June 9th, 2020 (44). Currently, there are still restrictions for elderly people. However, these measures negatively affected the physical and psychological performance of old people above the age of 65. Furthermore, because of these measures, there was a perception of the disease of elderly people (13).

Handicapped people are also considered as another disadvantageous group. Lockdowns prohibited handicapped people from getting regular health services and supports. Besides, as the schools were closed, they could not get proper education, and thus, there were losses in their improvements. For example breaks in the education of autistic children caused great losses in their expected achievements. On the other hand, the health services and supports to handicapped people sometimes caused those people to carry the virus to their families from the crowded health support centers. Besides, the Ministry of Health not only distributed masks and disinfectants but also provided health services at home. Municipalities also provided basic needs. Government entities and NGOs also worked together to support elderly people (14). Finally, the vaccine came to Turkey. The vaccination started from the elderly people who are above 85 and the people who could not go out.

Health Policies for Children in Turkey

Many health worker unions, NGOs, universities, and related institutions shared information through TV, radio, and other social media channels to inform the families about how to protect themselves and their children from the pandemic in Turkey. Although the children and youngsters are affected less by the pandemic, they can carry the virus to their family members. Right after the first case was detected on March 10th, kindergartens, children's daycare, primary and secondary schools, and high schools were disinfected by the municipalities. Education was interrupted and schools were closed on March 12th. Starting from April 4th, curfew for the youngs under 20 was initiated. On May 5th, it was announced that High Education Entrance Exam would be made at the end of June while it was first announced to be held in July (44). Exams and education models were revised frequently since the process of the pandemic could not be perfectly predicted. Unfortunately, the negative effects and the unexpected side effects of the pandemic on education could not be well-defined and it is still unclear yet. On the 23rd March, distance education and education through the internet started at primary and secondary schools. Ministry of Education initiated an internet-based system "mebozelegitim" for the students who could not get an education via EBA provided by TRT and need to get special education. Similarly, universities also initiated their distance education programs through their distance education centers and Council of Higher Education course platform (12).

Although children are less affected by the pandemic comparing with older people, they have a higher possibility to spread the virus. Thus, the government limited them to go out. It should be noted that even if the children are infected they were kept out of the treatment protocols. Ministry of Family, Working, and Social Services started the full quarantine to the places where the children under government protection stayed in. Those children were allowed to contact their families with the normalization that was started on June 15th. Starting from July 1st, foster parents' education programs were initiated. On the same date, children were allowed to participate in social, cultural sportive, and camp activities (39).

Policy Recommendations for the Health Policies for Children in Turkey

Since the virus is more effective on the elderly people and adults, most of the researches were focused on these group of people and ignored the children. On the contrary, children are the most affected group of age due to natural disasters or pandemics since they are lack social, emotional, behavioral needs and they cannot satisfy these needs without support. Therefore, the policies towards children are urgent and critical. First of all, children may have negative feelings during the lockdown. It is important to know the risk factors. In the near past, the National Health Commission of China announced a guide to protecting their mental health alongside the Daily routine necessities (46). The Turkish government can initiate those policies.

As expressed in the previous parts, there is a higher probability to have more violence and sexual abuse within the family during the pandemic. Thus, the data related to violence, abuse, and other crimes should be announced periodically on the city and regional base. Since there are no reliable data, it is hard to analyze the problem and the scholars can just make estimations based on the studies of other countries. It is a fact that there is an increasing number of children applying the police stations as victims. Because of the personal and occupational problems of consultants, teachers, and pediatricians as well as the politicians who leave distance to these problems, it is hard to reach abused children (47). Therefore, in the US-Florida for example, even though the schools are closed their claims of children abuses. Furthermore, it is estimated that just in March, April and May there are 276.293 unrecorded abuses due to the financial and psychological stress due to the pandemic in the US. In other words, while children are planned to protect from the disease at the expense of loss of education, there are uncounted losses such as abuse and violence at home (48). Parallel to the closing of the schools, there are fewer records of medical reports. Children are also scared of sharing information about their parents by telephone, text message, or emailing. To support this idea, many pieces of research were made before the pandemic period, confirmed that poor support lines and social isolation are perceived as risk factors (49). Social isolation and lockdowns because of the pandemic may cause similar outcomes in Turkey.

Family income is another factor affecting the life standard of children in the pandemic period. The children coming from high-income and well-educated families have a more comfortable living standard than their low-income counterparts. While those children could get enough physical activity, education, and nutrition, the poor children were stuck in small houses, could not get enough nutrition, and could not get quality education due to lack of physical equipment such as a computer, internet, and other necessary tools. Thus, distance education is a great problem for poor children. Furthermore, both the income and academic background of the parents may not be adequate to support those children to get enough distance education. Particularly in families with many children, distance education becomes even more costly since every child needs to have a different computer and technical support. Therefore, while setting the measures for quarantine, the poor conditions of low-income groups should be taken into account.

Another important problem is related to immigrant children. There are many children from Syria, Afghanistan, and other African countries in Turkey. Most of those children are fugitive and they try to survive under miserable conditions. So, the government should take extra precautions for those children to protect and to keep them from infecting their family members.

Girls also represent the most fragile group of children. They are at higher risk of education cuts. Besides, there are higher risks of early marriages for those children. Therefore both within the pandemic process and post-pandemic period girls should be monitored.

The last fragile group of children is the children under higher risk of crime. Children whose parents commit crimes are at higher risk of committing the crime. So, those children should be kept away from the criminal environment, and government and other social entities should support those children. If they are not monitored, the pandemic period provides a suitable environment for them to be pushed into the crime.

CONCLUSION

The right to health and education should be universally given to every child. But in developing countries, families cannot provide adequate support to their children for reasons such as unequal income distribution and unemployment. Children are forced to work to support their families when the help of government and institutions is insufficient or cannot be done regularly. These jobs can also be dangerous and harmful to health in countries where there is no control. Child exploitation, which hinders the development and education of children, is often observed in developing countries.

As a developing country, Turkey is among the most corrupt and poverty-stricken countries among European and OECD countries. Child labor occurs in Turkey due to low health and education spending and intensive migration. Some of these children submit to security units as victims or driven to crime. The services sector, which was closed due to the COVID-19 epidemic, has caused the poor who work most intensively in this sector to lose income. The closure of the services sector, which is the sector where children whose families suffer the loss of income also work the most, has caused a loss of income for children for the second time. Because one in three working children is already away from education, it is not possible for children who are in lockdown due to COVID-19 to turn to education since they are not registered. Children grow away from education through the lack of educated families of children who study at home due to the pandemic and problems with access to education such as the lack of equipment like the internet and computers. Families suffering from the loss of income are unable to make the health care costs necessary to protect their children and are unable to reach government support because of the closure of institutions or due to the COVID-19 anxiety. Since some of these children are refugees, they are not even registered. Yet, they experience a growing set of problems.

In order to protect children, the state must pay attention to health support as well as educational support. As health spending increases as part of fighting the pandemic, giving up spending in other areas will increase the number of

children who are abused, forced to work, and not provided with education. There should be regular home-checks along with increased assistance provided to children for their physical and psychological needs caused by the lockdown. Otherwise, problems that are all related to each other will increase child poverty, and in the future, the increase in poverty will affect negatively the development of the country.

Ethics Committee Approval: Since our study was not an experimental study including human or animal subject, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: ÖD; Design: ÖD; Data Collection/Processing: ÖD; Analysis/Interpretation: ÖD; Literature Review: ÖD; Drafting/Writing: ÖD; Critical Review: ÖD.

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Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.869791

Duzce Med J, 2021;23(S1):106-112
Düzce Tıp Fak Derg, 2021;23(S1):106-112

How an Infectious Disease Could Influence the Development of a Region: The Evidence of the SARS-CoV-2 Outbreak over the Tourism Intentions in Azores Archipelago

Bulaşıcı Hastalıklar Bölgesel Kalkınmayı Nasıl Etkiler: Azor Adaları'nda SARS-CoV-2 Salgınının Turizm Sektörüne Etkileri

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Received / Geliş Tarihi : 08.01.2021
Accepted / Kabul Tarihi : 21.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 25.03.2021

ABSTRACT

Aim: After a contagious disease outbreak, as is the case of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), societal dynamics shift on an unconventional level. In the lack of a vaccine, social distancing and massive lockdowns are acquired as the most effective strategies to contain this new virus. In this regard, the present study was carried out to determine the influence of SARS-CoV-2 over the Azores territory activities as tourism and consequent regional development impacts.
Material and Methods: Therefore, the study assessed the decision-makers, the public, and tourists' perceptions regarding this disease outbreak by applying testing tools as questionnaires. This study used a sample of 700 participants. The questionnaires were designed, considering the necessity to carry out online interviews, and were implemented in the Spring months of 2020. After the data from the surveys were gathered, analytical methods and tools were used.
Results: The research recognized that during an infectious disease outbreak, people prioritized spending their vacations at the holiday residence of family or friends (20%) instead of touristic resorts (hotels or rented apartments or houses). Also, the study verified a considerable increase in selecting rural tourism accommodations. Besides, more than half of the study participants considered that the "Clean and Safe" stamp (attributed by the Portuguese Health Authorities) is crucial when choosing accommodation and restaurants (75.8%) as well as for choosing the destination to visit (50.5%).
Conclusion: The study assumes enormous consequences of the SARS-CoV-2 crisis at multi-levels, being the tourism activity the most affected in this ultra-peripheral region.
Keywords: Azores archipelago; regional studies; SARS-CoV-2; sustainable planning; territorial impacts.

ÖZ

Amaç: Şiddetli akut solunum yolu sendromu koronavirüsü 2 (severe acute respiratory syndrome coronavirus 2, SARS-CoV-2)'nin yol açtığı bulaşıcı hastalık sosyal hayatı alışılagelmedik bir şekilde etkilemiştir. Aşılamaya kadar, bu yeni virüsü kontrol altına almak için sosyal mesafe ve kitlesel kısıtlamalar en etkili stratejiler olarak ortaya çıkmaktadır. Bu çerçevede, bu çalışma SARS-CoV-2'nin Azores bölgesi turizm sektörü faaliyetleri üzerindeki etkilerinin ve bölgesel kalkınmaya yansımalarının incelenmesi amacıyla yürütülmüştür.
Gereç ve Yöntemler: Bu nedenle bu çalışmada, anket yöntemi uygulanarak karar alıcıların, kamunun ve turistlerin gözünden bu salgının algısı değerlendirildi. Çalışmanın örneklemi 700 katılımcıdan oluşmaktadır. Anketler, çevrimiçi görüşme yapma gerekliliği göz önünde bulundurularak tasarlanmış ve 2020 yılının ilkbahar aylarında uygulanmıştır. Anketlerden elde edilen veriler toplandıktan sonra analitik yöntemler ve araçlar ile değerlendirilmiştir.
Bulgular: Araştırma sonuçlarına göre bu bulaşıcı hastalık salgını döneminde bireyler tatil tercihlerini turistik tatil tesisleri (oteller veya daire ya da ev kiralamak)'nden ziyade öncelikli olarak aile veya arkadaşlarının tatil evinde geçirme (%20) doğrultusunda yapmışlardır. Ayrıca, tatil tercihlerinde kırsal kesim turizm konaklama yerlerinin seçiminde de önemli artışlar olduğu gözlenmiştir. Bunun yanında, araştırmaya katılan bireylerin yarısından fazlası konaklama ve restoran seçiminde (%75,8), ve ziyaret edilecek olan destinasyonların seçiminde (%50,5) Portekiz Sağlık Kurulları tarafından tescillenen "Temiz ve Güvenli" pulunun bulunmasının çok önemli olduğunu düşünmekteydi.
Sonuç: Bu çalışma, SARS-CoV-2 dolayısıyla ortaya çıkan olumsuzlukların birçok katmanda ağır etkilerinin varlığını, özellikle bu çok periferdeki bölgede turizmin en fazla etkilenen sektör olduğunu ortaya koymuştur.
Anahtar kelimeler: Azores archipelago; bölgesel çalışmalar; SARS-CoV-2; sürdürülebilir planlama; bölgesel etkiler.

INTRODUCTION

The disease induced by the new coronavirus (severe acute respiratory syndrome coronavirus 2, SARS-CoV-2), emerging in Wuhan's city (China), spread rapidly worldwide in just a few months, affecting almost every region on the planet (1,2). The high degree of contagion was achieved due to the considerable flow of public transport and human contacts. Therefore, we are facing a health catastrophe (1). In fact, several previous studies prove the fundamental role of air travel in increasing the spread of infectious diseases, such as the case of the SARS-CoV-2 (3-5). According to scholars as Burkle (6), "...the relationship between pandemics and travel is essential to understand public health security...".

In the lack of a vaccine, social distancing and massive lockdowns are acquired as the most effective strategies to contain this new virus. Despite this, such measures are associated with several obstacles, especially for economies inextricably linked to the production and sale of goods or tourism. In this sense, several authors have warned of the possibility of a health crisis shaking society and tourism on a large scale (7-16).

The current state of social, economic, and health dilemmas in which we live seems to point effectively to the scenario described above (17-18), witnessing fundamental changes in many activities - i.e., the tourism industry (19-24).

In this regard, businesses and individuals' economic conditions are deteriorated, particularly in the areas most exposed to the health crisis's immediate impacts, as is the case of the tourism field. Thereby, this crisis's financial long-term impact will considerably depend on the answers proffered from a multidisciplinary perspective.

So, if we focus on the ultra-peripheral territories, as is the case of the Autonomous Region of the Azores, this virus outbreak could represent even more impacts - once in those activities as tourism plays a central role in its socio-economic sphere (25-27). Thereby, the current research intended to answer the following research problem: "How can an infectious disease influence the development of an ultra-peripheral region as the Azores?".

Consequently, this study seeks to identify and evaluate the consequences of SARS-CoV-2 over the Azores Region, specifically through the analysis of main-actors, the public, and the tourists' perceptions. So, it is expected to contribute to the thematic literature.

The Azores Region in Brief

The Azores Archipelago belongs to the Macaronesia Region (Figure 1). Madeira, Cape Verde, and the Canary Islands are also included in this region located in the North Atlantic. The Archipelago has nine islands and a total surface area of around 2,322 km^2, corresponding to approximately 2.5% of the Portuguese national territory (92,256 km^2). The islands are grouped by geographical proximity in 3 groups:

(i) Eastern; (ii) Central; (iii) and Western.

The three biggest islands are São Miguel, Pico, and Terceira - and they represent approximately 68.5% of the total area and about 85% of the Azores population. Population densities per km2 fluctuate between 184 inhabitants on the biggest island and 27 inhabitants on the smallest island. Amongst the 19 municipalities in the Azores, the largest is Ponta Delgada's isle of São Miguel. Contrarily, the smallest is Vila do Corvo on Corvo's island,

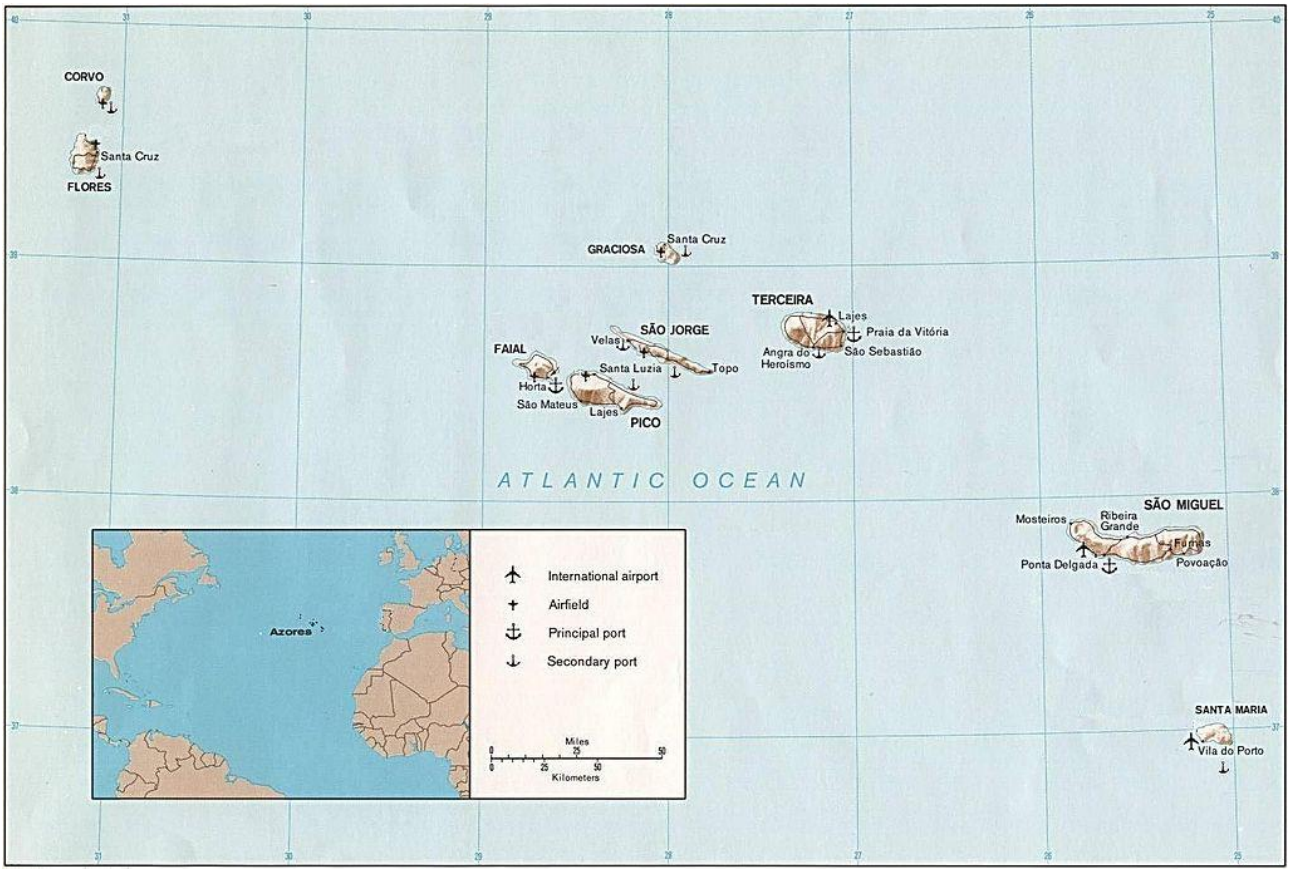

Figure 1. Azores Archipelago location (28).

which registers a variation in population density in 230 inhabitants per km^2.

Generally, the Azores' landscape is marked by a strong orography, where the high altitude is associated with the hardy relief. The islands emerge sharply from the ocean, showing significant vertical growth. The mountainous interior is furrowed by deep ravines, which tear the slopes down to sea level. The flat areas are poorly developed, with little representation in the island territory, emphasizing the west side of Santa Maria, Ponta Delgada, and graben of Ribeira Grande in São Miguel and graben of Praia da Vitória in Terceira. The plateau regions can be summed up in the Central Plateau in Flores, in the Achada Plateau in Pico, and the Graminhais and Furnas Achada Plateaus in the western half of São Miguel. The different islands' maximum altitude ranges between 405 m in Graciosa and 2,351 m in Pico, the highest point in Portugal. The islands' landscape is usually overwhelmed by the magnificent lagoons that occupy the abatement craters of extinct volcanoes (29).

In the Azores, the production systems represent the primary income and employment generation's primary sources, reflecting the endogenous economic support capacity. The emphasis is placed on the incidence and evolution of the agricultural and agri-food sector, the installed trends and prospects for qualification and diversification of the tourist sector, and extractive activities associated with civil construction (29).

In this region, the urban and rural systems represent the patterns and dynamics of urban occupation and rural settlement. Urban and rural settlement dynamics stand out in this context, and the location, shape, and structure of urban agglomerations in harmony with urban expansion and housing dynamics. Moreover, it is possible to verify a tendency of slight population growth, the persistence of a high index of rurality in the population's residence, and average values in Portugal (29).

Moreover, this Archipelago shows a significant increase in urban areas in evolutionary terms, reflecting the urban growth that has been witnessing in recent years. The agricultural and pasture areas have decreased in recent years, considering that in the 90's they represented more than 50% of the Azores area. Contrarily, there was an increase in forest areas and natural environments, when in the middle of the 90's decade, they represented near 30% of the Azores' territory.

Accessibility and equipment systems are part of the infrastructure, transport, communications, energy, and collective equipment networks (30). So, we should highlight the need to provide a set of services (utilities, communications, and energy) and mobility conditions to populations, tourists, and economic agents, as a privileged instrument of cohesion and competitiveness policies. Moreover, all islands have one or more port infrastructures representing on average 0.06% of each island's surface area.

MATERIAL AND METHODS

Considering the study's objective, several approaches and techniques were used, including direct and indirect analysis methods.

The methodological procedure was divided into four main stages: elaboration of the questionnaires, data collection, analysis of the case study, and interpretation of the results ending with the discussion and conclusions (Figure 2). The last phase focuses on the impact of an infectious disease influence on the development of an ultra-peripheral region as the Azores. In this regard, some guidelines and recommendations are provided to the actors and decision-makers related to planning and regional development.

Accordingly, the Azores Archipelago was used as a case study. Studies on similar themes, previously carried out by the team (31-36), provided a prior knowledge of the regional reality, allowing the collection of a more robust quantity and quality of data. In this way, on the one hand, the authors have precisely understood the fundamental issues regarding how this health crisis influences the regional development of an insular region. On the other hand, it also led to an understanding of how this crisis affects local entrepreneurs and consequently the region's sustainable development and planning.

The study was approved by the Ethics Committee of Azores University (Comissão de Ética of Universidade dos Açores, 18/2021, UAC/2021/4700).

Questionnaires and Sampling

The questionnaires were planned, recognizing the necessity to carry out online interviews. This typology of the questionnaire was selected considering the social distancing necessities caused by the SARS-CoV-2 pandemic.

This study sample was formed of 700 participants, and the web-surveys were carried out in the Spring months of 2020. In this research, most of the respondents were female, and the most representational age group was 35-54 years old. More than 60% of respondents were married. The participants' most representative educational training was university education, and the least representative was basic education. Moreover, more than 50% of the study participants were residents of the Azores Eastern Group, more precisely from São Miguel Island.

Statistical Analysis

After the data from the surveys were gathered, analytical methods and tools were used. Firstly, we used spreadsheets to compile data, which was then statistically explained using IBM SPSS Statistics (Statistical Package for the Social Sciences).

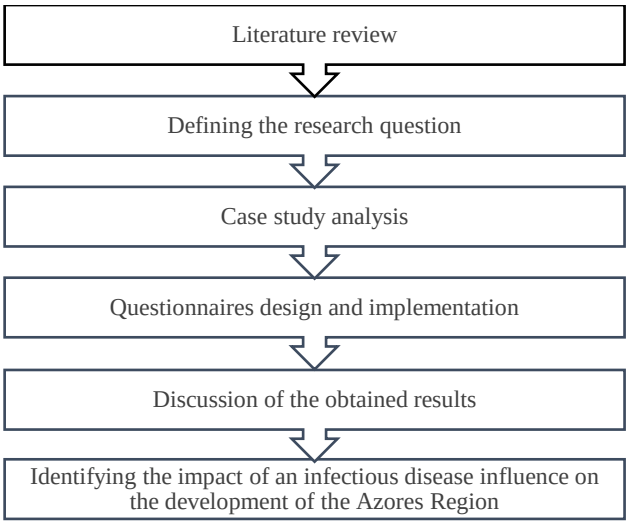

Figure 2. Methodological scheme

RESULTS

This section describes the obtained results through the use of exploratory tools applied to the case study.

Contextually, a question was made about the typology of accommodation for the 2020 vacation. Recognizing that we used open and short questions, 10 options were created due to many responses (Table 1). The most frequently selected option was to spend the 2020 vacation at family or friends' holiday residence (more than 20%), followed by those who opted for three to four-star hotels. There was a considerable increase in selecting rural tourism accommodations, reaching the third position with more than 13%, followed by pensions with 12.1%. A similar percentage was identified between the number of participants who wish to rent an apartment or residence (more than 9%) and the respondents who want their own holiday residence (8.8%) to spend the 2020 vacation. The same values were verified for camping and/or cruise options and five-star hotels. About hotels with less than three stars, the obtained values were low (2.1%). Additionally, less than 1% of the respondents stated that they had not yet decided on the type of accommodation for the 2020 vacation.

A question was also asked regarding the type of holiday accommodation (Table 2), with three options: (i) tourist accommodation in rural areas; (ii) tourist accommodation in an urban environment with green spaces; and (iii) tourist accommodation in an urban environment without green spaces. Although the results obtained show similar values, the most selected option was tourist accommodation in an urban environment with green spaces (ii), with 47.8% of the responses, followed by tourist accommodation in rural areas (i) with 43.8%. The least selected option was tourist accommodation in an urban environment without green spaces (iii), with less than 10%.

Among the participants who selected at least one of the answer options shown in Table 3, more than half considered that the “Clean and Safe” stamp (attributed by the Portuguese Health Authorities) is crucial when choosing accommodation and restaurants (75.8%) as well as for choosing the destination to visit (50.5%). Consequently, the results suggest that efforts should be made to grant this stamp to the regional touristic establishments.

Through the categorical analysis of principal components (PCA) in the data submatrix that contains items A.1 to A.6 and B.1 to B.6, five principal components were extracted using varimax rotation with Kaiser normalization, which explains about 70% (22.6%, 13.2%, 12.6%, 11.3%, and 9.9%) of the data variance (Table 4).

The items mostly related to the first principal component are items A.3, A.4, A.5, and A.6, so this dimension was called "social isolation." The second dimension's most essential items are items B.4, B.5, and B.6, which is why this component was called "search for cheaper travel options". Items A.1 and A.2 are the items that most contribute to the explanation of component three, which is why it was called "security." The items most related to dimension four are items B.2 and B.3; therefore, this was called "repercussions of SARS-CoV-2 at the level of holidays". Finally, the fifth main component was called "vacation expenses, compared to 2019" because item B.1 is the essential item for this dimension.

Table 1. Grouped options associated with the typology of accommodation for the 2020 vacation

Options	%
Not decided yet	0.8
In my vacation residence	8.8
Apartment or rented house	9.5
Camping or cruise	4.3
Family or friends vacation residence	24.3
Pension	12.1
Less than three star hotel	2.1
Three to four star hotel	20.1
Five star hotel	4.3
Rural tourism	13.7

Table 2. Closed-up question regarding the accommodation selection options

Options	n	%
i. Tourist accommodation in rural areas	272	43.8
ii. Tourist accommodation in an urban environment with green spaces	297	47.8
iii. Tourist accommodation in an urban environment without green spaces	52	8.4
Total	621	100.0
Missing	83	
Total	704	

Table 3. Closed-up question regarding the stamp “Clean and Safe”

Options	n	%
When choosing accommodation and restaurants	470	75.8
When choosing touristic activities	173	27.9
When choosing the destination to visit	313	50.5

Table 4. Factorial matrix - after using the varimax method

	Components				
	1	2	3	4	5
A.1	0.065	0.055	0.839	0.093	-0.103
A.2	0.066	0.023	0.847	-0.029	0.177
A.3	0.864	0.068	0.099	0.083	-0.140
A.4	0.883	0.062	0.100	0.082	-0.057
A.5	0.811	0.035	0.125	0.062	0.024
A.6	0.631	0.135	-0.198	0.050	0.253
B.1	0.013	0.030	0.073	0.028	0.877
B.2	0.087	-0.052	0.030	0.838	0.255
B.3	0.091	0.230	0.052	0.683	-0.428
B.4	0.129	0.795	-0.022	-0.038	0.109
B.5	-0.014	0.812	0.090	0.090	-0.050
B.6	0.298	0.459	0.024	0.384	-0.180

DISCUSSION AND CONCLUSIONS

In the current pandemic context, we are witnessing an abrupt decline in economic activity. Consumption decreased due to quarantines (lockdowns) and the decrease in the population's income. Production decelerated due to the drop in demand, the retention of workers at home and/or teleworking options, and the scarcity of intermediate and investment goods.

In this context, companies and individuals' financial situation is degraded, especially in the sectors most exposed to the health crisis's direct consequences, as is the case of the tourism sector.

The health crisis's economic consequence will considerably depend on the responses made at several levels: individual behavior, companies and workers, national governments, and international entities.

Contextually, tourism is one of the most dynamic economic activities and has the most significant growth potential globally (37-40). The tourism sector is increasingly recognized for the vast benefits it represents for countries, mostly for emerging economies, given its ability to promote and strengthen international relations to generate foreign exchange, create jobs, and potentially serve as a catalyst for regional development (39-41). According to the World Travel and Tourism Council (42), it is estimated that the sector contributes 10% of the world GDP (Gross Domestic Product). In fact, tourism-related activity generates one in ten jobs, and its turnover is comparable to or greater than that of other vital sectors. I.e., exports of oil, food products, or automobiles are just a few examples.

On the other hand, tourists' intentions show significant dynamics, both in terms of destination choice and accommodation selection (43-47). After the outbreak of infectious disease, as is the case with the SARS-CoV-2, the dynamics change to an unprecedented level. In fact, these premises were confirmed, once more, by the present research.

The "COVID-19 Free" or "Clean and Safe" stamp attributed by the Portuguese Health Authorities to tourist accommodation was the item with the survey participants' greatest agreement. On the other hand, the lowest level of agreement was related to the item "I will avoid air travel in the future," reflecting that people do not intend to stop traveling. There is some confidence on the part of the respondents about the current situation of the SARS-CoV-2 crisis.

Around 42.3% of respondents showed that they were willing to pay more for safe holidays. The security dimension is vital today in this sector. The “Clean and Safe” stamp is essential when choosing accommodation, restaurants, as well as the destination to visit. Consequently, the obtained results suggest that efforts should be made in this regard. Thereby, the study allows us to conclude that there are huge repercussions for SARS-CoV-2 regarding vacation options and social isolation issues and consequently over the regional development of territory with the socio-economic strictly linked with the tourism sector.

Although, and studying the thematic literature, more specifically the investigations carried out by Faulkner and Vikulov (48), a crisis can lead to a specific change in the tourism of a destination, which should not necessarily be understood as a negative impact. Besides, several other critical studies that have analyzed similar phenomena should also be respected for understanding this specific issue (49-53). Thus, the main regional actors and decision-makers must use the current moment to envision and consequently plan a more sustainable future for the Azores' territory.

So, considering the horizontal impacts of this pandemic crisis, the response should be also be based on a multidisciplinary perspective. Thereby, only through a multi-varieted strategy, where several fields and solutions were crossed and combined, will it be possible to mitigate and overcome the SARS-CoV-2 crisis impacts in the long-term.

Study Limitations and Prospective Research Lines

Although this investigation broadens our understanding of how the impacts of the SARS-CoV-2 outbreak influenced the development of an ultra-peripheral region as the Azores, research lines remain relevant. In fact, this study focuses only on the initial period of the virus outbreak, precisely the period between May and June 2020.

Therefore, considering that the pandemic crisis presents a considerably longer time window than the period analyzed by the present investigation, similar studies should be carried out about this study's precursor and predecessor months.

Although the present study provides interesting perspectives on the impacts over the development of an ultra-peripheral region as the Azores Archipelago, if further investigations were conducted on island territories, complementary results would be obtained to understand the problem from a global perspective.

Ethics Committee Approval: The study was approved by the Ethics Committee of Azores University (Comissão de Ética of Universidade dos Açores, 18/2021, UAC/2021/4700).

Conflict of Interest: None declared by the authors.

Financial Disclosure: FCT—Fundação para a Ciência e a Tecnologia, I.P., project number UIDB/00685/2020.

Acknowledgements: This paper is financed by Portuguese national funds through FCT—Fundação para a Ciência e a Tecnologia, I.P., project number UIDB/00685/2020 and also by the project GREAT—Genuine Rural Experiences in the Azores Tourism with the code: ACORES-01-0145-FEDER-000089.

Author Contributions: Idea/Concept: RAC, GC, PP, AS, CC, MGB; Design: RAC, GC, PP, AS, CC, MGB; Data Collection/Processing: RAC, GC, PP, AS, CC, MGB; Analysis/Interpretation: RAC, GC, PP, AS, CC, MGB; Literature Review: RAC, GC, PP, AS, CC, MGB; Drafting/Writing: RAC, GC, PP, AS, CC, MGB; Critical Review: RAC, GC, PP, AS, CC, MGB.

All the authors contributed equally to the development of the present paper. All phases of the paper development have been proper discussed and worked on by the authors. All authors have read and agreed to the published version of the manuscript.

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Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.862323

Duzce Med J, 2021;23(S1):113-121
Düzce Tıp Fak Derg, 2021;23(S1):113-121

Financial Risk Assessment in Healthcare Organizations

Sağlık İşletmelerinde Finansal Risklerin Değerlendirmesi

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 23.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 25.03.2021

ABSTRACT

Aim: Risk assessment is one of the important processes of risk management. This study aims to show how the financial risks encountered in hospitals are evaluated according to the risk management approach.
Material and Methods: We used risk assessment tables for identifying the financial activities of healthcare organizations, L-type decision matrix for risk assessment, and financial risk ratio methods for enterprise performance indication. In compliance with the enterprise risk management guidelines, we collected qualitative data through an interview with the risk manager of a hospital and quantitative data was created and adapted by the authors.
Results: According to the study sample, among the risks identified in the procurement process, the risk score of the risk 1 is 3, the risk score of the risk 3 is 4, and the risk score of risk number 4 is 2 points, and was found to be acceptable. The risk score for risk 2 is 10 points and was found to be remarkable. The financial risk ratio of the hospital is 0.10.
Conclusion: In the financial risk assessment, the risks in the hospital's procurement activities were determined as occurrence of public loss (No. 1), failure to procure the need (No. 2) and late procurement of the need (No. 4), which are all assessed as controllable risks. No. 4 is noteworthy enough to be distinguished from the other risks. Calculated financial risk ratios showed there were no risks for corporate performance of the healthcare organization in fulfilling the short-run obligations through its liquid assets.
Keywords: Financial risk; risk assessment; risk management.

ÖZ

Amaç: Risk değerlendirme risk yönetim sürecinin önemli bir adımıdır. Bu çalışma sağlık kuruluşlarında kurumsal risk yönetiminin önemini vurgulamak ve finansal faaliyetlere ait risklerin nasıl değerlendirilmesi gerektiğini bir örnekle göstermeyi amaçlamaktadır.
Gereç ve Yöntemler: Sağlık kuruluşlarının finansal faaliyetlerinin tanımlanmasında risk değerlendirme tablosu, risklerinin değerlendirilmesinde L tipi karar matrisi ve kurumsal performans göstergesi olarak finansal risk oranı yöntemi kullanılmıştır. Çalışmada kurumsal risk yönetimi yönergelerine göre finansal faaliyetlerin risk değerlendirmesi için gerekli olan nitel veriler bir hastanenin risk yöneticisinden görüşme yöntemiyle elde edilmiş, nicel veriler ise yazarlar tarafından türetilerek örnek oluşturacak biçimde uyarlanmıştır.
Bulgular: Çalışmada tedarik süreci ile ilgili tanımlanan risklerden 1 nolu riske ait risk puanı 3, 3 nolu riskin risk puanı 4 ve 4 nolu riskin risk puanı 2 puan olarak kabul edilebilir düzeyde bulunmuştur. 2 nolu riske ait risk puanı 10 puan olarak dikkate değer bulunmuştur. Hastanenin finansal risk oranı ise 0,10'dur.
Sonuç: Hastanenin tedarik faaliyetlerinin finansal risk değerlendirmesine göre, 1 nolu kamu zararı oluşması riski, 2 nolu ihtiyaca uygun mal alınamaması riski, 4 nolu ihtiyacın geç tedarik edilmesi riski kontrol edilebilir riskler olarak değerlendirilmiştir. 4 nolu ihtiyacın tedarik edilememesi riski ise dikkat edilmesi gereken risk olarak değerlendirilerek diğer risklerden ayrışmıştır. Ayrıca hesaplanan finansal risk oranına göre sağlık kuruluşunun kurumsal performansı finansal açıdan likit varlıkları ile kısa vadeli yükümlülüklerini karşılama riskinin bulunmadığı şeklinde değerlendirilmiştir.
Anahtar kelimeler: Finansal risk; risk değerlendirme; risk yönetimi.

INTRODUCTION

Healthcare quality is an indicator of the level of development. Healthcare facilities are important organizations in social and economic life (1). As a service enterprise, a healthcare organization is to produce health services for public needs through a combination of production factors (2). However, they are regarded as a different sector due to social importance of the service, market size and their own hallmarks (3).

As for risk management in healthcare organizations, in the heart of risk is patient and employee safety. Healthcare organizations are commercial enterprises and their financial, strategic and operational processes must be kept under control (4).

In Turkey, risk management in healthcare organizations focuses rather on patient and employee safety than such holistic approaches as Enterprise Risk Management (ERM) and risk-oriented management, internal control and audit, overlooking the emergence of risks in neglected areas of activities. The emergence of overlooked or neglected risks may lead to adverse outcomes including injuries and deaths in healthcare organizations. Such outcomes damage to patients, employees and third parties will affect the organization's financial structure as well (5). Risk management activities are of prime importance in operating financial activities and sustainability since the financial dimension of risk will affect the enterprise's financial activities.

Risk management in financial activities of healthcare organizations is assessed in two categories: Risks stemming from business processes and risks due to the organization's entire activities. In Turkey, risks in the financial activities of healthcare organizations are assessed according to the patient and employee criteria within quality management (6). The financial dimension of risks in operating activities is evaluated by the institutional performance and productivity assessment criteria (7). The importance of risk management is more connected with risks' financial outcomes than risk-related health and safety problems.

As in the ERM approach, holistic risk management applications may seem insufficient in healthcare organizations. Many healthcare organizations implement risk management strategies in programs, projects and services for clinical and patient safety. However, they are unsuccessful in enterprise risk management practices for financial success and sustainability (8-12).

The ERM approach is recommendable for improving the process of value creation and establishing a safer environment in healthcare organizations (13). In the articles on the application of ERM in healthcare organizations, while International Organization for Standardization (ISO) 31000 (14) and The Committee of Sponsoring Organizations of the Treadway Commission (COSO) (15) define the mutual steps of ERM as identification, analysis, assessment, monitoring and control, in the financial risk management studies on healthcare organizations, they are discussed by financial statement analysis, financial failure, bankruptcy prediction and institutional performance. No studies have discussed financial assessment of the risks that may occur in the operating process of healthcare organizations (16) and asserted risk management practices may improve their financial situations (17-19,20).

The present study aims to emphasize the importance of enterprise risk management in healthcare organizations and demonstrate how to assess the risks in financial activities. In this context, risk management practices in healthcare organizations will be mentioned, risk assessment, which is one of the stages of risk management; it will be shown over the hospital sample using the risk assessment table, the L-type decision matrix, financial risk ratio methods, and will be evaluated.

MATERIALS AND METHODS

We used risk assessment tables (5,8,18) for identifying the financial activities of healthcare organizations, L-type decision matrix (8,19) for risk assessment, and financial risk ratio methods (7) for enterprise performance indication.

Neither risk assessment table nor decision matrix is the first step in risk management. First, risk management committee and unit managers need to fill in a risk assessment form that will detect, identify and assess the relevant business risks. Second, the collected information will be conveyed into a risk assessment matrix for a visual expression. L-type 5x5 matrix diagram is used for the assessment of cause and effect or probability and impact relation. This matrix is optimal for simple risk analysis. However, this method is insufficient for multi process works with various flow charts and its success rate may vary depending on the analyst's experiences (19).

In compliance with the enterprise internal audit guidelines, we collected qualitative data through an interview with the risk manager of a hospital and quantitative data was created and adapted by the authors.

Procurement services in hospitals are provided by the purchasing unit. The purchasing units are affiliated with the administrative and financial affairs directorate. Purchasing transactions in hospitals are conducted by the provisions of Public Procurement Law No. 4734 and Public Procurement Contracts Law No. 4735. This Law allows enterprises to satisfy their urgent needs on the condition that the cost cannot exceed 10% of the budget in accordance with Article 22/d (Direct procurement) (9). The purpose of direct procurement process is to supply reasonably priced quality needs at market price level.

The work flow of the direct procurement process, the identified risks, the causes of the risks and the responses to the risks are arranged in Table A1, Table A2 and Table A3 in the appendix of article.

RESULTS

The following tables include the probability value ranges (Table 1) and impact value ranges (Table 2) of financial activities used in the calculation of the risk score. The risk score is calculated according to the following formula:

Risk score = Probability value x Impact value

The risk definitions and probability and impact values of the direct procurement method are shown in Table A1 and Table A2 in the annex. According to these values, the risk scores are calculated and the following decision matrix tables shown (Table 3).

The interpretation of the risk scores in the decision matrix tables is shown in risk assessment table (Table 4).

Table 1. Probability values

Frequency	Probability	Value
At least once a year	Very low	1
At least once in every six months	Low	2
At least once in every three years	Medium	3
At least once a month	High	4
At least once a week	Very high	5

Table 2. Impact values

Event	Severity	Value
Delay/Lag	Very low	1
High Cost	Low	2
Public Loss	Medium	3
Financial Distress	High	4
Termination of Activity	Very high	5

Table 3. Risk decision matrix

IMPACT						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	**2**	**4**	6	8	**10**
	1	1	2	**3**	4	5
		1	**2**	**3**	**4**	**5**
				PROBABILITY		

Low risk-green (1-6): Quick and simple precautions are applied immediately and additional measures are taken to the extent permitted by resources.
Moderate risk-yellow (7-14): Actions are performed as soon as possible but not after more than one year.
Excessive risk-red (15-25): Rapid actions are required. Risk committee/commission is given a briefing and remedial measures are taken immediately (10).

Table 4. Risk assessment

Risk No	Risk Score	Assessment	Frequency	Activity
		Unacceptable	Weekly	Urgent precautions are necessary
2	**10**	**Notable**	Monthly	Treatment is required
1-3-4	**3-4-2**	**Acceptable**	Semiannual	Must be monitored and counted in action plan

Enterprise financial performance evaluations of healthcare organizations are made by calculating financial risk ratios (Table 5). Accordingly, the following is an example of calculating the financial risk ratio of a healthcare organization.
Example:
1 million TRY net debt (A), 10 million TRY average accrued amount (D), 500 thousand TRY unbillable service accruement amount (E), 10 million TRY aggregate collection amount (B) and 9.5 million TRY aggregate accruement (C).
F= A/(D+E) x (B/C) F= 1,2 million / (10 million + 500 thousand) x 100 million / 105 million F=0,11 x 0,95 F=0,10

Table 5. Financial risk ratio (7)

Indicator	Formula	Parameter	Target	Average of Relevant Periods	2020
Financial Risk Ratio	F= [A/(D + E)] * (B / C)	A: Net Debt B: Aggregate Collection C: Aggregate Accruement D: Average Accruement E: Unbillable Service Accruement F: Financial Risk Ratio	≤ 2		0,10

DISCUSSION

Risk scores according to the risk table method of the direct procurement method and the procurement process are provided in Table 6.
According to the risk assessment results; the risk scores of the risks of public loss and the inability to purchase goods for the needs are low because their impact values are high while their probability values are low. These risks are considered controllable risks according to the risk matrix. The impact value and probability value of the risk of not supply the requirement are higher than other risks. According to the risk matrix, this risk is considered a remarkable risk.
In order not to cause mistakes and negligence in not purchasing goods that meet needs, procurement professionals take a high level of care in procurements with high risk such as public damage. Therefore, the risk probability in hospitals is low. However, considering the external environmental factors, the risk probability of late supply and failure to supply is higher than other risks.
In this case, the late supply of the need is considered controllable and the failure to supply the need is considered remarkable.

Table 6. Ranking of risk scores

Risk ID	Risk Score
2	10
3	4
1	3
4	2

The stock tracking system performed by the Ministry of Health ensures control of the critical stock level in hospitals. This system reduces the risk possibility that may be encountered in the procurement process.

The financial processes risk in hospitals affect their financial performance. The financial risk ratio of the hospital is 0.10. Enterprise has difficulties in discharging its debts over liquid assets when the financial risk ratio is greater than 2. Enterprise suffers from no difficulties if the ratio is equal to 2 or smaller than 2 (11). In public hospitals, high but unconvincing service costs lead to low revenue despite high sales volume. Public hospitals often suffer from resource insufficiency. The financial risk ratio (0.10), indicates that hospital does not have the risk to meet its liquid assets and current liabilities.

The study shows that risk assessment results of financial processes are consistent with financial performance risk values. This supports studies suggesting that risk management practices lead to improvements in the financial situation of healthcare institutions.

CONCLUSION

Hospitals must develop administrative activities for predicting potential risks and turning them into an opportunity to minimize possible losses. Hospitals with actively operating risk management will remain farther ahead of the game than those with no attempts to assure patient and employee safety and service quality. Potential risks and effects of these risks may vary depending on conditions, resources and environmental factors. Risk management is a proactive methodology for hospitals in fighting operational, clinical and financial risks. However, the variety and assessment of risks are challenging. Self-recognition is highly important for enterprises.

Financial risk is usually associated with the probability of monetary loss. Financial risk is commonly defined as the probability for company to remain incapable of fulfilling its cash flow obligations. As in any other enterprises, financial risk is analyzed in healthcare organizations. However, the results of such an analysis may misdirect information users since financial reports are manipulated easily in the organizations with no enterprise risk management practices and no risk-oriented internal auditing.

In the present study, we have discussed financial risk management for hospitals and presented an example of financial risk assessment at financial level. Risk assessment varies depending on enterprises, sectors and risk areas. However, there are some essentials in financial risk assessment that any enterprise is supposed to comply with. Specialists suggest implementing an effective internal control and audit structure in healthcare organizations for the establishment of a risk-based administration system instead of various risk and audit activities. In financial risk assessment, self-recognition and competence in taking necessary precautions to turn risks into opportunities are of prime importance for enterprises. We have used basic methods of analysis and documents in this paper though there are numerous other methods and documents being used in financial risk assessment. We used risk assessment tables (5,8,18) for identifying the financial activities of healthcare organizations, L-type decision matrix (8,19) for risk assessment, and financial risk ratio methods (7) for enterprise performance indication.

However, such risk assessment practices will provide very low chance to diminish financial risks and contribute to financial structure in healthcare organizations with no internal audit mechanism that can transform the risk management process into a proactive system through an ERM-like holistic risk assessment approach. All in all, risk management activities are to increase enterprise value and assure sustainability. Thus, enterprise risk management must be put into practice and an internal auditing unit must be established for monitoring the risks regularly and updating the audit reports. Furthermore, risk assessment of healthcare organizations must be conducted by independent audit institutions and high risk organizations must receive compulsory risk management support.

The present study will guide risk managers of healthcare organizations in assessing the risks of their financial activities and contribute to the formation of an enterprise risk culture.

Ethics Committee Approval: Since our study was not an experimental study including human or animal subject, ethics committee approval was not required.

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: MT, İE; Design: MT, İE; Data Collection/Processing: MT, İE; Analysis/Interpretation: MT, İE; Literature Review: MT, İE; Drafting/Writing: MT, İE; Critical Review: MT, İE.

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The Appendix:

Table A1. Risk determination form

Management/Unit/Subunit:					**Date: .../.../20....**
1	**2**	**3**	**4**	**5**	**6**
Order	**Reference No**	**Name of Business Process**	**Steps in Business Process**	**Risk Determined**	**Reason for Risk**
1	IMISB-1	Direct procurement process	*Determination of the need *Preparation of technical specification *Purchasing unit's demand for procurement *Budget control *Approval of expenditure order if budget is appropriate *Approval of market price survey commission *Conduction of a market survey *Approval of pricing *Approval of inspection and acceptance commission *Placing and order *Acceptance or return of goods in accordance with the Goods Inspection and Acceptance Regulation * Issuing a movable transaction bill *Issuing a payment order *Assessment officer's approval of payment order *Submitting payment order and documents regarding additional expenditures to accounting unit	Occurrence of public loss	*Unnecessary, missing or too many demands *Final price of the need exceeding its market price due to defective market survey *Payment before delivery *Payment without the completion of pre-purchase inspection and acceptance
2	IMISB -2			Failure to procure the need	*Lack of allocation for the need in budget *Lack of sufficient allocations in budget
3	IMISB -3			Failure to purchase goods for the need	*Erroneous preparation of specification *Commission's inappropriate buyouts *Lack of actualized inspection and acceptance
4	IMISB -4			Late procurement of the need	*Documents are prepared late *Document preparation is missing or erroneous *Time constraints *Supplier's late delivery of goods *Supplier's late delivery of documents *Supplier's erroneous preparation of documents

Risk determination is a process when healthcare professionals and staff become aware of the risks in medical services. Determined risks are registered in risk determination form.

Table A2. Risk voting form

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Order	**Reference No**	**Name of Business Process**	**Steps in Business Process**	**Risk Determined**	**Impact A**	**Impact B**	**Impact C**	**Impact (A+B+C)/3**	**Probability A**	**Probability B**	**Probability C**	**Probability (A+B+C)/3**	**Risk Score (Imp. x Pr.)**
1	IMISB -1	Direct procurement process	*Determination of the need *Preparation of technical specification *Purchasing unit's demand for procurement *Budget control *Approval of expenditure order if budget is appropriate *Approval of market price survey commission *Conduction of a market survey *Approval of pricing *Approval of inspection and acceptance commission *Placing and order *Acceptance or return of goods in accordance with the Goods Inspection and Acceptance Regulation * Issuing a movable transaction bill *Issuing a payment order *Assessment officer's approval of payment order *Submitting payment order and documents regarding additional expenditures to accounting unit	Risk: Occurrence of public loss Reasons: *Unnecessary, missing or too many demands *Final price of the need exceeding its market price due to defective market survey *Payment before delivery *Payment without the completion of pre-purchase inspection and acceptance	3	3	3	3	1	1	1	1	3
2	IMISB -2			Risk: Failure to procure the need Reasons: *Lack of allocation for the need in budget *Lack of sufficient allocations in budget	5	5	5	5	2	2	2	2	10
3	IMISB -3			Risk: Failure to purchase goods for the need *Erroneous preparation of specification *Commission's inappropriate buyouts *Lack of actualized inspection and acceptance	2	2	2	2	2	2	2	2	4
4	IMISB -4			Risk: Late procurement of the need Reasons: *Documents are prepared late *Document preparation is missing or erroneous *Time constraints *Supplier's late delivery of goods *Supplier's late delivery of documents *Supplier's erroneous preparation of documents	1	1	1	1	2	2	2	2	2

Based on risk determination sources, the impacts of risks, degrees of impact, probabilities and degrees of probability are determined are registered in risk voting form for calculation of risk scores.

Table A3. Risk registration form

Management/Unit/Subunit:													**Date: .../../20....**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Order	**Reference No**	**Name of Business Process**	**Steps in Business Process**	**Risk Determined**	**Responses to Risk: Current Controls**	**Impact**	**Probability**	**Risk Score (R)**	**Change (Direction of Risk)**	**Responses to Risk: New/ Additional/ Removed Controls**	**Start Date**	**Risk Holder**	**Statements**
1	IMISB -1	Direct procurement process	*Determination of the need *Preparation of technical specification *Purchasing unit's demand for procurement *Budget control *Approval of expenditure order if budget is appropriate *Approval of market price survey commission *Conduction of a market survey *Approval of pricing *Approval of inspection and acceptance commission *Placing and order *Acceptance or return of goods in accordance with the Goods Inspection and Acceptance Regulation * Issuing a movable transaction bill	Risk: Occurrence of public loss Reasons: *Unnecessary, missing or too many demands *Final price of the need exceeding its market price due to defective market survey *Payment before delivery *Payment without the completion of pre-purchase inspection and acceptance	*Pricing out commission receives tender from at least three companies * Commission compares tendered prices with those in the market * Commission compares tendered prices with costs of other similar tasks determined by administration * Procurement demand is made with movable requisition * Registration officer confirms storage for the need and confirms movable requisition *Inspection and acceptance commission accepts orders after enumerating, weighing and/or measuring them *Storehouse supervisors verify information in the acceptance report	3	1	**3**				Director of Financial and Adm. Services	
2	IMISB -2			Risk: Failure to procure the need Reasons: *Lack of allocation for the need in budget *Lack of sufficient allocations in budget	*The needs are determined precisely according to annual plans and programs *Reasoned payment offers are made during budget preparation*Requesting for allocation transfer for the allowances that are not offered during budget preparation* Supplying additional allocation for insufficient allowances	5	2	**10**				Director of Financial and Adm. Services	

3	IMISB -3		*Issuing a payment order *Assessment officer's approval of payment order *Submitting payment order and documents regarding additional expenditures to accounting unit	Risk: Failure to purchase goods for the need *Erroneous preparation of specification *Commission's inappropriate buyouts *Lack of actualized inspection and acceptance	*Technical specification is prepared by specialist *Pricing out commission is comprised of specialists *Qualified employees are stationed at purchasing units *Documents are prepared and supervised by experienced staff to avoid shortcomings and mistakes *Documents are supervised and signed by managers in pecking order	2	2	**4**				Director of Financial and Adm. Services	
4	IMISB -4			Risk: Late procurement of the need Reasons: *Documents are prepared late *Document preparation is missing or erroneous *Time constraints *Supplier's late delivery of goods *Supplier's late delivery of documents *Supplier's erroneous preparation of documents	* Inspection and acceptance commission is comprised of specialists. * Taking necessary precautions so that assessment officer in charge of preliminary financial audit can control each phase healthily	1	2	**2**				Director of Financial and Adm. Services	

Risk registration form includes determined risks, reasons for risks, responses, risk scores calculated by probability and impact values, control frequencies, supervision of activities on hand, management of such risks as change results, and other relevant terms. Risk data on all units is followed in consolidated risk registration form.

Research Article / Araştırma Makalesi
doi: 10.18678/dtfd.861952

Duzce Med J, 2021;23(S1):122-130
Düzce Tıp Fak Derg, 2021;23(S1):122-130

Analyzing Attitude towards COVID-19 Vaccine in the Context of the Health Industry: The Role of Country of Origin Image

COVID-19 Aşısına Yönelik Tutumların Sağlık Sektörü Açısından Analizi: Menşei Ülke İmajının Rolü

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Received / Geliş Tarihi : 15.01.2021
Accepted / Kabul Tarihi : 24.03.2021
Available Online / Çevrimiçi Yayın Tarihi : 25.03.2021

ABSTRACT

Aim: The aim of this study is to investigate individuals' attitude towards the coronavirus disease 2019 (COVID-19) vaccine, and explain vaccination intention in the framework of the theory of reasoned action. The study extends the theory of reasoned action with country of origin image variable.
Material and Methods: The data of the study were collected by survey method. The survey consists of a total of 48 items, including individual innovativeness, subjective norms, attitude towards COVID-19 vaccine, intention to get COVID-19 vaccine, country of origin image, demographic characteristics, and general opinions about the vaccine and COVID-19. 333 participants answered the surveys. Data were analyzed by structural equation modeling using SPSS v.21 and AMOS v.23 package programs.
Results: Attitude towards German COVID-19 vaccine (β=0.888, $p<0.001$) and German's country of origin (β=0.436, $p<0.001$) variables have significant and positive relationships with intention to get German vaccine. Subjective norms (β=0.750, $p<0.001$), China's country of image (β=0.265, $p<0.001$), attitude towards Chinese COVID-19 vaccine (β=0.198, $p<0.001$), variables have significant and positive relationships with intention to get Chinese COVID-19 vaccine. Country of origin image is significantly and positively related to both attitude towards German COVID-19 vaccine (β=0.690, $p<0.001$) and Chinese COVID-19 vaccine (β=0.461, $p<0.001$).
Conclusion: The most important factor associated with the intention to get German COVID-19 vaccine is the attitude towards the COVID-19 vaccine. The most important factor associated with the intention to get Chinese COVID-19 vaccine is the subjective norm. Country of origin image is a significant variable for both countries.
Keywords: COVID-19 vaccine; theory of reasoned action; country of origin image; public health.

ÖZ

Amaç: Bu çalışmanın amacı, bireylerin koronavirüs hastalığı 2019 (coronavirus disease 2019, COVID-19) aşısına yönelik tutumlarını inceleyerek, aşı olma niyetini gerekçeli eylem teorisi çerçevesinde açıklamaktır. Çalışma gerekçeli eylem teorisini menşei ülke imajı değişkeni ile genişletmektedir.
Gereç ve Yöntemler: Çalışmanın verileri anket yöntemiyle toplanmıştır. Anket, bireysel yenilikçilik, subjektif normlar, COVID-19 aşısına yönelik tutum, COVID-19 aşısı olma niyeti, menşe ülke imajı, demografik özellikler ve aşı ve COVID-19 hakkında genel görüşler dahil olmak üzere toplam 48 maddeden oluşmaktadır. 333 katılımcı anketleri cevaplandırmıştır. Veriler SPSS v.21 ve AMOS v.23 paket programları kullanılarak yapısal eşitlik modellemesi ile analiz edilmiştir.
Bulgular: Alman COVID-19 aşısına yönelik tutum (β=0,888; $p<0,001$) ve Almanya'nın menşei ülke imajı (β=0,436; $p<0,001$) değişkenleri, Alman aşısı olma niyeti ile anlamlı ve pozitif ilişkilidir. Subjektif normlar (β=0,750; $p<0,001$), Çin'in menşei ülke imajı (β=0,265; $p<0,001$), ve Çin aşısına yönelik tutum (β=0,198; $p<0,001$) değişkenleri Çin aşısı olma niyeti ile anlamlı ve pozitif ilişkilidir. Menşei ülke imajı, hem Alman COVID-19 aşısına yönelik tutum ile (β=0,690; $p<0,001$), hem de Çin COVID-19 aşısına yönelik tutum (β=0,461; $p<0,001$) ile anlamlı ve pozitif ilişkilidir.
Sonuç: Alman COVID-19 aşısı olma niyeti ile ilişkili en önemli faktör Alman COVID-19 aşısına yönelik tutumdur. Çin COVID-19 aşısı olma niyetiyle ilişkili en önemli faktör, subjektif normlardır. Menşei ülke imajı, her iki ülke için de önemli bir değişkendir.
Anahtar kelimeler: COVID-19 aşısı; gerekçeli eylem teorisi; menşei ülke imajı; halk sağlığı.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) emerged in China in 2019 and has been called a pandemic by World Health Organization (WHO). The COVID-19 pandemic changed human life, ways of working, and almost all systems. The health industry made a great effort during the pandemic and it is one of the most affected industries from the virus. The health industry quickly adapted itself to pandemic conditions and also continuously worked on vaccine development. Even though vaccine development is a long process, considerable progress was made.

Although the importance of vaccination to prevent diseases is known, there is still hesitation to get vaccines in societies. Vaccine hesitancy is one of the most discussed concepts in health science and there are also debates on this issue in public. Vaccine hesitancy is defined as the behavior with delay in acceptance or refusal of vaccines despite available services. The hesitancy depolarized the vaccine supporters and anti-vaccine counterparts (1). According to Palm et al.'s (2) study people who were informed on the safety/effectiveness of the vaccine were more likely to report that they would take the vaccine; the finding highlights the importance of informing people about the vaccine. Furthermore, when people were informed about political influences on vaccine development, they were hesitant to get the vaccine. Salali and Uysal's (3) study shows that 31% of the participants were hesitant to get the vaccine while 3% reject to get the vaccine. The success of the vaccine campaigns to control COVID-19 does not only depend on the effectiveness and/or safety of the vaccine but also the acceptance of the public. Another study in America demonstrates that the rate of rejection is 30% even for a vaccine that has optimal qualities (4). Sallam's (5) study points out that the vaccine acceptance rate is low in Middle East, Russia, Africa, and several European countries. In this direction, it is seen that more studies on vaccination intention are needed in those countries.

To fill this void, this study aims to explain factors related to intention to get COVID-19 vaccine in the framework of the theory of reasoned action since the first step to understand vaccination intention is determining the factors associated with the intention. This study also intends to investigate the effect of country of origin image on this decision with a multidisciplinary perspective. Furthermore, this study presents participants' attitudes towards the COVID-19 vaccine, their opinions on the COVID-19 virus and COVID-19 vaccine. Together with these, the moderator role of individual innovativeness in the relationship between country of origin image and COVID-19 vaccination intention is examined.

MATERIAL AND METHODS

Theory of Reasoned Action

One of the fundamental theories that explain consumers' product/service adaptation decision is the theory of reasoned action (6). This theory is utilized as a common model to predict behavior and/or behavioral intention (7).

Theory of reasoned action states that attitude, subjective norm, and behavioral intention variables affect behavior. According to the theory, individuals' behavioral intention is explained by attitude and subjective norm (8). In this respect; attitude is "affective or valenced response toward performing some behavior", and subjective norm is "a person's belief about whether significant others feel that he or she should perform the target behavior" (9).

This study used attitude and subjective norms as antecedents of behavioral intention in the framework of the theory of reasoned action and extended the theory with country of origin image variable.

Country of Origin Image

Countries give cues to help consumers evaluate the products (10). The country where the headquarters are located is conceptualized as country of origin in the marketing literature (11). One of the fundamental constructs of country of origin is country of origin image (12). Country of origin image is the foundation of country reputation, attractiveness, and brand image. Positive country or origin image contributes to the economic, social, and political power of the country (13). Country of origin image is conceptualized as the attitude towards a country (14). One of the first definitions of country of origin image belongs to Nagashima (15) who defines country of origin image as "the image that consumers associate or attach to products of a specific country".

Consumers use their beliefs or perceptions about a country to evaluate the country's brands (16,17). The researches in the literature show that country of origin image affects product image and product judgments (18), brand image and brand evaluation (19), consumers' attitudes (20), and purchase intention (19-23).

The research on generic drugs shows that country of origin image affects brand power and brand awareness, which are the components of brand equity in this category (24). Similarly, study by Smaoui et al. (25) concludes that country of origin affects consumers' perception of drug quality and trust. Another research on over-the-counter medicines states that country of origin is a determinant of purchase intention (26).

Although country of origin image variable was tested on several product groups, there is a need to conduct research on the vaccine. Country of origin of the vaccine comes to the forefront as an important factor in predicting vaccination intention.

Individual Innovativeness

When new technologies and products are introduced to the market, consumers reach them differently. It is expected that people who have a high level of individual innovativeness adapt to innovation more quickly (27) and earlier than others (28). The level of individual innovativeness affects individuals' reactions to the vaccine, especially when there is uncertainty. Also, vaccines are directly related to a person's health so the risk is also higher. Goldsmith's (29) findings show that consumer innovativeness theories can be extended to different consumption areas. Accordingly, innovative consumers tend to be consistent regardless of the product category. Innovativeness as a personality trait was used as a moderator variable in studies in the literature (30-32). Therefore, the innovativeness level of individuals is included as a moderator variable in the research.

In the light of the theoretical framework, the following research models are formed. Figure 1 and Figure 2 show the research models of the study.

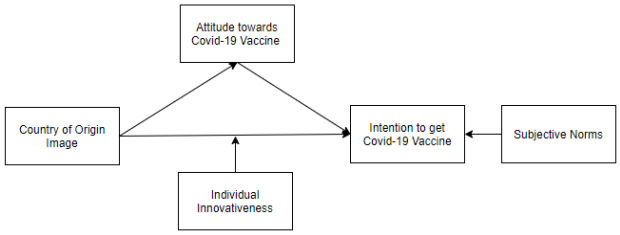

Figure 1. Research model (Germany)

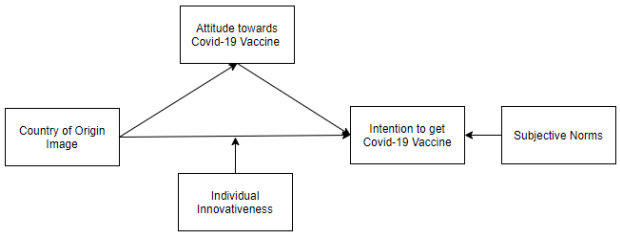

Figure 2. Research model (China)

H1: There is a positive relationship between Germany's country of origin image and intention to get German vaccine.
H2: There is a positive relationship between Germany's country of origin image and attitude towards German vaccine.
H3: Attitude towards German vaccine mediates the relationship between Germany's country of origin and intention to get German vaccine.
H4: Individual innovativeness moderates the relationship between Germany's country of origin image and intention to get German vaccine.
H5: There is a positive relationship between attitude towards German vaccine and intention to get German vaccine.
H6: There is a positive relationship between subjective norms and intention to get German vaccine.
H7: There is a positive relationship between China's country of origin image and intention to get Chinese vaccine.
H8: There is a positive relationship between China's country of origin image and attitude towards Chinese vaccine.
H9: Attitude towards Chinese vaccine mediates the relationship between China's country of origin and intention to get Chinese vaccine.
H10: Individual innovativeness moderates the relationship between China's country of origin image and intention to get Chinese vaccine.
H11: There is a positive relationship between attitude towards Chinese vaccine and intention to get Chinese vaccine.
H12: There is a positive relationship between subjective norms and intention to get Chinese vaccine.

Survey Design

In the survey form used in the study, preliminary information was given to the participants about the scope of the study, that the participant information would be kept confidential and about the researchers. Later, 48 scale items were included to test the hypotheses of the research, the items were prepared as a 5-point Likert scale. Individual innovativeness with four items adapted from Flynn and Goldsmith (33), subjective norms with three items adapted from Nysveen et al. (34), attitude towards COVID-19 vaccine with three items adapted from Hamari et al. (35), intention to get COVID-19 vaccine with three items adapted from Sherman et al. (36) and country of origin image is measured by seven items adapted from Hien (19).
In the last part of the survey, there are questions about demographic characteristics and questions to measure general opinions about the vaccine and COVID-19.

Data Collection

The data of the study were collected using the survey method with convenience sampling. The research population is Turkish citizens who have knowledge about the COVID-19 vaccine. A total of 334 surveys were collected from the participants living in İstanbul. A survey was not included in the analysis because it has extreme values. The study was approved by the Social and Humanities Research Ethics Committee of Yıldız Technical University (2021/01).

Statistical Analysis

SPSS v.21 and AMOS v.23 programs were used to test the research model and hypotheses. Analysis results are included under the headings of demographic characteristics, reliability, validity and exploratory factor analysis findings, structural equation modeling and hypothesis tests.

RESULTS

Demographic Characteristics of the Participants

Table 1 demonstrates the demographic information about the participants. According to Table 1, 61% of the participants are female and 39% are male participants. Majority of the participants (59.5%) have bachelor degree. Participants aged between 18 and 29 constituted 55.3% of the total participants. Finally, information on household income level and occupation were obtained from the participants. 28% of the participants' household income level is 10,000 TL and above while 26.4% or the participants' is between 2.501 and 5.000 TL. 37.5% of the participants works at private sector while 32.4% of the participants are students.

Reliability, Validity and Exploratory Analysis Results

In order to determine the factor structures of the variables in the study, exploratory factor analysis was applied first. In the exploratory factor analysis, two important parameters were taken into consideration: KMO test and Bartlett sphericity test. According to Sharma (37), KMO test should be above 0.60 and Bartlett sphericity test should be less than 0.05 for sampling adequacy in measuring the suitability of the data collected by the survey method to factor analysis. As given in Table 2, KMO values for the scales are in the range of 0.722-0.919. Accordingly, it is understood that the sample size is suitable for factor analysis. Bartlett sphericity test results were also significant ($p<0.05$). Accordingly, it is understood that the correlation between the items of the scales is adequate for factor analysis (38).
According to Hair et al. (39), the internal reliability, convergent and discriminant validity of the scales used in the structural model should be tested at the first stage. In order for the scales to be accepted as internally reliable, the

Cronbach alpha value and the composite validity value should be 0.70 and above (40). When the values related to the scales are examined in Table 2, it has been determined that the Cronbach alpha values are in the range of 0.823-0.969 and have a very high reliability. CR (composite reliability) values are in the range of 0.785-0.967, AVE values are above the limit value determined as 0.70 and meet the combination validity requirements. Accordingly, the scales have a high degree of reliability and combination validity and are internally reliable. AVE values and factor loadings should be 0.50 and above in order to accept convergent validity. In order to ensure discriminant validity, the square roots of the AVE values should be greater than the correlation values between the structures (41,42). According to Table 2, factor loadings and AVE values are above the limit value of 0.5, ensuring convergent validity.

In Table 3 and Table 4, the inter-structure correlations and the square roots of the AVE values are given. The square roots of the AVE values are shown diagonally. Correlations between structures were lower than the square roots of AVE values. Accordingly, discriminant validity is provided. In addition, the table includes skewness and kurtosis values. Limit values for skewness and kurtosis are determined as -1.5 and +1.5 intervals. Accordingly, the data set has a normal distribution (43). In the research, the criteria of goodness of fit were examined by applying confirmatory factor analysis with the AMOS program. Confirmatory factor analysis goodness of fit values for the Germany model were found as "CFI: 0.965, CMIN/df: 2.514, SRMR: 0.053, GFI: 0.894, AGFI: 0.857, RMSEA: 0.068", while for China it was "CFI: 0.964, CMIN/df: 2.160, SRMR: 0.052, GFI: 0.902, AGFI: 0.870, RMSEA: 0.059". Both models have values above the limit values (44).

Table 1. Demographic characteristics, n=333

Demographic Characteristics	n	%
Gender		
Female	203	61.0
Male	130	39.0
Education Level		
High School and below	31	9.3
Bachelor Degree	198	59.5
Master's Degree	96	28.8
Doctorate Degree	8	2.4
Age		
18 - 29	184	55.3
30 - 39	61	18.3
40 - 49	38	11.4
50 - 64	46	13.8
65 and above	4	1.2
Household Income		
2,500 TL and below	17	5.1
2,501 - 5,000 TL	88	26.4
5,001 -7,500 TL	67	20.1
7,501 - 10,000 TL	65	19.5
10,001 TL and above	96	28.8
Occupation		
Public Employee	61	18.3
Private Sector Employee	125	37.5
Entrepreneur	9	2.7
Student	108	32.4
Retired	16	4.8
Unemployed	14	4.2

Structural Equation Modeling and Hypothesis Tests

The hypotheses of the research were tested with path analysis by establishing structural equation modeling. Two different models have been established for Germany and China. The goodness of fit values of the established models were examined, and the fit values for model 1 (without mediator variable) and model 2 (with mediator variable) were given in Table 5 and Table 8. According to the model goodness of fit values determined by Hair (40), it is seen that the fit values of the research models are above the limits.

Table 2. Exploratory factor analysis, reliability and validity results

Items	Factor Loadings	Cronbach α	CR	AVE
Subjective norms (KMO: 0.763, Bartlett's: 802.498, df: 3, p<0.001)				
S1	0.935			
S2	0.929	0.93	0.93	0.8
S3	0.946			
Germany's country of origin image (KMO: 0.919, Bartlett's: 3043.530, df: 21, p<0.001)				
GCOI1	0.904			
GCOI2	0.924			
GCOI3	0.911			
GCOI4	0.940	0.97	0.97	0.8
GCOI5	0.906			
GCOI6	0.923			
GCOI7	0.916			
Attitude towards German COVID-19 Vaccine (KMO:0.727, Bartlett's: 1129.224, df: 3, p<0.001)				
AG1	0.966			
AG2	0.971	0.95	0.95	0.9
AG3	0.917			
Intention to get German COVID-19 Vaccine (KMO:0.763, Bartlett's: 806.241, df: 3, p<0.001)				
IG1	0.930			
IG2	0.946	0.93	0.93	0.8
IG3	0.935			
China's country of origin image (KMO: 0.902, Bartlett's: 1663.293, df: 21, p<0.001)				
CCOI1	0.807			
CCOI2	0.852			
CCOI3	0.852			
CCOI4	0.879	0.93	0.92	0.6
CCOI5	0.769			
CCOI6	0.821			
CCOI7	0.843			
Attitude towards Chinese COVID-19 Vaccine (KMO: 0.722, Bartlett's: 671.727, df: 3, p<0.001)				
AC1	0.933			
AC2	0.935	0.90	0.90	0.8
AC3	0.870			
Intention to get Chinese COVID-19 Vaccine (KMO: 0.766, Bartlett's: 1143.100, df: 3, p<0.001)				
IC1	0.958			
IC2	0.973	0.96	0.96	0.9
IC3	0.956			
Individual innovativeness (KMO: 0.731, Bartlett's: 770.910, df: 10, p<0.001)				
II1	0.757			
II2	0.824			
II3	0.612	0.82	0.78	0.5
II4	0.811			
II5	0.813			

Table 3. Descriptive statistics and correlations (Germany)

Factor	Mean	SD	Skew.	Kurt.	1	2	3	4	5
Country of origin	3.764	1.054	-1.183	0.940	**0.898**				
Attitude	3.278	1.121	-0.417	-0.447	0.677	**0.930**			
Intention	3.129	1.079	-0.273	-0.496	0.548	0.768	**0.904**		
Subjective norms	3.199	1.135	-0.422	-0.729	0.547	0.631	0.444	**0.903**	
Individual innovativeness	2.508	0.829	0.191	-0.471	0.383	0.235	0.348	0.231	**0.675**

Table 4. Descriptive statistics and correlations (China)

Factor	Mean	SD	Skew.	Kurt.	1	2	3	4	5
Country of origin	3.109	0.967	-0.402	-0.294	0.796				
Attitude	2.644	0.886	-0.264	-0.315	0.461	0.868			
Intention	2.662	1.065	0.096	-0.606	0.433	0.810	0.944		
Subjective norms	3.199	1.135	-0.422	-0.729	0.453	0.397	0.477	0.904	
Individual innovativeness	2.508	0.829	0.191	-0.471	0.211	0.163	0.149	0.230	0.675

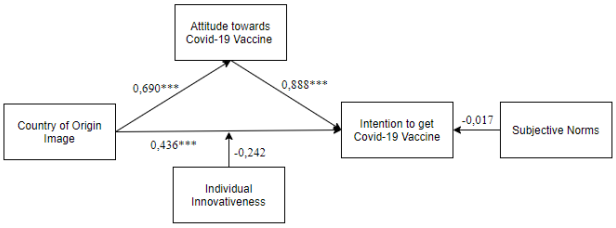

Figure 3. Path analysis results (Germany). ***: p<0.001

The model of the study established for Germany is given in Figure 3. Path coefficients and significance levels are shown on the model. According to Table 5, which includes the hypothesis test results for the German model; there is a positive and significant relationship between Germany's country of origin image and the intention to get a German vaccine (β=0.436, p<0.001) and attitude towards getting a German vaccine (β=0.690, p<0.001). Hence, the H1 and H2 hypotheses were supported. A significant and positive relationship (β=0.888, p<0.001) was found between attitude towards German COVID-19 vaccine and intention to get German COVID-19 vaccine, and H5 was supported. There was no significant and positive correlation (β=-0.017, p=0.708) between subjective norms and intention to get a German vaccine. Hence, the H6 hypothesis was not supported.

Two separate models were created to test the role of attitude towards German COVID-19 vaccine mediator (Table 6). Model 1 does not contain mediator variables. Model 2 contains the mediator variable. Then, the significance values and path coefficients of these models were compared. In Model 1, the path between Germany's country of origin image and intention to get German COVID-19 vaccine is positive and significant (β=0.436, p<0.001). Adding the attitude in model 2 distorted the significance value (β=-0.066, p=0.271). The deterioration in significance value and path coefficient proves the mediating role in the relationship between attitude towards German COVID-19 vaccine, Germany's country of origin image and intention to get German COVID-19 vaccine.

Table 5. Hypothesis testing results (Germany)

Hypothesis	Path		Std. β	Std. Error	C.R.	p	Result
H1 (Model 1)	G.COI	G.Int.	0.436	0.442	0.062	***	Supported
H2 (Model 2)	G.COI	G.Att.	0.690	0.050	13.838	***	Supported
H5 (Model 2)	G.Att.	G.Int.	0.888	0.067	13.279	***	Supported
H6 (Model 2)	S.Norms	G.Int.	-0.017	0.044	-0.374	0.708	Not Supported
Model Fit Indices							
Model 1: CFI: 0.974, CMIN/df: 3.089, SRMR: 0.033, GFI: 0.921, AGFI: 0.882, RMSEA: 0.079							
Model 2: CFI: 0.970, CMIN/df: 3.143, SRMR: 0.073, GFI: 0.910, AGFI: 0.869, RMSEA: 0.080							

Table 6. Mediation analysis results (Germany)

Hypothesis		Path		Std. β	Std. Error	C.R.	p	Result
H3	**(Model 1)**	G.COI	G.Int.	0.436	0.442	0.062	***	Supported
	(Model 2)	G.COI	G.Int.	-0.066	0.061	-1.1	0.271	

It aimed to examine moderator role of individual innovations in the relationship between China's country of origin image and intention to get German COVID-19 vaccine. For this, individual innovations' moderator role tested using the AMOS program. The interaction term was created by multiplying the averages of Germany's country of origin image and individual innovations, and it was tested path between the interaction term and intention to get German COVID-19 vaccine. According to Table 7, which includes the analysis results, individual innovations is not a moderator (β=-0.242, p=0.314) in the relationship between Germany's country of origin image and intention to get German COVID-19 vaccine.

The model of the study established for China is given in Figure 4. Path coefficients and significance levels are shown on the model. According to Table 8, which includes the hypothesis test results for the Chinese model; there is a positive and significant relationship between China's country of origin image and the intention to get a Chinese vaccine (β=0.265, p<0.001) and the attitude towards Chinese vaccine (β=0.461, p<0.001), so the H7 and H8 hypotheses were supported. A significant and positive relationship was found between attitudes towards Chinese vaccine and intention to get Chinese COVID-19 vaccine (β=0.198, p<0.001) and subjective norms (β=0.750, p<0.001), and H11 and H12 were supported.

Two separate models were created to test the role of attitude towards Chinese COVID-19 vaccine mediator (Table 9). Model 1 does not contain mediator variables. Model 2 contains the mediator variable. Then, the significance values and path coefficients of these models were compared. In Model 1, the path between China's country of origin image and intention to get Chinese COVID-19 vaccine is positive and significant (β=0.265, p<0.001). Adding the attitude in Model 2 distorted the significance value (β=-0.006, p=0.900). The deterioration in significance value and path coefficient proves the mediating role in the relationship between attitude towards Chinese COVID-19 vaccine, China's country of origin image and intention to get Chinese COVID-19 vaccine.

It aimed to examine moderator role of individual innovations in the relationship between China's country of origin image and intention to get Chinese COVID-19 vaccine. For this, individual innovations' moderator role tested using the AMOS program. The interaction term was created by multiplying the averages of China's country of origin image and individual innovations, and it was tested path between the interaction term and intention to get Chinese COVID-19 vaccine. According to Table 10, individual innovations' moderator role (β=-0.337, p=0.129) does not exist in the relationship between China's country of origin image and intention to get Chinese COVID-19 vaccine.

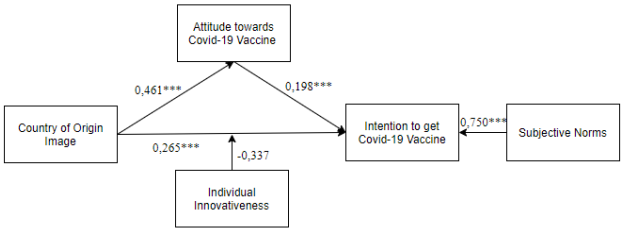

Figure 4. Path analysis results (China). ***: p<0.001

Table 7. Moderation analysis results (Germany)

Hypothesis	Path		Std. β	Std. Error	C.R.	p	Result
H4	G.COI*II	G.Int.	-0.242	0.058	-1.006	0.314	Not Supported

G.COI*II: Individual innovativeness (interaction term)

Table 8. Hypothesis testing results (China)

Hypothesis	Path		Std. β	Std. Error	C.R.	p	Result
H7 (Model 1)	C.COI	C.Int.	0.265	0.064	4.556	***	Supported
H8 (Model 2)	C.COI	C.Att.	0.461	0.056	7.980	***	Supported
H11 (Model 2)	C.Att.	C.Int.	0.198	0.039	4.734	***	Supported
H12 (Model 2)	S.Norms	C.Int.	0.750	0.053	15.605	***	Supported

Model Fit Indices
Model 1: CFI: 0.975, CMIN/df: 2.068, SRMR: 0.039, GFI: 0.934, AGFI: 0.899, RMSEA: 0.070
Model 2: CFI: 0.973, CMIN/df: 2.334, SRMR: 0.058, GFI: 0.922, AGFI: 0.891, RMSEA: 0.063

Table 9. Mediation analysis results (China)

Hypothesis		Path		Std. β	Std. Error	C.R.	p	Result
H9	**(Model 1)**	C.COI	C.Int.	0.265	0.064	4.556	***	Supported
	(Model 2)	C.COI	C.Int.	0.006	0.050	0.126	0.900	

Table 10. Moderation analysis results (China)

Hypothesis	Path		Std. β	Std. Error	C.R.	p	Result
H10	C.COI*II	C.Int.	-0.337	0.062	-1.518	0.129	Not Supported

C.COI*II: Individual innovativeness (interaction term)

DISCUSSION

While the COVID-19 pandemic affects the whole world, vaccination studies are also increasing. Turkey has also started vaccination. This study aims to investigate the antecedents of vaccination intention in the framework of theory of reasoned action and extends the theory with country-of-origin construct. In line with this purpose, two models were created for German and Chinese COVID-19 vaccine, hypotheses were formed and tested.

Two separate models were formed to analyze the relationships between subjective norms, attitude towards COVID-19 vaccine, country of origin image, and vaccination intention. Furthermore, the mediating role of attitude in the relationship between country of origin and vaccination intention, and the moderating role of individual innovativeness in the relationship between country of origin and vaccination intention were analyzed. Results for Germany show that the most important factor related to getting the German vaccine is the attitude towards German COVID-19 vaccine (β=0.888, $p<0.001$). The finding underlines that to increase the intention to get the German COVID-19 vaccine, creating positive attitudes towards German COVID-19 vaccine should be prioritized. When people think that getting the vaccine is logical, their intention to get the German COVID-19 vaccine increases. The second important variable to explain intention to get German COVID-19 vaccine is Germany's country of origin image (β=0.436, $p<0.001$). In addition, Germany's country of origin image is positively related to attitude towards German COVID-19 vaccine (β=0.690, $p<0.001$). It should be underlined that country of image is related to both attitudes toward German COVID-19 vaccine and intention to get German COVID-19 vaccine. On the other hand, attitude towards German COVID-19 vaccine mediates the relationship between Germany's country of origin and intention to get German COVID-19 vaccine. However, the research found that there is not a relationship between subjective norms and intention to get German COVID-19 vaccine. This finding indicates that significant others' opinion is not related to getting the German COVID-19 vaccine. Furthermore, individual innovativeness does not moderate the relationship between Germany's country of origin image and intention to get German COVID-19 vaccine.

Results for China demonstrate that the most important factor related to getting the Chinese COVID-19 vaccine are subjective norms (β=0.750, $p<0.001$). This finding indicates that if significant others expect individuals to get the vaccine, individuals are more inclined to get the Chinese COVID-19 vaccine. Therefore, it should be underlined that others opinions are essential to increase the likelihood of getting the Chinese COVID-19 vaccine. The second important variable to predict intention to get the Chinese COVID-19 vaccine is China's country of origin image (β=0.265, $p<0.001$). Furthermore, there is a positive relationship between attitude towards Chinese COVID-19 vaccine and intention to get Chinese COVID-19 vaccine (β=0.198, $p<0.001$). Moreover, the study found a positive relationship between China's country of origin image and attitude towards Chinese COVID-19 vaccine (β=0.461, $p<0.001$). Attitude towards Chinese COVID-19 vaccine mediates the relationship between China's country of origin and intention to get Chinese COVID-19 vaccine while individual innovativeness does not moderate the relationship between China's country of origin and intention to get Chinese COVID-19 vaccine.

CONCLUSION

In conclusion, the study reveals that the most important variable related to getting the German COVID-19 vaccine is attitude towards the German COVID-19 vaccine whereas the most important variable related to get the Chinese COVID-19 vaccine is subjective norm. Country of origin is an essential variable for both countries and should be taken into account while researching medicine products.

Consumers take performance risk, financial risk, time risk, physical risk, social risk, and psychological risk while making buying decisions. Medicine and health industries are some of the most sensitive and significant industries from the point of risk factors. Therefore, decision-makers in the health industry should consider health risk and hesitation together with cost. From a marketing perspective, this study presented that country of origin image is a significant variable for the health industry and vaccination. The study highlights the importance of country of origin image, attitude, and subjective norms variables for the health industry.

Ethics Committee Approval: The study was approved by the Social and Humanities Research Ethics Committee of Yıldız Technical University (2021/01).

Conflict of Interest: None declared by the authors.

Financial Disclosure: None declared by the authors.

Acknowledgements: None declared by the authors.

Author Contributions: Idea/Concept: KA, EÖÇ, ŞGK; Design: KA, EÖÇ, ŞGK; Data Collection/Processing: KA, EÖÇ, ŞGK; Analysis/Interpretation: KA, EÖÇ, ŞGK; Literature Review: KA, EÖÇ, ŞGK; Drafting/Writing: KA, EÖÇ, ŞGK; Critical Review: KA, EÖÇ, ŞGK.

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AUTHOR GUIDELINES

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TITLE (English and Turkish), SHORT TITLE, ABSTRACT (English and Turkish), Keywords (English and Turkish), INTRODUCTION, MATERIAL AND METHODS, RESULTS, DISCUSSION, CONCLUSION, REFERENCES
ABSTRACT and ÖZ should be compatible in terms of translation and each should be between 200-250 words.
ABSTRACT should be structured as "Aim, Material and Methods, Results, Conclusion".
ÖZ, should be structured as "Amaç, Gereç ve Yöntemler, Bulgular, Sonuç".

Review (Invited Only)

TITLE (English and Turkish), SHORT TITLE, ABSTRACT (English and Turkish), Keywords (English and Turkish), INTRODUCTION, Subtitles Related to the Subject, CONCLUSION, REFERENCES
ABSTRACT and ÖZ should be compatible in terms of translation and each should be between 150-200 words.

Case Report

TITLE (English and Turkish), SHORT TITLE, ABSTRACT (English and Turkish), Keywords (English and Turkish), INTRODUCTION, CASE REPORT, DISCUSSION, REFERENCES
ABSTRACT and ÖZ should be compatible in terms of translation and each should be between 100-150 words.

Other

The general writing rules are applied for the preparation of the writings (letter to the editor, editorial comment/discussion, etc.) except these three basic types of article. There is no title and abstract sections in these writings. The number of references is limited to 5. The dedicated article should be specified by giving the number and date. The name, institution and address of the author should be included at the end of writing. Answer to the letter is given by the editor, or authors of the dedicated article, by publishing again in the journal.

AUTHOR GUIDELINES

WRITING RULES

- Articles should be prepared as Microsoft Word® document.
- The required margins are 2.5 cm on all sides.
- Page numbers should be placed to bottom right corner of pages.
- All texts must be typed with double-space as left-aligned using 12 point Times New Roman font.

KEYWORDS

- Number of the keywords must be at least 2, words should be separated from each other by a semicolon (;).
- Keywords in Turkish must be given in accordance with Türkiye Bilim Terimleri (TBT) (http://www.bilimterimleri.com), and keywords in English must be given in accordance with Medical Subject Headings (MESH) (http://www.nlm.nih.gov/mesh/MBrowser.html).

STATISTICAL METHODS

- All research articles should be assessed in terms of biostatistics and indicated with appropriate plan, analysis and report. In these articles last subtitle of the MATERIAL and METHODS section should be the "Statistical Analysis".
- In this section, the statistical methods used in the study should be written by indicating the purpose of use, package programs and versions used for statistical analysis should be specified.
- p values should be given in three decimal digits (p=0.038; p=0.810 etc.).
- Further information to control the convenience of articles in terms of biostatistics, can obtained from www.icmje.org.

ABBREVIATIONS

- The term should be written in full words with the abbreviation in parenthesis where first mentioned, and the same abbreviation should be used throughout the entire text.
- Abbreviations used internationally should be used in accordance with the Scientific Writing Rules.

TABLES AND FIGURES

- Should be indicated at the end of the relevant sentence in the text as (Table 1) and/or (Figure 1).
- Tables (with headings) and figures (with captions) must be added after references at the end of the text as each to be on a separate page.
- The table headings should be written at top of the table (Table 1. Table heading) and the figure captions should be written below the figure (Figure 1. Figure caption) as their first letters being upper case.
- If any abbreviation or symbol is used in tables and figures, it should be explained as a footnote below.
- The figures and photographs should be upload as separate files in .png, .jpg, etc. format and at least 300 dpi resolution.
- Captions of figure and photograph should be given on a separate page respectively, after the page including last table.
- If figure, picture, table, graphic etc. which have been published before is used, written permission must be taken and it should be stated in the explanation of figures, pictures, tables, graphics. The legal responsibility in this regard belongs the authors.

ACKNOWLEDGEMENT

- If any conflict of interest, financial support, donation and other editorial (English/Turkish evaluation) and/or technical support, it must be stated in this section before the REFERENCES section.

REFERENCES

- References should be numbered according to the order of use and stated with numbers in parentheses as (1) or (1,2) or (3-5) at the end of the relevant sentence in the text.
- Reference list should be formed according to the reference order used in the text.
- If the number of authors are 6 or less, all authors should be specified, if there are 7 or more "et al." should be added after the first 6 authors are specified.
- The conference papers, personal experiences, unpublished papers, theses and internet addresses should not be used as references.
- DOI is the only acceptable online reference.

Article:

Al-Habian A, Harikumar PE, Stocker CJ, Langlands K, Selway JL. Histochemical and immunohistochemical evaluation of mouse skin histology: comparison of fixation with neutral buffered formalin and alcoholic formalin. J Histotechnol. 2014;37(4):115-24.

Aho M, Irshad B, Ackerman SJ, Lewis M, Leddy R, Pope T, et al. Correlation of sonographic features of invasive ductal mammary carcinoma with age, tumor grade, and hormone-receptor status. J Clin Ultrasound. 2013;41(1):10-7.

Book:

Buckingham L. Molecular diagnostics: fundamentals, methods and clinical applications. 2nd ed. Philadelphia: F.A. Davis; 2012.

Book Chapter:

Altobelli N. Airway management. In: Kacmarek R, Stoller JK, Heuer AJ, editors. Egan's fundamentals of respiratory care. 10th ed. St. Louis: Saunders Mosby; 2013. p.732-86.

YAZARLARA BİLGİLENDİRME

BİLİMSEL SORUMLULUK

Bilimsel yayıncılık standartları açısından, gönderilecek makaleler, Uluslararası Tıbbi Dergi Editörler Kurulu (ICMJE), Dünya Tıbbi Editörler Birliği (WAME) ve Yayın Etik Kurulu (COPE) kriterlerine uygun olarak hazırlanmalıdır.

- Gönderilecek makalelerde araştırma ve yayın etiğine uyulması zorunludur. Makalelerin sorumluluğu yazarlarına aittir.
- Makalelerin daha önce hiç bir yerde yayınlanmamış ve/veya yayınlanmak üzere değerlendirme sürecinde olmaması gerekir.
- Değerlendirme sürecinin başlaması için makaleler, tüm yazarlar tarafından imzalanmış Telif Hakkı Devir Formu ile birlikte gönderilmelidir. Yazar sıralaması için Telif Hakkı Devir Formu'ndaki imza sırası dikkate alınır.
- Sorumlu yazar, tüm yazarlar adına makalenin son halinin sorumluluğunu taşır.

ETİK SORUMLULUK

- "İnsan" öğesini içeren tüm çalışmalarda Helsinki Deklerasyonu Prensipleri'ne (https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/) uygunluk aranır. Bu tip çalışmalarda yazarların, GEREÇ VE YÖNTEMLER bölümünde çalışmayı bu prensiplere uygun olarak yaptıklarını, kurumlarının etik kurullarından onay ve çalışmaya katılmış insanlardan "bilgilendirilmiş olur" (informed consent) aldıklarını belirtmeleri gerekmektedir.
- Çalışmada "Hayvan" öğesi kullanılmış ise yazarların, GEREÇ VE YÖNTEMLER bölümünde Guide for the Care and Use of Laboratory Animals (https://grants.nih.gov/grants/olaw/guide-for-the-care-and-use-of-laboratory-animals.pdf) prensipleri doğrultusunda çalışmalarında hayvan haklarını koruduklarını ve kurumlarının etik kurullarından onay aldıklarını belirtmeleri gerekmektedir.
- Olgu sunumlarında hastalardan "bilgilendirilmiş olur" (informed consent) alınmalıdır.
- Etik kurul onay bilgisi GEREÇ ve YÖNTEMLER bölümünde kurul adı, onay tarihi ve sayısı ile birlikte belirtilmelidir.
- Eğer çalışmada direkt-indirekt ticari bağlantı veya maddi destek veren kurum mevcut ise yazarlar; kullanılan ticari ürün, ilaç, firma vb. ile ticari hiçbir ilişkisinin olmadığını veya varsa nasıl bir ilişkisinin olduğunu (konsültan, diğer anlaşmalar), editöre sunum sayfasında belirtmelidirler.
- Yazarlar çalışma ile ilgili kişisel ve finansal tüm ilişkilerin bildirilmesinden sorumludur. Makalenin başvurusu ve/veya değerlendirmesi ile ilişkili herhangi bir çıkar çatışması olup olmadığının açıkça beyan edilmesi gerekmektedir.
- Makalelerin bilimsel ve etik kurallara uygunluğu yazarların sorumluluğundadır.

BAŞVURU DOSYALARI

Makaleler aşağıda belirtilen şekilde ayrı dosyalar halinde sisteme yüklenmelidir.

Telif Hakkı Devir Formu: Başvuru sırasında sistemden alınacak Telif Hakkı Devir Formu tüm yazarlar tarafından makaledeki yazar sıralamasına uygun şekilde imzalanmış olmalıdır.

Başvuru Mektubu: Makalenin türü, daha önce hiç bir yerde yayınlanmamış ve/veya yayınlanmak üzere değerlendirme sürecinde olmadığı, varsa çalışmayı maddi olarak destekleyen kişi ve kuruluşlar ve bu kuruluşların yazarlarla olan ilişkileri (yoksa olmadığı) belirtilmelidir. Makalenin konusuyla ilgili olarak önerilen, yazarlarla ve kurumlarıyla ilgisi olmayan en az iki hakemin adları, akademik unvanları, kurumları, iletişim bilgileri ve e-posta adresleri yazılmalıdır. Editörlerin hakemleri seçme hakkı saklıdır.

Başlık Sayfası: Makalenin başlığını (İngilizce ve Türkçe), 40 karakteri geçmeyen kısa başlık, tüm yazarların adlarını, akademik unvanlarını, ORCID® numaralarını, kurumlarını, e-posta adreslerini ve ayrıca sorumlu yazarın adını, yazışma adresini, telefon numarasını, e-posta adresini içermelidir. Makale daha önce bilimsel bir toplantıda sunulmuş ise toplantı adı, tarihi ve yeri (yoksa sunulmadığı) belirtilmelidir.

Ana Metin: Makalenin başlığı (İngilizce ve Türkçe), 40 karakteri geçmeyen kısa başlık, Öz (İngilizce ve Türkçe), Anahtar kelimeler (İngilizce ve Türkçe), Ana Metin (gönderilen makalenin türüne uygun olarak bölümlere ayrılmış), Kaynaklar, Tablolar ve Şekil açıklamaları yer almalıdır.

Etik Kurul Onay Belgesi: Tüm araştırma makaleleri için Etik Kurul Onay Belgesi ayrı bir dosya olarak yüklenmelidir.

Not: Makalede şekil, resim veya fotoğraf varsa bunların da her biri ayrı birer dosya olarak yüklenmelidir.

MAKALE TÜRÜNE GÖRE KULLANILMASI GEREKEN BÖLÜMLER

Araştırma Makalesi

BAŞLIK (İngilizce ve Türkçe), KISA BAŞLIK, ÖZ (İngilizce ve Türkçe), Anahtar kelimeler (İngilizce ve Türkçe), GİRİŞ, GEREÇ VE YÖNTEMLER, BULGULAR, TARTIŞMA, SONUÇ, KAYNAKLAR

ÖZ ve ABSTRACT çeviri açısından uyumlu olmalı ve her biri kendi içinde 200-250 kelime arasında olmalıdır.

ABSTRACT, "Aim, Material and Methods, Results, Conclusion" şeklinde yapılandırılmalıdır.

ÖZ, "Amaç, Gereç ve Yöntemler, Bulgular, Sonuç" şeklinde yapılandırılmalıdır.

Derleme (Sadece Davetli)

BAŞLIK (İngilizce ve Türkçe), KISA BAŞLIK, ÖZ (İngilizce ve Türkçe), Anahtar kelimeler (İngilizce ve Türkçe), GİRİŞ, Konu ile İlgili Alt Başlıklar, SONUÇ, KAYNAKLAR

ÖZ ve ABSTRACT çeviri açısından uyumlu olmalı ve her biri kendi içinde 150-200 kelime arasında olmalıdır.

Olgu Sunumu

BAŞLIK (İngilizce ve Türkçe), KISA BAŞLIK, ÖZ (İngilizce ve Türkçe), Anahtar kelimeler (İngilizce ve Türkçe), GİRİŞ, OLGU SUNUMU, TARTIŞMA, KAYNAKLAR

ÖZ ve ABSTRACT çeviri açısından uyumlu olmalı ve her biri kendi içinde 100-150 kelime arasında olmalıdır.

Diğer

Bu üç temel makale türü dışındaki (editöre mektup, editöryel yorum/tartışma vb.) yazıların hazırlanmasında da genel yazım kuralları geçerlidir. Bu tür yazılarda başlık ve öz bölümleri yoktur. Kaynak sayısı 5 ile sınırlıdır. İthaf olunan makale sayı ve tarih verilerek belirtilmelidir. Yazının sonunda yazarın ismi, kurumu ve adresi yer almalıdır. Mektuba cevap, editör veya makalenin yazarları tarafından, yine dergide yayınlanarak verilir.

YAZARLARA BİLGİLENDİRME

YAZIM KURALLARI

- Makaleler Microsoft Word® belgesi olarak hazırlanmalıdır.
- Sayfa kenarlarında 2,5 cm boşluk bırakılmalıdır.
- Sayfa numaraları sayfanın sağ alt köşesine yerleştirilmelidir.
- Tüm metinler 12 punto Times New Roman karakteri kullanılarak çift satır aralığı ile sola hizalanmış olarak yazılmalıdır.

ANAHTAR KELİMELER

- Anahtar kelime sayısı en az 2 olmalı, kelimeler birbirlerinden noktalı virgül (;) ile ayrılmalıdır.
- Türkçe anahtar kelimeler Türkiye Bilim Terimleri (TBT)'ne (http://www.bilimterimleri.com), İngilizce anahtar kelimeler Medical Subject Headings (MESH)'e (http://www.nlm.nih.gov/mesh/MBrowser.html) uygun olarak verilmelidir.

İSTATİSTİKSEL YÖNTEMLER

- Tüm araştırma makaleleri biyoistatistik açıdan değerlendirilmeli ve uygun plan, analiz ve raporlama ile belirtilmelidir. Bu makalelerde, GEREÇ VE YÖNTEMLER bölümünün son alt başlığı "İstatistiksel Analiz" olmalıdır.
- Bu bölümde çalışmada kullanılan istatistiksel yöntemler ne amaçla kullanıldığı belirtilerek yazılmalı, istatistiksel analiz için kullanılan paket programlar ve sürümleri belirtilmelidir.
- p değerleri ondalık üç basamaklı (p=0,038; p=0,810 vb.) olarak verilmelidir.
- Makalelerin biyoistatistik açıdan uygunluğunun kontrolü için ek bilgi www.icmje.org adresinden temin edilebilir.

KISALTMALAR

- Terim ilk kullanıldığında parantez içinde kısaltmayla birlikte açık olarak yazılmalı ve tüm metin boyunca aynı kısaltma kullanılmalıdır.
- Uluslararası kullanılan kısaltmalar Bilimsel Yazım Kurallarına uygun şekilde kullanılmalıdır.

TABLOLAR VE ŞEKİLLER

- Metinde ilgili cümlenin sonunda (Tablo 1) ve/veya (Şekil 1) şeklinde belirtilmelidir.
- Tablolar (başlıklarıyla birlikte) ve şekiller (açıklamalarıyla birlikte) kaynaklardan sonra ve her biri ayrı bir sayfada olacak şekilde metnin sonuna eklenmelidir.
- Tablo başlıkları tablo üstünde (Tablo 1. Tablo başlığı), şekil açıklamaları ise şeklin altında (Şekil 1. Şekil açıklaması), ilk harfleri büyük olacak şekilde yazılmalıdır.
- Tablolarda ve şekillerde kısaltma veya sembol kullanılmış ise altında dipnot olarak açıklanmalıdır.
- Şekiller ve fotoğraflar, .png, .jpg vb. formatta ve en az 300 dpi çözünürlükte ayrı dosyalar halinde yüklenmelidir.
- Şekil ve fotoğraf alt yazıları, son tablonun olduğu sayfadan sonra, ayrı bir sayfada sırasıyla verilmelidir.
- Daha önce basılmış şekil, resim, tablo, grafik vb. kullanılmış ise yazılı izin alınmalı ve açıklama olarak belirtilmelidir. Bu konudaki hukuki sorumluluk yazarlara aittir.

TEŞEKKÜR

- Eğer çıkar çatışması/çakışması, finansal destek, bağış ve diğer bütün editöryel (İngilizce/Türkçe değerlendirme) ve/veya teknik yardım varsa, bu bölümde, KAYNAKLAR bölümünden önce belirtilmelidir.

KAYNAKLAR

- Kaynaklar, kullanım sırasına göre numaralandırılmalı ve metin içinde ilgili cümlenin sonunda parantez içinde numaralarla (1) veya (1,2) veya (3-5) şeklinde verilmelidir.
- Kaynaklar dizini, metin içinde kaynakların kullanıldığı sıraya göre oluşturulmalıdır.
- Yazar sayısı 6 veya daha az ise tüm yazarlar belirtilmeli, 7 veya daha fazla ise ilk 6 yazar belirtildikten sonra "et al." eklenmelidir.
- Kongre bildirileri, kişisel deneyimler, basılmamış yayınlar, tezler ve internet adresleri kaynak olarak gösterilmemelidir.
- DOI tek kabul edilebilir online referanstır.

Makale:

Al-Habian A, Harikumar PE, Stocker CJ, Langlands K, Selway JL. Histochemical and immunohistochemical evaluation of mouse skin histology: comparison of fixation with neutral buffered formalin and alcoholic formalin. J Histotechnol. 2014;37(4):115-24.

Aho M, Irshad B, Ackerman SJ, Lewis M, Leddy R, Pope T, et al. Correlation of sonographic features of invasive ductal mammary carcinoma with age, tumor grade, and hormone-receptor status. J Clin Ultrasound. 2013;41(1):10-7.

Kitap:

Buckingham L. Molecular diagnostics: fundamentals, methods and clinical applications. 2nd ed. Philadelphia: F.A. Davis; 2012.

Kitap Bölümü:

Altobelli N. Airway management. In: Kacmarek R, Stoller JK, Heuer AJ, editors. Egan's fundamentals of respiratory care. 10th ed. St. Louis: Saunders Mosby; 2013. p.732-86.


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