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Evaluation of Digital News about the Covid-19 Vaccine Turkovac in terms of Health Reporting Criteria[1]

COVID-19 Aşısı Turkovac ile ilgili Dijital Medyada Yayınlanan Haberlerin Sağlık Haberciliği Kriterleri Açısından Değerlendirilmesi

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Abstract

The COVID-19 pandemic has shown how vulnerable societies can be in the face of infectious diseases. The outbreak of the pandemic has also demonstrated the importance of reliable information in managing the disease and that false or fake news spreads as fast as the virus during the pandemic, posing a public health threat. In other words, the pandemic was also accompanied by an infodemic, that can be defined as the excess and spread of both true and false information. While societies` need for reliable information and news consumption has increased, news has played an essential role in informing and raising awareness during the pandemic. Accordingly, this research's primary concern is to critically analyse news about Turkey's first domestic COVID-19 vaccine "Turkovac" in digital news media using the criteria of HealthNewsReview.org and the Vaccine News Preparation Declaration prepared jointly by journalists, academics and public health experts. The research is based on a qualitative and quantitative content analysis of the research data consisting of 502 news articles published between January 1 and December 31, 2021, on 12 different newspapers and news sites. It was found that the news analysed did not adequately and reliably convey information about the vaccine development process and the vaccine to the public. While scientific data on the effectiveness of vaccines and the limitations of vaccine trials are not sufficiently covered in the news, nationalist discourse has been observed to dominate the news. The findings of this study fill the knowledge gaps in this under-examined research area.

Keywords: COVID-19, Vaccines, Turkey's Domestic Vaccine, Turkovac, Health News Reporting.

Öz

COVID-19 salgını bulaşıcı hastalıklar karşısında toplumların ne kadar savunmasız olabileceklerini ortaya koymuştur. Pandeminin patlak vermesi, hastalığın yönetiminde güvenilir bilginin önemini ve pandemi sürecinde yanlış ya da yalan haberlerin virüs kadar hızlı yayılarak halk sağlığı açısından tehdit oluşturduğunu da göstermiştir. Yani pandemiye, hem doğru hem de yanlış bilginin yayılması olarak tanımlanabilecek bir bilgi salgını (infodemi) da eşlik etmiştir. Toplumların güvenilir bilgi ve haber tüketimine olan ihtiyacı artarken, pandemi sürecinde haberler bilgilendirme ve farkındalık yaratmada önemli bir rol oynamıştır. Bu doğrultuda, bu araştırmanın temel kaygısı, Türkiye'nin ilk yerli COVID-19 aşısı "Turkovac" ile ilgili dijital haber medyasındaki haberleri HealthNewsReview.org ve Türkiye'de gazeteciler, akademisyenler ve halk sağlığı uzmanlarınca ortak olarak hazırlanan Aşı Haberleri Hazırlama Bildirgesi kriterlerini kullanarak eleştirel olarak analiz etmektir. Araştırma, 12 farklı gazete ve haber sitesinde 1 Ocak ile 31 Aralık 2021 arasında yayınlanan 502 haberden oluşan araştırma verilerinin nitel ve nicel içerik analizine dayanmaktadır. İncelenen haberlerin aşı geliştirme süreci ve aşıya ilişkin bilgileri kamuoyuna yeterince ve güvenilir bir şekilde anlatmadığı bulgulanmıştır. Aşının etkileri ile ilgili bilimsel veriler ve aşı çalışmalarına ilişkin limitler haberlerde yeterince yer almazken, haberlerde, milliyetçilik söylemlerinin hâkim olduğu gözlemlenmiştir. Bu çalışmanın bulguları, yeterince incelenmemiş bu araştırma alanındaki bilgi boşluklarını doldurmaktadır.

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Evaluation of Digital News about the COVID-19 Vaccine Turkovac in terms of Health Reporting Criteria

Anahtar kelimeler: COVID-19, Aşılar, Türkiye'nin Yerli Aşısı, Turkovac, Sağlık Haberciliği.

Introduction

The media has proven to be an important tool in disseminating information about vaccines, raising awareness, and motivating the public to make important decisions about health care (Catalan-Matamoros & Peñafiel-Saiz, 2019, p. 34). The COVID-19 pandemic, which we recently experienced and which still reverberates, has once again demonstrated this characteristic of the media. As observed worldwide, the COVID-19 pandemic also had humanitarian, economic, and social implications. Since the pandemic, much attention has been paid to the social impact of COVID-19, particularly discussions of the inequalities it has produced. Despite all the scientific developments and the widespread availability and use of modern technologies in the world, the COVID-19 pandemic has brought to the fore the question of how vulnerable societies can be to infectious diseases. Thanks to some measures taken since the first outbreak, the epidemic has been partially brought under control. However, it has been repeatedly stated by scientific circles that real and full control of the pandemic can be achieved only with vaccines and their rapid, safe, and equitable distribution, access and use throughout the world. The World Health Assembly [WHA], has recognized that providing comprehensive immunity to COVID-19 is a 'global public good' (2020, p. 3). In addition to this, Amnesty International has addressed the fundamental human rights issues arising from the development and distribution of COVID-19 vaccines under four headings (2020, p. 4). They can be summarized as follows:

> 1. Concerns about "vaccine nationalism" and "intellectual property rights" that could lead to unequal distribution of vaccines around the world.

> 2. Inadequate quantity and lack of accessibility of vaccines in countries and the challenges national health systems face.

> 3. Affordability and issues relating to the pricing of COVID-19 vaccines at the national level.

> 4. Concerns about clinical trials, mandatory vaccination schedules, and some people's opposition and refusal to vaccinate.

One of the most important factors that can affect the equitable distribution of vaccines on a global scale is who conducts vaccine research, where it begins, what priorities are set, and how it is funded. In addition to efforts to develop treatments for COVID-19, there are more than 100 early- and preclinical-stage vaccines and 10 clinical-stage vaccine trials in the first three months of the pandemic (Nuffield Council on Bioethics, 2020). The World Health Organization [WHO],   which monitors and reports vaccine development studies worldwide, reports that 194 vaccine studies are in the preclinical phase and 132 are in the clinical phase as of November 2021. The drug development process, which is very costly, is patented to allow companies to protect their income during the patent term, recoup their research and development costs, and hedge against economic risks. Since March 2020, numerous tests, drugs and

Aslıhan Ardıç Çobaner, Nermin Alkan, Canan Dural Tasouji

vaccines have been developed that can be used for diagnosis and treatment COVID-19 (The World Health Organization, 2021).

Particularly given that underdeveloped countries lag behind in accessing sufficient quantities of vaccines, the importance of producing COVID-19 vaccines within national borders has become apparent. Vaccine trials in Turkey, whose history is actually quite old but has slowed since the late 2000s, have gained momentum with the COVID-19 outbreak. Recognizing the importance of vaccines in managing the pandemic, multicentre vaccine development studies, which include Selcuk University, Istanbul University - Cerrahpasa, Uludag University, Sakarya University, Pendik Veterinary Control Institute, Scientific and Technological Research Council of Turkey [TUBITAK], Marmara Research Centre (MAM), Vetal inc. (TUBITAK, 2020), have been initiated in Turkey, along with vaccine trials that are rapidly increasing around the world. Turkovac is the first domestic vaccine developed in Turkey against COVID-19. The first studies with the vaccine began in April 2020, and after Phase 1 and Phase 2 studies, Phase 3 studies began in October 2021. In December 2021, the vaccine was included in the COVID-19 vaccine administration process and offered as an alternative to other vaccines already available (Usul, 2021).

With the domestic vaccine trials, an intense flow of information about the vaccine has begun in the media, while at the same time society's need for reliable information about vaccines and news consumption has increased. In this context, there is no denying the importance of sensitive, responsible, impartial, reliable, and accurate news production in the reporting of vaccines and immunizations, which has become even more important with the global spread of the deadly COVID-19. As vaccines against COVID-19 begin to spread, people consuming the news around the world on a daily basis are forced to deal not only with the disease outbreak, but also with an excessive amount of information. It is widely recognised that vaccines are one of the most effective methods of preventing disease, and a major achievement in the fight against the pandemic has been the rapid and successful development of various vaccines against COVID-19. However, the process of developing vaccines against the novel coronavirus is accompanied and threatened by an infodemic (Rathore & Farooq, 2020, p. 162), i.e., dissemination of an excessive amount of both accurate and inaccurate information. In the context of the development of Turkey's first COVID-19 vaccine, Turkovac, the news media played a key role in disseminating an excessive amount of information. Since accurate and objective health news is crucial during a period declared as a pandemic, the analysis of news about vaccines disseminated in large quantities to the public during this period assumes great importance, as people have a need and search intensively for information about vaccines, which are considered the most important remedy against this disease.

In this context, the main objective of this research is to analyse and critically evaluate the digital news about "Turkovac", Turkey's first domestic COVID-19 vaccine, using criteria we developed in light of the *Health News Review* and *Vaccine News Preparation Declaration* criteria, which provide a useful framework for evaluating health-related news reports in terms of its content and ethics released by

different industries and platforms. To achieve the research objectives, this study poses several questions: What are the main features of the news about Turkovac published in the online media in Turkey? what are the most common themes that appear in these news, and to what extent does the news provide sufficient and reliable information and meet the criteria referred to in the study? The study, based on a qualitative and quantitative content analysis of 502 news articles from 12 different newspapers and news sites, seeks to understand what type of information is included and what types of discourse are foregrounded in the news content about Turkovac and the vaccine development process, and to what extent the vaccine-related news meets the established criteria.

This paper briefly outlines the background of the COVID-19 vaccine development studies in the world in general and in Turkey in particular by describing the phases of the Turkovac vaccine. Having highlighted the role of COVID-19 vaccines in the fight against the pandemic, the increased need of the public to receive information about vaccines was discussed. General ethical rules and criteria for health journalism and vaccine-related news are then evaluated and their importance in the context of preventing the simultaneous dissemination of exaggerated, inadequate, inaccurate, biased, and unnecessary information in the fight against the pandemic is discussed. Following that the choice of methodological approach and detailed information about the research sample are provided. Lastly, after a detailed analysis of the data, concluding remarks and suggestions for possible new directions are made for scholars interested in this area of research.

1. Background of COVID-19 Vaccines Development Studies in the World and Turkey

Vaccine production in Turkey was centralized with the Refik Saydam Hygiene Institute established in 1928. Since the 1940s, the institute has produced many different types of vaccines, such as those against typhoid, dysentery, cholera, plague, meningococcus, staphylococcus, pertussis, brucellosis, influenza, rabies, tuberculosis, tetanus, diphtheria, scarlet fever, mixed vaccine, typhoid, smallpox, and influenza (Saçaklıoğlu et al. 2003, p. 19). The facility that supplies Turkey's vaccine needs has also exported vaccines to various countries. Due to the decline or complete disappearance of the diseases, the production of typhoid vaccine was stopped in Turkey in 1971 and smallpox vaccine in 1980, and many vaccines can be purchased if needed. However, in the 2000s, it has been observed that there has been a partial resurgence of interest in vaccine production in Turkey. In 2009, a combination of five vaccines, namely diphtheria, pertussis, tetanus, Hib, and polio, was purchased; packaging and injector filling technology was brought to Turkey. Quadruple-mix vaccines and pneumonia vaccines followed in 2011, and gradual antigen production of tetanus and diphtheria vaccines in Turkey is planned for 2015. Full domestic production of antigens was expected in 2019, but studies have not yet been completed (Teyit.org, 2020). No licensed vaccine has been produced in Turkey since 1998, when vaccine production was stopped at Refik Saydam Public Health Institution (Okyay, 2020, p. 245).

With the COVID-19 pandemic, experimental research on vaccine development has accelerated both in Turkey and worldwide.Different types of vaccines against COVID-19 infection have been developed.

The first of the vaccine types developed is an inactivated vaccine, which contains an inactivated virus that does not cause disease but does elicit an immune response. Other types include: Vaccines that contain attenuated viruses that do not cause disease but elicit an immune response; protein-based vaccines that use protein fragments that mimic the structure of the virus to safely elicit an immune response; viral vector vaccines, which use non-violent viruses carrying RNA fragments of the virus to elicit a safe immune response; and m-RNA and DNA vaccines, a state-of-the-art approach that uses genetically engineered RNA and DNA fragments to produce proteins that themselves elicit a safe immune response (World Health Organization, 2022a).

Vaccine development studies consist of different phases in which preclinical and clinical studies are conducted. Preclinical studies include laboratory and animal studies, including research and development studies. While it typically takes ten years to develop, test and license a new vaccine, this process has been quite rapid for COVID-19 vaccines. The clinical trial phase typically consists of four human phases in which human participants or groups of humans are studied for health effects. These can be categorized as follows (Okyay, 2020, pp. 228-230):

Phase 1: Phase 1 studies are the first phase of a clinical trial. They are not intended to treat or prevent a disease, but to determine whether the product being studied is safe for humans (e.g. to determine a safe dose range and to identify side effects). The number of people invited to this phase is very small; usually it is between 20 and 80 people, with about 30 people. Usually these are healthy volunteers, sometimes patients.

Phase 2: In the second phase of clinical testing, the safety of a potential treatment and, at the same time, its efficacy are further investigated. Typically, 100 to 300 people participate in the trial to determine if the treatment is safe and effective for treating a condition.

Phase 3: Phase 3 clinical trials begin when previous studies show that a treatment is safe while promising the expected effect. They usually include several hundred to several thousand participants from phases 1 and 2 and are often spread across different hospitals and countries. By comparing the intervention to other standard or experimental interventions, the goal is to monitor adverse effects and gather information that will allow the intervention to be used safely. If these studies show that a product (drug, vaccine) is safe and effective, manufacturers can apply for approval.

Phase 4: Post-marketing studies to identify additional information, including the risks, benefits, and optimal use of the product. These studies are designed to monitor the effectiveness of the community-approved intervention and to collect information on any adverse events associated with widespread use.

Looking at the COVID-19 technologies for vaccine production, five vaccines that have entered the first phase of vaccine studies are produced using three different methods. These methods are: inactive

vaccines, viral vector (adenovirus) vaccines and messenger RNA (mRNA) vaccines. Inactivated vaccines are produced using traditional methods. By decaying and neutralizing the virus, our immunity is stimulated without harming our bodies. The long-term effects of inactivated vaccines can be discussed more clearly compared to other vaccines. Since they contain dead viruses, they are considered safer in the first phase. They can be stored at 2-8°C. The production of inactivated vaccines is more difficult and slower than others. According to the results of the interim evaluation of the phase III trials conducted in Turkey, the efficacy of the vaccine was reported to be 91.25%. Sinovac vaccine belongs to this class (Republic of Turkey Ministry of Health, 2022). Viral Vector (Adenovirus) Vaccines use a virus that has been modified. A virus that causes flu-like illness (adenovirus) is supported by the coronavirus protein after genetic intervention, and it is aimed to create immunity in humans. These vaccines, like Zika, have long been in phase III against viral diseases like chikungunya. Although the microorganisms in the vaccines are alive, they cannot cause disease in humans because they are weakened. The advantage is that they can be stored at 2-8°C, that is, in routinely used vaccine cabinets. It is one of the new technologies for the development of vaccines. Sputnik-V and Oxford/AstraZeneca vaccines (AZA-1222) fall into this category (Republic of Turkey Ministry of Health, 2022). Messenger RNA vaccines (mRNA) use lab-produced mRNA to teach cells of the human body how to produce a protein that triggers an immune response in human bodies (Centers for Disesase Control and Preventation, 2022). mRNA takes part in protein synthesis, which is produced naturally in our body. The mRNAs produced artificially in the laboratory aim to warn us against the virus by working like our own mRNAs. These molecules are then destroyed like our own molecules and thrown out of the body. These vaccines are vaccines that have been produced similarly to the technology that has been studied with personalized immunotherapy methods for the treatment of many diseases, including cancer, for 25 years. The biggest disadvantage of these vaccines is that the Biontech/Pfizer vaccine (BNT-162b2) can be stored at -70°C, and the Moderna vaccine (mRNA-1273) at -20°C. Biontech/Pfizer and Moderna vaccines fall into this category (Republic of Turkey Ministry of Health, 2022).

Vaccine development studies on more than 10 centre are still being conducted in Turkey, supported by the presidency of the Health Institutes of Turkey (TUSEB) and the Scientific and Technological Research Council of Turkey (TUBITAK). These studies are conducted in institutions/organisations such as Erciyes University, Hacettepe University, Marmara University, Yıldız Technical University, Ataturk University, Akdeniz University and Nanography Nano Technology Inc. (Ağaç, 2021). Turkovac is the vaccine against COVID-19 developed in Turkey in collaboration with the TÜSEB and Erciyes University (see TUSEB, 2021). The vaccine Turkovac is produced in the same way as Sinovac, namely by the inactive method. In the inactive method, known as the traditional method, the virus is fragmented and inactivated, and immunity is stimulated without harming the human body. The production of such vaccines is more difficult and slower than others (Ağaç, 2021). The following graphic provides detailed information on the timeline of the development of the Turkovac vaccine.
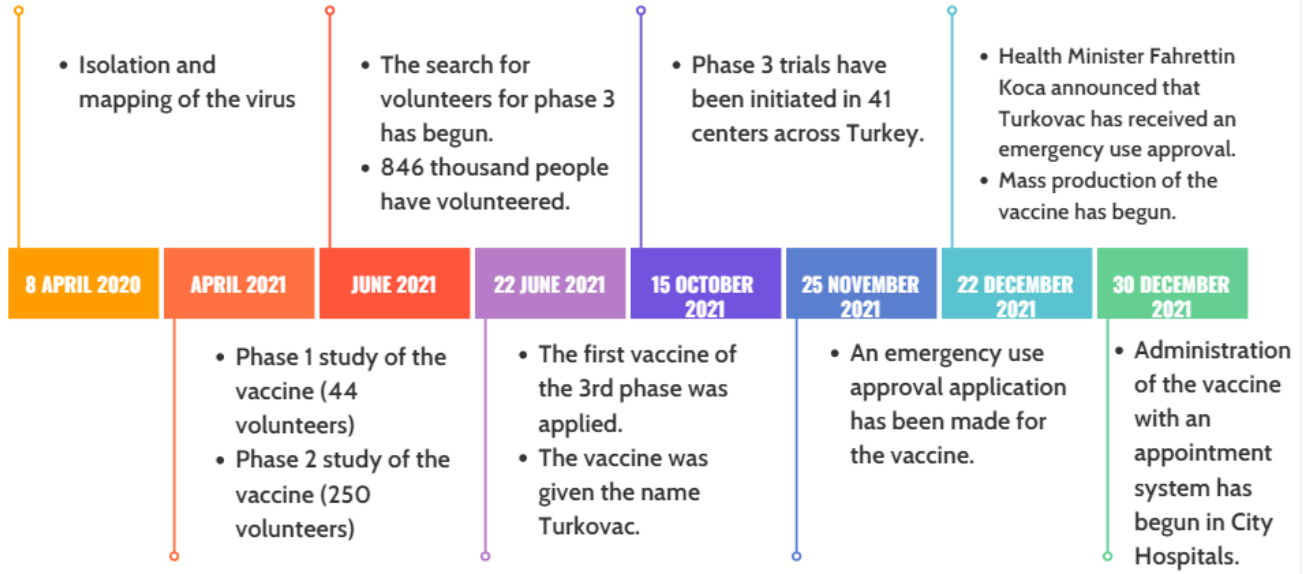
8 APRIL 2020	APRIL 2021	JUNE 2021	22 JUNE 2021	15 OCTOBER 2021	25 NOVEMBER 2021	22 DECEMBER 2021	30 DECEMBER 2021

- Isolation and mapping of the virus
- The search for volunteers for phase 3 has begun.
- 846 thousand people have volunteered.
- Phase 3 trials have been initiated in 41 centers across Turkey.
- Health Minister Fahrettin Koca announced that Turkovac has received an emergency use approval.
- Mass production of the vaccine has begun.

- Phase 1 study of the vaccine (44 volunteers)
- Phase 2 study of the vaccine (250 volunteers)
- The first vaccine of the 3rd phase was applied.
- The vaccine was given the name Turkovac.
- An emergency use approval application has been made for the vaccine.
- Administration of the vaccine with an appointment system has begun in City Hospitals.

Figure 1. Turkovac Time Line

Source: The Figure was Created by the Authors.

2. Health News Review and International Guideliness for Evaluating Health News Reporting

After emphasizing that COVID-19 vaccines are the only and most effective means of fighting the pandemic, the public's need for information about available vaccines has increased. Ethical principles that must be followed in health journalism in general, and vaccine news in particular, to prevent an infodemic in the fight against the pandemic guided us in the analysis part of our study. The general aims of health communication can be summarized as meeting the need for health information, providing accurate health information, creating health awareness, building/improving health literacy. It also addresses more specific issues such as recognizing the right to health as a sick or healthy person and raising awareness on this issue, making the attitudes and behaviours of sick and healthy individuals more positive, protecting the right to live in a healthy environment. This brings us to the general definition of health communication. The concept of health communication can be defined as "the type of communication required in the field of health" in the most general sense (Yüksel, 2018, pp. 15-16). Health communication is defined by the Society for Health Communication [SHC], as the science and art of communicating to promote the health and well-beings of individuals and societies (2017). In addition to these general descriptions characterizing health communication, the foreign literature is primarily concerned with the questions of what qualified health journalism should look like, the ethical principles in health journalism, the applicability of these principles, what obstacles stand in the way of this functioning and what an ideal health journalism should look like.

Health journalism is defined by Paul et. al (2021) as the dissemination of medical and health related information and issues in various types of media. The most important tasks of health journalism include health education, raising public awareness of health and health consciousness and the topics of health news can be listed as new discoveries in the field of medicine, developments in the health sector, the

Evaluation of Digital News about the COVID-19 Vaccine Turkovac in terms of Health Reporting Criteria

course of common diseases in the country and the world, and legal regulations in the field of health (Kaya, 2018, p. 334). As noted by Paul et. al (2021, p.357) the field of interest of health journalism primarily includes coverage of health related news and information, "medical research and its publication, and health policies, programs, and their criticism, involving both print and digital media". In addition, Kaya (2018, p. 335) states that health journalists have both journalistic and public health responsibilities, i.e., due to the functions and scope of health journalism, they have a special responsibility to ensure public trust and health in addition to timely, accurate, and reliable reporting. In a similar vein, Paul et. al (2021, p. 357) also observe that health journalism not only helps influence people's health behaviours, but also has a great impact on the "global public health scenario" as insufficient or exaggerated and misleading reporting poses a significant "public health threat". Moreover, according to the Members of the Association of Health Care Journalists [AHCJ]), journalists have a special responsibility when reporting on health and medical issues; this responsibility stems from the role of journalists as watchdogs who hold the powerful accountable and give voice to the marginalized, disadvantaged and voiceless groups (A Association of Health Care Journalists, 2022).

There are some regulations and ethical rules that are applied worldwide to provide the public with correct information about health and to eliminate the ethical problems in its functioning and operation. The health reporting guidelines prepared by PressWise on behalf of the World Health Organisation were adopted as an official code by the WHO's European Health Communication Network [EHCN] in 2000 (Kaya, 2018, p. 338). EHCN describes its purpose as firstly, "to recognize and promote awareness of the importance of health communication"; secondly, "to involve communication professionals more deeply in the health sector and improve the relationship between health professionals, governments and the mass media"; thirdly, "to make available through the media health information that is ethically and scientifically sound, relevant to current health concerns, reliable and understandable by target audiences" (World Health Organization, 1998, pp. 2-3). The Association of Health Care Journalist has also published a policy statement for health journalism in the United States and around the world emphasizing that journalists should bear some responsibility when reporting on health-related issues. The list of responsibilities Includes but not limited to avoiding vague and sensational language, fully disclosing the risks and benefits of treatment, clearly stating and explaining the significance and meaning of outcomes, and involving and consulting independent experts (see Association of Health Care Journalist, 2022). In addition, the Guide to Science and Health Communication, one of the guides in this area, is also a joint effort of the Royal Institute of Great Britain, the Social Issues Research Institute, and the Royal Society (Kaya, 2018, p. 337- 338). There are guides for health journalists in the U.S., U.K., Australia, and Canada that include information on what topics to cover, why, and how to cover them when reporting on disease (Kaya, 2018, p. 339). Among the principles that guide our evaluation of the news in our study is the Checklist for Accuracy, Balance, and Integrity from the

HealthNewsReview.org organisation in the United States, which includes recommendations for health journalism to consider when producing health news stories (Kaya, 2018, p. 339).

According to the information on the website of *HealthNewsReview.org*, it is a project founded by Gary Schwitzer, which was launched in 2006. The project grew to a team of about 50 people who assessed the daily health coverage of major U.S. news organizations. In addition, in 2015, the project began reviewing health-related press releases from industry, medical journals, hospitals, academic medical centers, and others. In its first year of existence, the project won several journalism industry awards - the Mirror Award, which honors those who "hold up a mirror to their own industry for the benefit of the public," and the Knight-Batten Award for Innovations in Journalism HealthNewsReview.org (HealthNewsReview.org, 2022a).

The *HealthNewsReview.org* team evaluates health journalism, advertising, marketing, public relations, and other messages that can influence people, and provides criteria for consumers to evaluate these messages themselves. One of the key principles the project believes in is that improving the quality and flow of health messages and information to consumers can be an important step toward meaningful health reform (HealthNewsReview.org, 2022b). The criteria established by HealthNewsReview.org consists of 10 different elements that all health news (press releases) should contain. They believe that the criteria address the fundamental issues that people need to know about health interventions - and how/if they matter to their lives. People need this information to form an opinion about these interventions. HealthNewsReview. org believes that it is possible that some health messages may not meet all of these criteria at once, and that it may be impossible or inappropriate for a health story/health message to meet all of the criteria. In this case, the Group states that it does not consider certain criteria to be applicable in some cases (HealthNewsReview.org, 2022c). The ten criteria developed by HealthNewsReview.org. are as follows:

1. Does the story adequately discuss the costs of the intervention?

2. Does the story adequately quantify the benefits of the intervention?

3. Does the story adequately explain/quantify the harms of the intervention?

4. Does the story seem to grasp the quality of the evidence?

5. Does the story commit disease-mongering?

6. Does the story use independent sources and identify conflicts of interest?

7. Does the story compare the new approach with existing alternatives?

8. Does the story establish the availability of the treatment/test/product/procedure?

9. Does the story establish the true novelty of the approach?

10. Does the story appear to rely solely or largely on a news release?

In Turkey, a group of academics, journalists, nongovernmental organisations, public health workers, and citizens who draw attention to the importance of properly informing society about vaccines through the media have produced the *"Declaration on Vaccine News Processing"* with a pluralistic process and a common understanding of how vaccine news should be processed. This declaration was made available on *asibildirgesi.org* and an open call was made to the community. The declaration highlighted 17 points that should be considered when preparing vaccine news. The content of these points consists in summary of the following: the importance of public health in news content production, The role and responsibility of public administrations in providing transparent information to society, the importance of herd immunity, informing the public about the possible side effects of vaccines, including information based on scientific evidence and expert opinion. Moreover, according to the declaration, the content of the news should be clearly stated, be impartial and not arouse suspicion; the language used should be simple and understandable, avoiding exaggerated expressions that can cause anxiety and fear; the reliability of the scientific information contained in the news should be guaranteed; content that leads to racism, exclusion, and discrimination should be avoided, and language that protects health care workers should be used (asibildirgesi.org, 2022).

3. Methodology

In accordance with the stated aim of the study to gain an in-depth understanding of the main characteristics of news about Turkovac published in online news media, the most common themes that appear in these news, and whether online news about the Turkovac provides sufficient and reliable content in relation to health reporting criteria, a qualitative and quantitative approach based on content analysis of the data seemed most appropriate. Content analysis is the analysis of texts, which may be based on a quantitative or qualitative approach, or both, to "quantify and analyse the presence, meaning, and relationships of words and concepts" and then draw conclusions about the content of messages (Devi, 2009, pp. 1-2). The content analysis of the two approaches applied in this study provided us with a categorization and classification of the communication content as well as the frequency of key words.

For the selection of newspaper and news sites, the list published by alexa.com was used as a guide. Seven newspapers and news sites representing the online news media (*Ensonhaber.com, Hurriyet.com.tr, Milliyet.com.tr, Sozcu.com.tr, Haberturk.com, Yenisafak.com*, *Sabah.com.tr*) were selected for analysis because they are among the 50 websites with the most interactions in Turkey, according to alexa.com data. Five other newspaper and news sites (*Evrensel.net, Cumhuriyet.com, Birgun.net, Gazeteduvar.com, Yenicaggazetesi.com*) were also included to represent the opposition and alternative press; thus, a total of 12 newspapers and news websites constituted the sample of the research. From the above newspapers, news published between January 1 and December 31, 2021 was retrieved through the Interpress news agency and searched using keywords such as "domestic vaccine"; "national vaccine" and "Turkovac". Repetitive and out-of-context articles were eliminated from the 690 news items, and a total of 502 news articles were analyzed using content analysis based on criteria we

developed using *Health News Review* and the *Vaccine News Preparation Declaration* criteria. Each news was coded separately by the researchers using a coding scale. The coding scale used in the analysis of the news was created by the researchers, revised several times after the initial evaluation, and given its final form. To increase reliability, each of the three researchers coded 15 news separately. Then, Krippendorff's (2004, p. 241) alpha statistic, which indicates the agreement between two or more coders, was used for intercoder reliability, and accordingly, $\alpha = 0.95$ was obtained. The data were analyzed using the SPSS 22 program. The criteria that helped in news analysis, developed with the help of Health News Review (HealthNewsReview.org) and the *Vaccine News Preparation Declaration* (https://asibildirgesi.org), can be stated as follows:

1. What issues/themes are mentioned in the news about the process of domestic vaccine development?

2. Whose views are reflected in the news and on which sources is the news mainly based?

3. Is there prior knowledge about vaccines?

4. How the news about Turkovac looks like (supporters, against/critical, neutral, uncertain)?

5. Does the news adequately address the cost of developing a vaccine (funds earmarked for vaccine research and development)?

6. Does the news adequately address the evidence of vaccine effectiveness? (What are the limitations of the existing studies/research on Turkovac? /Was the study conducted on only a few people? /Was the study conducted within a short period of time?)

7. Does the news provide adequate information about the potential harms of the vaccine?

8. Did the news mention whether the domestic vaccine was discussed at scientific meetings or with experts?

9. Does the news contain a commercial concern, false and sensational information about the domestic vaccine?

10. Is Turkovac compared to other available vaccines/alternatives in the news?

11. Does the news address the availability of the vaccine (ongoing phases of the vaccine, including the time needed to complete the phases and market the vaccine)?

12. Does the news emphasise national feelings and universal values regarding Turkovac?

These main criteria and their sub-criteria which facilitate the elaboration and interpretation of the main criteria formed the basis for the coding guide used in the content analysis. The research object is limited to the news about Turkovac published in 12 digital news media in Turkey. The study sample consists of 12 news sites selected from both traditional media digital news sites and alternative media news sites.

The study is limited to news in the one-year period between January 1 and December 31, 2021, the date the Turkovac studies began.

4. Findings

Analysis of the data revealed that June, September, October, and December are the months with more than 50 reports each, with October being the month with the most reports among these months with 165 reports. In contrast, February, July, August, and November are the months with 50 or less reports per month; November, with 14 reports, and February, with only one report, are the two months with the least reports among these months (see Graphic 1).
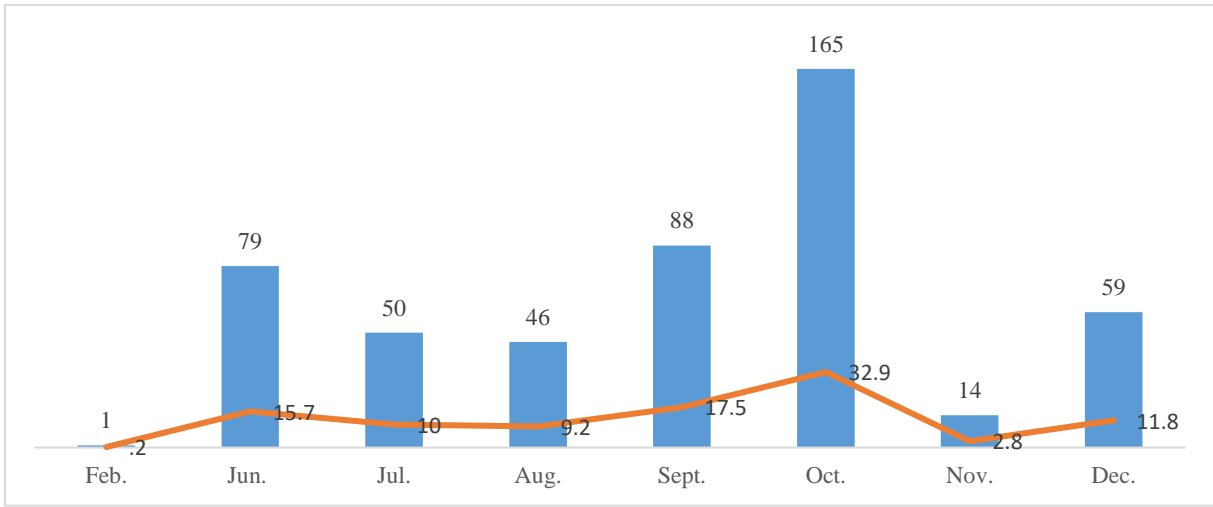
Graphic 1. Distribution of News by Month

Looking at the distribution of news by media, *Habertürk* and *Sabah* were the media that published the most news, with around 100 news items each, while *Hürriyet* and Milliyet followed these newspapers with around 60 news items each. In the other eight (8) newspapers, *Sözcü, Yenişafak, Ensonhaber, Cumhuriyet, Yeniçağ, Evrensel, Gazete Duvar,* the number of news items varied between 40 and 10 for each of them. The least news was published in *Evrensel* and *Gazete Duvar*, the opposition newspapers. In other words, while *Habertürk* and *Sabah* of the mainstream media were the channels in which most news was published, opposition newspapers such as *Evrensel* and *Gazete Duvar* were the channels in which the least news was published (see Graphic 2).

Aslıhan Ardıç Çobaner, Nermin Alkan, Canan Dural Tasouji
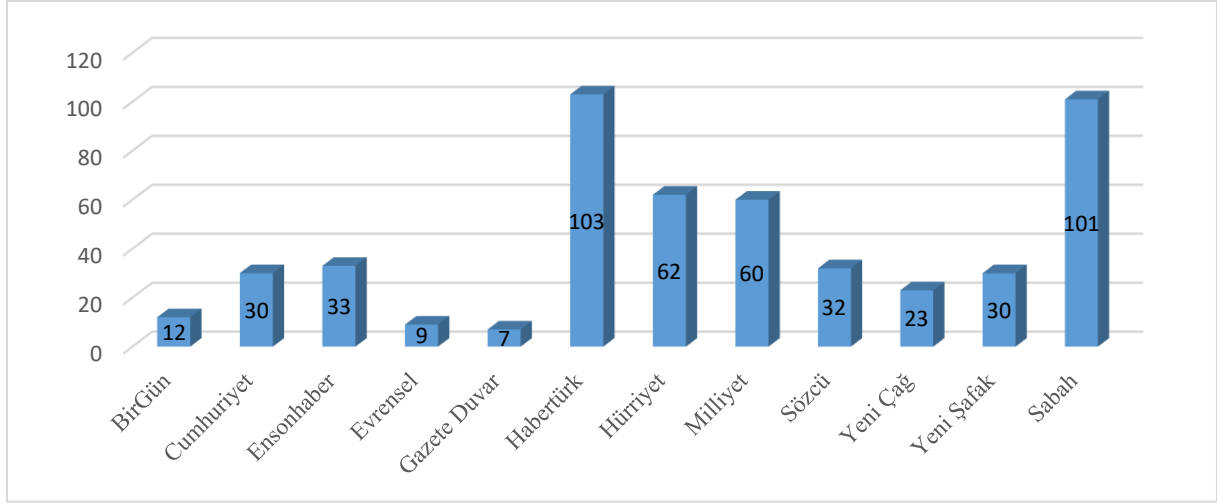
Graphic 2. Distribution of News by Media

The analysis of the data identified eight themes, which are listed in the table above. As shown in the table, the majority of news, 89.4%, included information about the different phases and the process of administration of the vaccine. Following that, the emphasis on the importance/necessity of herd immunity appeared as the second theme with a share of 64.7%. The other three common themes that have appeared on the data, including information on variants of the virus, including statements and opinions of the Scientific Committee on reporting and naming of the vaccine, have a low percentage of less than 15%. Comparison among available vaccines, inclusion of the presidential statement in reporting, and mention of vaccine contribution to the economy are three other common themes identified in the data analysis. However, when looked at the percentages, these three themes are between 5 and 10, meaning they appeared less frequently in the news (see Table 1).

Table 1. Themes Identified by the Data Analysis

Identified Themes	F	%
Mention of the different phases and the process of administration of the vaccine	443	89.4
Emphasis on the importance/necessity of herd immunity	325	64.7
Information about variants of the virus	70	13.9
Including the statements and opinions of the Scientific Committee	59	11.8
Naming of the vaccine	57	11.4
A comparison among available vaccines	50	10
Including the statement of the President	41	8.2
Mention of the contribution of the vaccine to the economy	25	5

When we analyzed who is the main actor in the news, in other words, who speaks in the news, the data shown in Figure 3 below emerged. Looking at the table, Minister of Health Fahrettin Koca and the official of the Ministry of Health appear as the most important spokespersons of the news with 48.2%.

Followed by scientists and experts, whose frequency of appearing as main actors in the news is quite low at 22.3%. After the scientists and experts, who have the second highest percentage of spokespersons in the news, although it is far behind that of the ministers of health, follow the president/government official, the team that developed the vaccine, an ordinary person, a professional organization, the opposition, and others, whose percentage ranges from 10% to 0.6%. The analysis shows that Health Minister Fahrettin Koca and officials from the Ministry of Health are the main actors in the coverage of the COVID-19 vaccine "Turkovac," while professional organizations, unions, and opposition are the groups whose voices and opinions are less heard in the news (see Table 2).

Table 2. The Main Actor in the News

Who speaks in the news?	F	%
Minister of Health Fahrettin Koca and Official of the Ministry of Health	242	48.2
Scientist and Experts	112	22.3
President/Government Official	50	10
The Team That Developed the Vaccine/TÜSEB	46	9.2
An Ordinary Person/ People	16	3.2
Professional Organization-TTB, Union	5	1
Opposition	3	0.6
Other	30	5.2
Total	502	100

As shown in Figure 4 below, the analysis of the origin of the news showed that the vast majority of the news, i.e. 76.9%, came from the news agency. Social media content such as statements made by the Minister of Health on social media or tweets by the President about vaccines, accounted for the second highest percentage as a source of news at 22.3%. While the source could not be identified in 8.2% of the news, the percentage of news in which the source was a reporter was 4.4%, the percentage of news in which the source was an ordinary person/ people was found to be 3.2%, and the percentage of news in which the source was coded as other was 0.8% (see Table 3).

Table 3. Origin of the News

Origin of the News	F	%
News Agency	386	76.9
Social Media	112	22.3
Not Specified	41	8.2
Reporter	22	4.4
An Ordinary Person/ People	16	3.2
Other	4	0.8
Total	502	100

Another phenomenon we focused on in analysing the data was understanding and disclosing the attitude of the news toward the vaccine. We assessed and evaluated the content of the news to understand the extent to which the news was neutral, supportive, critical, or oppositional. The vast majority of news reports, 88%, favoured the vaccine. Oppositional and critical opinions about the vaccine accounted for only 3%, and the neutral, unbiased, or impartial stance was held by only 9% (see Graphic 3). This analysis shows that the reporting on Turkovac is far from one of the ethical rules that must be followed, especially in reporting on health-related issues, namely to be impartial and objective.
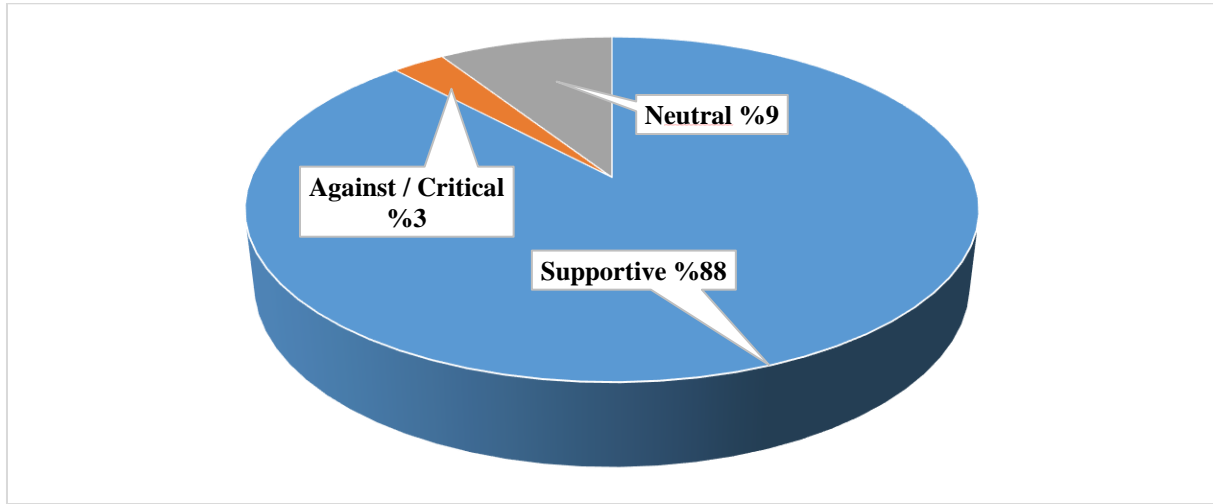
Graphic 3. The Attitude of the News Towards the Vaccine

To gain further insight into the coverage of Turkovac in the digital news media, the data analysis also revealed the following characteristics of the news reports. In 99.4% of the news (497 news), there was no information about the cost of the vaccine. In 83.1% of the news (417 news), it was emphasised that it was a "domestic and national" vaccine. Only 24.9% of the news (125 news) included a discussion of the scientific evidence on the effects of the vaccine. 75% (377 news) included no such discussion. Only 4.2% of the news (21 news) included a discussion of the effect of the vaccine is limited; no such discussion is found in 95.8% (481 news). Half of the news, that is, 51% (256 news), included information about the sample of the study conducted related to the vaccine. In 31.5% of the news (158 news), there was information about the duration of research conducted in connection with the vaccine, but in 68.5% of the news (344 news), there was no such information. While 11.6% of the news (58 news) mentioned possible harms and side effects of the vaccine, 88.4% (444 news) did not. 40.6% of the news (204 news) included expressions appealing to national feelings, such as "our own vaccine, our own weapon"; "our own vaccine is our own power"; "Turkey producing its own vaccine will strengthen its hand in the fight against the pandemic"; "support our domestic vaccine, let our own assurance against the epidemic become concrete"; "this is the pride of our nation, this pride belongs to our nation", etc.). However, 59.4% (298 news) included no such nationalistic statements. Only 13.5% of the news (68 news) mentioned the vaccine as a universal value and service to humanity, and only 12.7% of the news (64 news) compared Turkovac with other available COVID-19 vaccines. 46.8% of the news (235 news)

included information about the availability of the vaccine (when the phase studies will be completed, how long it will take for the vaccine to reach the market and when it will be used, etc.). 53.2 % of the news (267 news) did not include such information. 88.8% of the news (446 news) were based on a single source statement or bulletin. Only 11.2% of the news (56 news) included more than one source and statement from different people.

Conclusion

The SARS-CoV-2 virus, the causative agent of COVID-19 disease, has struck 228 countries worldwide in the last two years, infecting more than 500 million people and killing more than 6 million (WHO, 2022b). During the pandemic, social media was the main area for the spread of misinformation and disinformation. This situation, called infodemi, has almost similar effects to the damage caused by the pandemic. According to the first international survey conducted in relation to COVID-19, most people indicated that they had encountered incorrect information about COVID-19 on social media, and, on the contrary, a positive correlation was found between following news sources and the presence of correct information about the pandemic (Nielsen et. al., 2020). Vaccine information has been observed to be disseminated via social media during the introduction of COVID-19 vaccines, while social media has increased public distrust of vaccine safety (Wilson and Wiysonge, 2020; Lewandowsky et al., 2021). For this reason, reaching reliable news in the news media has also become more important. Despite the widespread use of social media today, traditional media (television, radio, and print) remain an important link between public health officials and the public. Keeping journalists regularly informed and supporting their information needs on vaccine safety issues and concepts can help reduce sensational reporting (WHO, 2020).

In the pandemic phase, when lack of information and uncertainty about vaccines increase, the media play an important role as an intermediary between public health authorities and the public in disseminating accurate and reliable information about vaccines. The Digital News Report published by the Reuters Institute in 2021 also showed that during the pandemic, trust in traditional news centers and the need for reliable news sources increased compared to social media. According to the report, while social media use is increasing in Turkey, trust in social media messages has decreased (Newman & Flecher, 2021). As COVID-19 changes the need for news, access to news, and trust in news, achieving reliable news in the news media has become important both as the pandemic has progressed and as vaccination rates have increased. While the media play an important role in providing accurate information about developments in situations where risk communication becomes important, such as pandemics, regularly briefing journalists and supporting their information needs on vaccine safety issues and concepts will help avoid sensational reporting (WHO, 2020).

This study aims to analyze the news about domestic vaccine Turkovac in digital media in Turkey in terms of content and ethics and critically evaluate the news. The study includes the process of phase 1,

phase 2 of Turkey's first indigenous vaccine and after these phases the naming of the vaccine by the president as "Turkovac" then phase 3 processes until the start of trials and the launch of the vaccine after receiving approval for immediate use.

The main objective of this research was to analyse and critically evaluate the digital news about the Turkey's first domestic COVID-19 vaccine "Turkovac" based on the criteria we developed in light of the *Health News Review* and *Vaccine News Preparation Declaration* criteria, which is a valuable guide for evaluating health-related news in terms of its content and ethics. The study analyzed 502 news articles from 12 different newspapers and news websites. The research, which was based on a qualitative and quantitative content analysis of the research data, revealed important insights into the coverage of Turkovac in the digital news media and its content in terms of providing realistic, sufficient and objective information. Our analysis has shown that the news examined fails to provide the public with adequate and reliable information about the vaccine development process, including the costs, benefits, harms and potential impacts of the vaccine. However, as emphasized in the vaccine statement, information based on scientific evidence and assessments by competent persons should be the focus of vaccine messages (asibildirgesi.org). The news also fails to adequately address the scientific evidence and the limitations of research regarding the effect of the vaccine. Expressions of nationalism manifest as a dominant phenomenon in the news during the development of the domestic COVID-19 vaccine in Turkey. This leads to taking sides and moving away from neutrality when reporting on the issue of health. Future studies related to the Turkovac news could focus on the public health implications of these discourses by conducting more detailed research on vaccine nationalism. The results of this study cover knowledge gaps in the field, but in the context of Turkey, the scant research on vaccine news in general (Kazaz et al., 2021) and the paucity of studies on Turkovac news in particular highlight the significance of this work.

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