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COVID-19 Pandemisi Sürecinde Dental ve Ortodontik Tedaviler Hakkında Dünya Çapında İnternet Verilerinin İncelenmesi: Bir Google Trend Analizi

Evaluation of Worldwide Internet Data on Dental and Orthodontic Treatments in the COVID-19 Pandemic Process: A Google Trends Analysis

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ÖZET

Amaç: Bu çalışmanın amacı, dünyadaki COVID-19 salgını sırasında dental ve ortodontik tedaviler hakkında internet verilerinin analizini sunmaktır.
Materyal ve Metot: 5 Mayıs 2020'de Google Trends uygulamasında 9 terim (coronavirus oral, COVID-19 dentistry, coronavirus dentistry, coronavirus dental, coronavirus oral care, coronavirus dental treatment, COVID-19 dental treatment, COVID-19 orthodontic, coronavirus orthodontic treatment, and coronavirus orthodontic) son üç aylık süreçte arandı. Arama sonuçları yeterli anahtar kelimeye sahip tüm anahtar kelimeler için ayrı ayrı ve dünyadaki 24 ülke için ayrı ayrı kaydedildi. Bu veriler, ülkelerdeki onaylanmış toplam COVID-19 vakası ile ilişkilidir. Toplam doğrulanmış COVID-19 olguları ile ortalama Google Trend değerleri arasındaki korelasyon değerleri için Pearson korelasyon testi kullanıldı.
Bulgular: En yüksek GT değerleri, " coronavirus dentistry " aramasında İngiltere (100), ABD (96) ve Kanada'da (63) bulundu. Koronavirüs - diş tedavileri ile ilgili aramalarda en yüksek veriler Birleşik Krallık'ta (100), ABD'de (95) ve İspanya'da (41) görülmüştür. Koronavirüs - ortodontik tedavi ile ilgili aramalarda en yüksek veriler ABD ve Birleşik Krallık'ta (100) elde edilirken, Hindistan (36) ve Fransa (18) bunu takip etmiştir. Diğer ülkelerde yeterli arama verisi bulunamamıştır. Tabloya göre, GT değerleri ile toplam doğrulanmış COVID-19 olguları arasında negatif bir korelasyon (r: 735; p: 0.411) olmasına rağmen, istatistiksel olarak anlamlı bulunmadı (p>0.05).
Sonuç: Google Trends değerleri ile onaylanmış toplam COVID-19 vakası arasında anlamlı bir ilişki bulunamamıştır.

Anahtar Kelimeler: COVID-19, Google Trends, dental tedaviler, ortodonti, internet

ABSTRACT

Aim: The aim of this study is to present the analysis of internet data about dental and orthodontic treatments during the COVID-19 pandemic process in the world.
Material and Method: On May 5, 2020, nine terms (coronavirus oral, COVID-19 dentistry, coronavirus dentistry, coronavirus dental, coronavirus oral care, coronavirus dental treatment, COVID-19 dental treatment, COVID-19 orthodontic, coronavirus orthodontic treatment, and coronavirus orthodontic) were searched in the last quarterly Google Trends app. Search results were recorded separately for all keywords and separately for 24 countries in the world with sufficient data. These data are correlated with total confirmed COVID-19 cases in countries. Pearson correlation test was used for correlation values between total confirmed COVID-19 cases with mean Google Trend values.
Results: The highest GT values were found in United Kingdom (100), USA (96) and Canada (63) when Google Trends searched for "coronavirus dentistry". In searches related to coronavirus - dental treatments, the highest data was seen in the United Kingdom(100), while it was(95) in the USA, (41) in Spain. In the searches related to coronavirus - orthodontic treatment, the highest data was obtained in USA and United Kingdom(100) while India(36) and France(18) followed. There is not enough search data in other countries. According to the table, there was a negative correlation (r:735; p:0.411) between GT values and total confirmed COVID-19 cases, but it was not found statistically significant(p> 0.05).
Conclusion: There was no significant relationship between Google Trends values and total confirmed COVID-19 cases.

Key Words: COVID-19, Google Trends, dental treatments, orthodontics, internet data

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INTRODUCTION

The coronavirus (COVID-19) pandemic is a global health crisis that defined by the World Health Organization (WHO). The guidelines concerning human health are constantly updated with new information about disease. National governments ensure the identification of suspicious cases and the activation of social isolation and quarantine measures at national level (Caprioglio et al., 2020).

Although several dental clinics in affected countries by pandemic have been completely closed or have been only providing urgent dental treatment need. The urgent dental treatment need continues even in the pandemic process all over the world. Guo et al., (2020) reported that urgent dental treatment need in China only decreased by 38% during the pandemic. The recent increase of orthodontic treatment with aesthetic needs in developing countries with socio economic development has become more popular and a common clinical procedure (Kim, 2017). Urgent orthodontic treatment can be defined as emergence orthodontic appliances and occurance of pain. Orthodontic treatment prevelance ranges from 10% to 35% in developed countries surveys (Proffit et al., 1998; Chestnutt et al., 2003). Therefore urgent orthodontic treatment need is frequently encountered during pandemic.

Due to these pre social isolation and quarantine cautions, individuals' internet search engine usage about pandemic disease have increased at this stage. Many people seek health information from internet sources. The internet is used by millions of people that has become a critical role for information globally (Cervellin et al., 2017). The most common keyword driven search engine on internet is Google, provides Google Trends service that is able to analyze internet search in examining population behaviour since 2004 (Google, 2014; Allem et al., 2017). Online search query data with Google Trends could help to assess precursors of behaviour changes distribution (Ayers et al., 2014).

Google Trends plays a key role in general population behaviour changes for the health services. Therefore, a critical facility for them is to distribute COVID-19 and provide health services. In our study we aimed to determine behaviour changes on dental and orthodontic treatment needs using Google Trends during COVID-19 pandemic in the World.

MATERIAL and METHODS

As the article does not deal with humans or any material previously collected from humans, no ethical approval was taken. Research and publication ethics were followed in the article.

Google Trends is an online search tool that analyzes a specific search term entered into Google's search engine by total search volume. The interest over time is represented by numbers on the graph that reflect how many searches have been carried out for a search term, relative to the total number of searches done on Google over time. To explain further, those numbers do not represent the absolute search volume, because they are normalised data and presented on a scale from 0–100 in order to reduce data redundancy and improve data integrity. Each point on the graph is divided by the highest point and multiplied by 100. When there is not enough data, 0 (normalised data) is shown. In regard to regional interest, the numbers represent the search volume relative to the highest point on the map, which is always 100 (normalised data).

On May 5, 2020, the Google Trends application was searched on Google for the last three months (05.02.2020-05.05.2020). Search results were recorded separately for all keywords and separately for countries in the world with sufficient data. The distribution of the countries with sufficient popularity data for the keywords "coronavirus oral", "COVID-19 dentistry", "coronavirus dentistry", "coronavirus dental", "coronavirus oral care", "coronavirus dental treatment", "COVID-19 dental treatment", "COVID-19 orthodontic", "coronavirus orthodontic treatment", and "coronavirus orthodontic" is shown in Figure 1-3.

Countries that do not have sufficient data and do not include Google Trends were excluded. The mean of all search results is taken and a Google Trends Value (GTV) is obtained for the countries. It is associated with data from countries obtained from the COVID-19 Situation Report - 106, which consists of data received by WHO from national authorities until 5 May 2020 at 10:00 CEST (https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports).

The number of active cases in countries with GTV has been evaluated with reference to this report. Pearson correlation test was used in Minitab Statistical Program for correlation values between total confirmed COVID-19 cases with Google Trend values.

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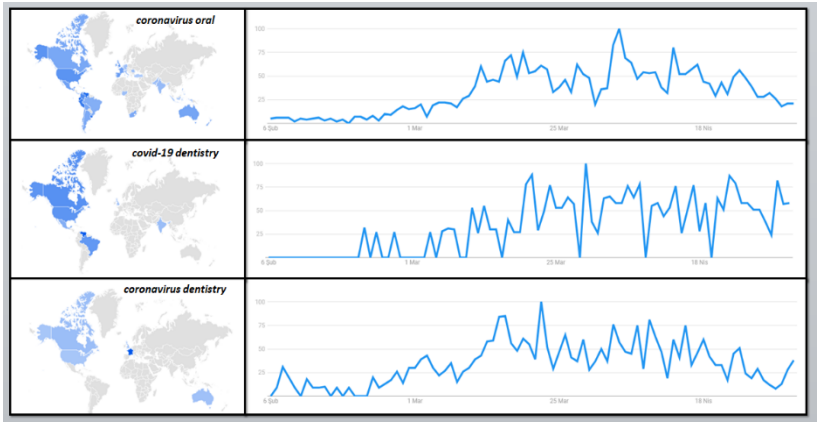

Figure 1: Distribution of search results of the terms ''coronavirus oral, COVID-19 dentistry, coronavirus dentistry'' in worldwide.

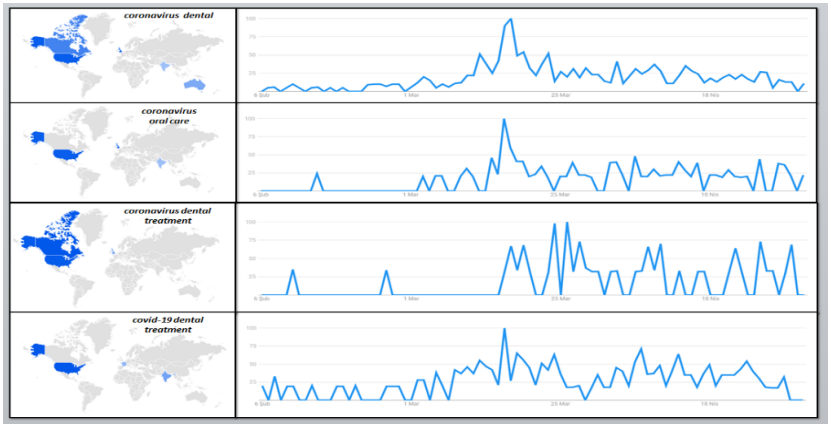

Figure 2: Distribution of search results of the terms ''coronavirus dental, coronavirus oral care, coronavirus dental treatment, COVID-19 dental treatment'' in worldwide.

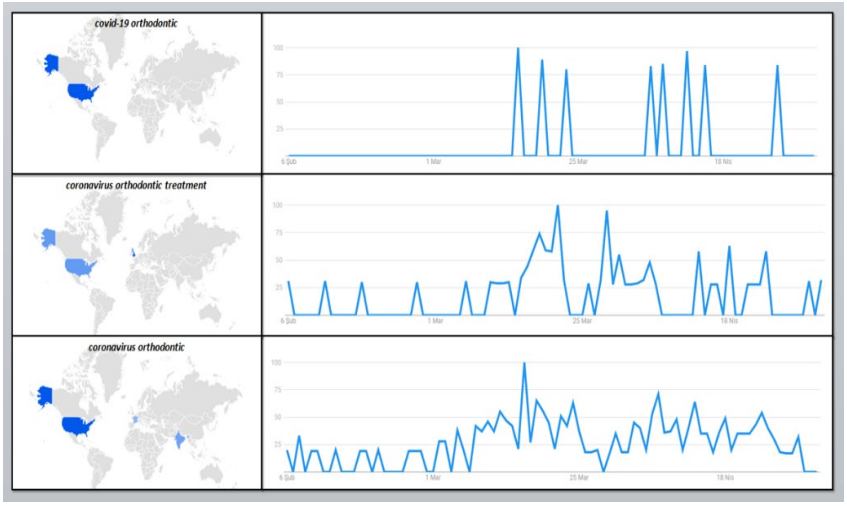

Figure 3: Distribution of search results of the terms ''COVID-19 orthodontic, coronavirus orthodontic treatment, and coronavirus orthodontic'' in worldwide.

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RESULTS

The highest GT values were found in Ecuador (100), Panama (98), and Venezuela (81) when Google Trends searched for "coronavirus oral". When the term " COVID-19 dentistry " was searched for Google Trends, the highest GT values were found in Venezuela (100), USA (48) and Brazil (45). The highest GT values were found in United Kingdom (100), USA (96) and Canada (63) when Google Trends searched for "coronavirus dentistry".

In searches related to coronavirus- dental treatments, the highest data was seen in the United Kingdom (100), while it was (95) in the USA, (41) in Spain. In the searches related to coronavirus - orthodontic treatment, the highest data was obtained in USA and United Kingdom (100) while India (36) and France (18) followed. There is not enough search data in other countries.

The mean of the GT values obtained for the three search terms with the most data and total confirmed COVID-19 cases according to WHO of the 24 countries are shown in Table 1. According to the table, there was a negative correlation (r:735; p:0.411) between GT values and total confirmed COVID-19 cases, but it was not found statistically significant (p> 0.05).

Table 1: Google Trends values and total confirmed Covid-19 cases of countries in worldwide

	Google Trends Value (GTV)			Total Confirmed Cases
	coronavirus oral	coronavirus dentistry	coronavirus dental treatment	
Ecuador	100	-	-	31881
Panama	98	-	-	7197
Venezuela	81	-	32	357
Uruguay	78	-	30	655
Dominica	73	-	-	16
Peru	68	-	-	45928
Colombia	56	-	-	7668
United Kingdom	50	100	100	190588
United States	49	96	95	1154985
Costa Rica	49	-	-	739
Canada	48	63	32	59844
Ireland	44	-	-	21722
Brazil	26	-	-	101147
Singapore	25	-	-	18778
New Zealand	22	33	34	1137
India	15	10	-	46433
Pakistan	13	-	-	21501
Belgium	12	-	-	50267
Italy	10	-	-	211938
Netherlands	5	-	-	40770
Turkey	2	-	-	127659
Indonesia	1	-	-	11587
France	-	-	39	130242
Spain	-	-	41	218011

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DISCUSSION

COVID-19, SARS-CoV-2, or coronavirus, as we first heard, entered our agenda as an outbreak in China in the last days of 2019. Since it was seen in 2019, this coronavirus was named "COVID-19". The epidemic, which spread to the whole world and turned into a pandemic in a short time, became a concern for dentists (Yalçın, 2020).

According to "The New York Times", dentists are one of the occupational groups with the highest risk of contamination (https://www.nytimes.com/interactive/2020/03/15/business/economy/coronavirus-worker-risk.html).

Physicians, intensive care personnel, dentists, paramedics, nurses, hostesses, cargo carriers are the most risky business lines. Especially ophthalmologists and dentists are in the high risk group since they are COVID-19 positive and in close contact with asymptomatic patients. There are publications reporting that dentists have a high risk of COVID-19 infection due to close face-to-face contact (Peng et al., 2020). It is known that COVID-19 is transmitted through aerosols formed during medical procedures or indirectly from saliva (Wax et al., 2020; To et al., 2020). In Germany, a case of COVID-19 showing the transmission of the disease has been published as a result of contact with an asymptomatic patient (Rothe et al., 2020). As the incubation period can vary from 0 to 24 days and most patients develop only mild symptoms, dental practice is likely to be performed with patients with asymptomatic COVID-19 infection (Guan et al., 2020). The use of aerators in patients causes the formation of aerosols and splashes, bacteria, viruses, fungi and blood to leap and contaminate us and the environment (Szymanska, 2007). This poses a risk to the dentist team.

With the spread of the COVID-19 virus all over the world, many areas have been affected, as well as the dentistry area. Patients whose dental treatments were interrupted, patients with problems arising from their teeth in this process were victimized. In general, all non-emergency dental treatment in the world and in Turkey has been postponed. Because dental devices (aerator etc.), which are frequently used in dentistry. Cause the intraoral flora to spread to the air. In this case, it causes the spread of an existing viral infection in the patient (Yalçın, 2020).

Internet data has undoubtedly been the most frequently used information tool of patients in the pandemic process. For this, the most commonly used internet search engine in the world is Google. Google has released Google Trends, which has been reviewing the terms searched on Google since 2004, revealing the most popular and most popular search terms over time and by country (Google, 2014). Our aim in this study is to examine the patients', dental and dental treatment of patients during the COVID-19 pandemic process.

When making Google trends analysis, the terms that people can search the most are preferred. It was observed that individuals searched for this period considering that diseases caused by COVID-19 virus may have oral symptoms. They may also have searched for information about dental and orthodontic treatments by patients during this period. It may have been searched not only by patients but also by physicians. Physicians may also have searched for information about treatment approaches and conditions that should be considered in this process.

When our findings are examined, it is seen that searches related to dentistry, dental treatments and orthodontic treatments are mostly popular in North and South America. Considering the data of the last 3 months, individuals may have wanted to get information about dental treatments as a result of anxiety in case of possible increase scenario due to the lower number of coronavirus cases and mortality rates in these countries. Interest in dentistry, dental treatments and orthodontic treatments in Europe and Asia remained quite low in this period. Google Trends value is not shown as there is not enough data in many European and Asian countries. Adequate data could not be found in countries such as Italy, Spain, France and the United Kingdom, particularly those affected by the COVID-19 outbreak in Google Trends data. This may be due to the aggressive spread of this virus and the increase of mortality rates in many countries of Europe, especially because people have put their dental treatments to the fore. It is seen that there is a negative correlation between the data of the world health organization and the data of Google Trends in the last 3 months, during which the epidemic reached its peak. In countries where the number of active and dead patients affected by coronavirus has increased, Google Trends values for dental treatments are lower. However, Google Trends values for dental treatments have been higher in South American countries where there are currently few active cases.

Conclusion

There was no significant relationship between Google Trends values (GTV) and total confirmed COVID-19 cases. Google has been one of the sources of information for people in this process. However, new studies with more detailed data are needed after the COVID-19 pandemic ends.

Conflict of Interest

The authors deny any conflicts of interest.

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