

Temporal Trends in COVID-19 Vaccine Acceptance in Türkiye: A Systematic Review

Türkiye’de COVID-19 Aşı Kabulünün Zaman İçindeki Değişimi: Bir Sistematik Derleme

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ABSTRACT

Background: Determining temporal trends in vaccine hesitancy could provide critical information for fighting against vaccine hesitancy and the pandemic. This paper aims to determine the temporal trends in COVID-19 vaccine acceptance in Türkiye and to assess the relevance of these trends to political decisions and practices.

Methods: This systematic review was registered in PROSPERO. Studies published in TRDizin, DergiPark, PubMed, Web of Science, and the National Thesis Center databases were examined. The final article search was conducted on 20.05.2022.

Results: This review contains 51 studies (n=52421). Until the date when Türkiye (Ministry of Health) announced that Türkiye had an agreement with a vaccine company, COVID-19 vaccine acceptance was in a decreasing trend; after that it turned into an increasing trend.

Conclusion: As a result, we concluded that the periodic decrease in vaccine acceptance was related to information pollution, vaccines’ uncertainties, and health communication issues during the relevant time period.

Keywords: COVID-19, Systematic Review, Trends, Vaccination Hesitancy, Vaccination Refusal

ÖZ

Giriş: Aşı kararsızlığının zamanla nasıl değiştiğini belirlemek, aşı kararsızlığı ve salgınla mücadelede kritik bilgiler sağlayabilir. Bu çalışma, Türkiye’de COVID-19 aşısı kabul oranındaki zaman içerisindeki eğilimleri belirlemeyi ve bu eğilimlerin politik kararlar ve uygulamalarla ilişkisini değerlendirmeyi amaçlamaktadır.

Materyal ve Yöntem: Bu sistematik derleme PROSPERO’ya kaydedilmiştir. TRDizin, DergiPark, PubMed, Web of Science ve Ulusal Tez Merkezi veritabanlarında yayınlanan çalışmalar incelenmiştir. Son makale araması 20.05.2022 tarihinde yapılmıştır.

Bulgular: Bu derleme, 51 çalışmayı (n=52421) içermektedir. Sağlık Bakanlığı, Türkiye’nin bir aşı şirketiyle anlaşması olduğunu duyurduğu tarihe kadar COVID-19 aşı kabulü azalan bir eğilim gösterirken, sonrasında artan bir eğilime dönmüştür.

Sonuç: Sonuç olarak, aşı kabulündeki dönemsel düşüşün, ilgili zaman dilimindeki bilgi kirliliği, aşılardaki belirsizlikler ve sağlık iletişimi sorunlarıyla ilişkili olduğunu düşünülmektedir.

Anahtar Kelimeler: COVID-19, Sistematik Derleme, Eğilim, Aşı Kararsızlığı, Aşı Reddi

INTRODUCTION

By the year 2020, the 21st century manifested as a period in which communicable diseases lost their former cruciality and non-communicable diseases became more crucial than ever. Vaccine hesitancy remained a public health issue during the first two decades of this century, despite scientists’ efforts to draw attention to the issue. Nonetheless, as a result of the COVID-19 pandemic, vaccine

hesitancy has become more intense and influential than ever before. At the beginning of the pandemic, there was no effective vaccine, so protective measures such as mask-distance-hygiene were the only available solution. Despite this, it is well-known that vaccination is the most effective and permanent method of disease control. For this reason, vaccine development studies began at the beginnings of the COVID-19 pandemic and advanced swiftly. As a result, by the end of the year 2020, a number of vaccines had been launched and received emergency use authorization in different regions of the world, but at the same time, doubts about the efficacy of vaccines and concerns about potential side effects spread at an equal rate (1, 2). In addition, information pollution has become an infodemic

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due to the rapid spread of false/unfounded information about COVID-19 on social media and individuals' inability to query this information (3, 4).

Various studies have assessed the relationship between pandemic management and vaccination decision. According to these studies, the process turned into a crisis as a result of information pollution in the media, political attitudes, and health communication. As a result, public's trust in scientists and the scientific community was deeply shaken. Problems such as the perception-based nature of vaccination studies, negative discourses against mRNA vaccines, problems in vaccine supply, and inadequate vaccination campaigns negatively affected vaccine acceptance (5, 6). On the other hand, some researchers claim that the Ministry of Health crisis communication was successful (7, 8). Besides these, there are a large number of published studies that find a relationship between COVID-19 vaccine acceptance and sociodemographic characteristics (9-12).

In addition to the genetic and clinical characteristics of the disease agent, COVID-19 vaccine hesitancy is a significant barrier in the fight against the pandemic. Determining the temporal trends in vaccine acceptance could provide crucial information for combating hesitation and, by extension, the pandemic. The present study aims to determine the temporal trends in COVID-19 vaccine acceptance in Türkiye and to assess the relevance of these trends to political decisions and practices.

MATERIALS AND METHODS

This systematic review was registered in the International Prospective Register of Systematic Reviews (PROSPERO, <https://www.crd.york.ac.uk/prosperto/>) database with the registration number ***, and the stages of the study were shared on this platform. The PRISMA 2020 guideline was utilized for the study's reporting.

Search strategy and selection criteria

The databases PubMed, Web of Science, TRDizin,

and DergiPark were examined. The database of the National Thesis Center was searched as part of unpublished studies. The inclusion criteria were: (1) Publications in English or Turkish; (2) studies of the general population, students, and healthcare professionals; (3) studies aimed at directly or indirectly determining the percentage of COVID-19 vaccine acceptance/hesitancy; (4) full-text accessible papers; (5) studies carried out between 01.01.2020 – 01.02.2022; (6) cross-sectional, descriptive, or cohort types of studies. The exclusion criterion was: (1) studies conducted with individuals under 18.

On 05.02.2022, the first article search was conducted using the following keywords in the title and abstract: “COVID-19 and aşı and kararsızlık”, “COVID-19 and aşı and kararsızlığı”, “COVID-19 and aşı and tereddüt”, “COVID-19 and aşı and tereddütü”, “COVID-19 and aşı and tereddüdü”, “COVID-19 and aşı and karşıtlığı”, “COVID-19 and aşı and ret”, “COVID-19 and aşı and reddi”, “COVID-19 and aşı and kabul”, “COVID-19 and aşı and kabulü”, “COVID-19 and vaccine and refusal”, “COVID-19 and vaccine and intention to vaccine”, “COVID-19 and vaccine and hesitancy”, “COVID-19 and vaccine and accept”, “COVID-19 and vaccine and acceptance”, “COVID-19 and vaccine and rejection”. Since there was no way to perform a combined search in the DergiPark database, each database was searched separately for keywords. During searches of PubMed and Web of Science, “and Turkey” was added to the keywords. The article search was repeated on 20.05.2022.

Quality appraisal and data extraction

Data extraction was performed for the following items: Date of survey, study design, number of participants, target population (e.g., general population, healthcare professionals, and students), vaccine acceptance/hesitancy/refusal percentage, and region. The extracted data was transferred to the MS Excel table that was created. Two researchers extracted the data independently, and then compared the results. Three investigators met to evaluate and resolve any disagreement. Study qualities were assessed

using the JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data (13). Two researchers independently assessed the study's quality, and then the results were compared. Three researchers met to evaluate and resolve any disagreements. The quality assessment result is shown in the Table 2.

MS Office, EndNote, and Tableau programs were utilized during the research process.

Daily COVID-19 Cases retrieved from the COVID-19 Information Platform of the Ministry of Health (14).

Vaccination decision questions' characteristics

In studies conducted prior to the beginning of vaccination in Türkiye, participants' vaccination decisions were surveyed using the following approach: "Will you get vaccinated?", "Do you consider getting vaccinated?" et cetera. In studies conducted after the beginning of vaccination, the vaccination decisions were surveyed as follows: "Have you been vaccinated?", "Did you get vaccinated?" et cetera.

Participants' responses were categorized as "acceptance/refusal" or "acceptance/hesitancy/refusal." The "research date" was chosen as the day surveys began. The dates of the ethics committee's approval were used as the research dates for two studies since the research dates were not specified. The research dates for three studies were the dates of submission to the journal.

Ethical approval

The current study did not require approval from an ethics committee because it was a systematic review.

Funding

There was no funding source for this research.

Data availability statement

This paper contains all data collected for this research.

RESULTS

Study characteristics

A total of 286 studies were initially identified, including 40 from the TRDizin database, 115 from the DergiPark database, 75 from the PubMed database, 27 from the Web of Science database, and 29 from the National Thesis Center database. After excluding repetitive and irrelevant studies, 96 studies were examined.

For various reasons, 45 of these studies were excluded: 19 studies were deemed unsuitable for the intended purpose, 17 studies were deemed unsuitable for results, 8 studies were deemed unsuitable for the methodology, and full-text access was unavailable for 1 study. In this study, 40 articles and 11 theses were included. One study questioned the vaccination decisions of three different target populations. Another study questioned the vaccination decision three times; two of the studies separately questioned the preference for domestic and foreign vaccines. A total of 57 records were included in our study (Figure 1). 9 of the studies are descriptive, and the remaining ones are cross-sectional. There is no cohort study among them.

Before vaccination in Türkiye, a total of 24 studies were performed. The earliest research was conducted on 30.04.2020, and the most recent on 01.10.2021. 29 studies on the general population, 18 on healthcare professionals, and 4 on students were conducted. The number of participants ranged from 63 to 3,937. There were 52,421 participants in total, including 34,591 members of the general public, 14,560 healthcare professionals, and 3,270 students. The lowest vaccine acceptance percentage was 16.8%, while the highest was 96.8% (Table 1, Figure 2).

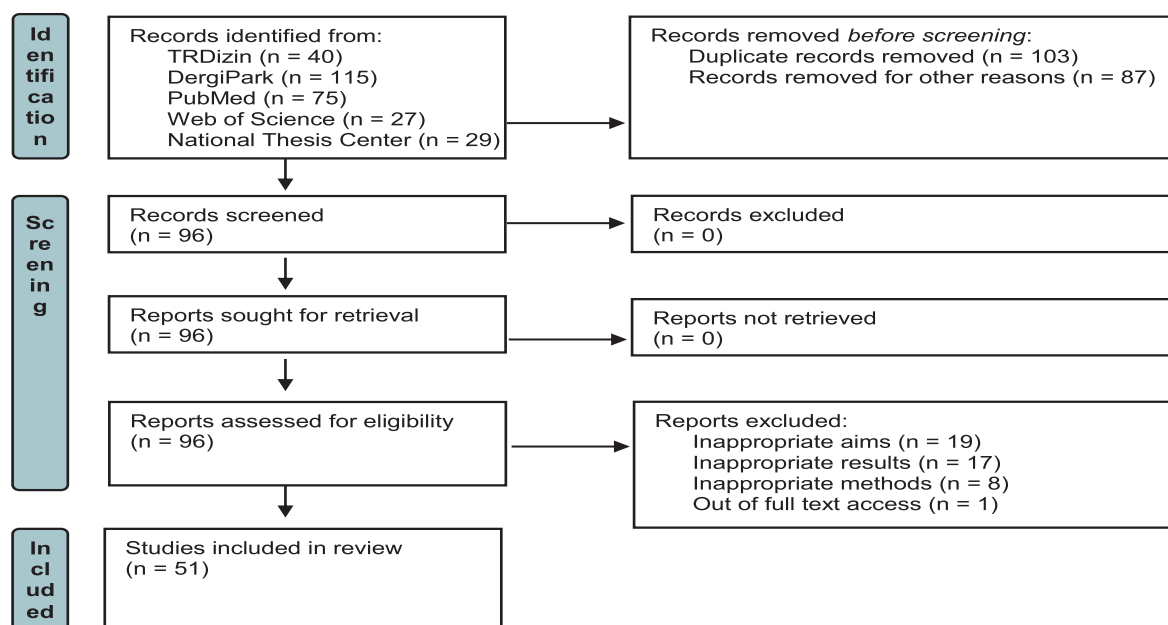


Figure 1- Identification of studies via databases and registers

Trends of COVID-19 vaccine acceptance

The Ministry of Health announced a contract with Sinovac on 25.11.2020. The implementation of the CoronaVac vaccine (Sinovac) began in Türkiye on 13.01.2021. On 12.04.2021, Comirnaty vaccine (Pfizer-BioNTech) implementation commenced. In this study, the time period from the beginning of the pandemic to 25.11.2020 was designated “Period 1”; the time period from 25.11.2020 to 13.01.2021 was designated “Period 2”; the time period from 13.01.2021 to 12.04.2021 was designated “Period 3”; and the time period after 12.04.2021 was designated “Period 4” (Figure 2).

In 9 studies (including repeated records, n=17,535) conducted during Period 1, the vaccine acceptance percentage declined. Most of these studies were conducted on the general population. Vaccine acceptance among healthcare professionals was higher than the general population. Vaccine acceptance among general population ranged from 27.4% to 84.7% (Table 1, Figure 2).

There were 21 studies (including repeated records, n=15,073) in Period 2. Vaccine acceptance ranged from 16,8% to 84,6% during this period. However, among healthcare professionals, vaccine acceptance tended to be higher than that of the general population (Table 1, Figure 2).

In Period 3, twelve studies (n=10,362) were conducted, with the majority focusing on the general population. Vaccine acceptance ranged from 33.3% to 82.2% during this period. It is noteworthy that vaccine acceptance increased during this period. In addition, vaccine acceptance amongst healthcare professionals tended to be higher than among the general population (Table 1, Figure 2).

There were 15 studies (n=9,451) in Period 4. During this period, vaccine acceptance among healthcare professionals and the general population were close to each other; in addition, they were higher than in previous periods. Thus, the highest vaccine acceptance was reached in Period 4. Vaccine acceptance ranged from 39.4% to 96.8% during this period (Table 1, Figure 2).

A total of 4 studies (n=3,270) were conducted on students. Considering the first of these studies, vaccine acceptance among students was lower than that of healthcare professionals and the general population. Consequently, students’ vaccine acceptance increased and converged with that of other groups (Table 1, Figure 2).

The overall trends of vaccine acceptance decreased until Period 1 and increased thereafter. In Period 4, vaccine acceptance reached around 90% (Table 1, Figure 2, Figure 3).

Table 1- Percentage of vaccine acceptance and associated characteristics of the studies examined, 2022, Çanakkale

No.	Author(s)	Date	Participants	Participant Feature	Acceptance (%)	Hesitancy (%)	Refusal (%)	Region	Other Features/ Notes
1	Salali et al. (15)	30.04.2020	3936	General Population	66,0	31,0	3,0	Türkiye	
2	Dündar et al. (16)	12.05.2020	254	General Population	84,7	-	15,3	Adıyaman	
3	Akarsu et al. (17)	10.06.2020	759	General Population	55,5	35,9	8,6	Türkiye	
4	Yıldız et al. (18)	15.06.2020	82	General Population	35,4	-	64,6	Rize	Families with vaccine hesitancy
5.1	Kucukkarapinar et al. † (19)	17.07.2020	3888	General Population	56,1	27,8	16,1	Türkiye	Asked at 3 different times
5.2	Kucukkarapinar et al. † (19)	01.09.2020	3888	General Population	43,5	29,7	26,8	Türkiye	Asked at 3 different times
6	Seyhan NS. (20)	01.10.2020	334	General Population	27,4	-	16,0	İstanbul	Excluded “I lack sufficient knowledge” option (56.6%)
7	Gönüllü et al. (21)	01.11.2020	506	Healthcare Professional	83,0	-	17,0	Türkiye	
5.3	Kucukkarapinar et al. † (19)	01.11.2020	3888	General Population	41,1	30,9	28,0	Türkiye	Asked at 3 different times
8	Özcan et al. (22)	30.11.2020	248	General Population	45,1	31,9	23,0	Kocaeli	
9	Yılmaz et al. (23)	02.12.2020	1293	General Population	41,2	37,9	20,9	Türkiye	
10	Kurtuluş et al. (24)	09.12.2020	183	Healthcare Professional	53,6	-	46,4	Şanlıurfa	
11	Uçar H. (25)	10.12.2020	521	General Population	34,4	30,3	35,3	Ankara	
12.1	Yigit et al. ‡ (26)	11.12.2020	428	General Population	33,9	-	66,1	Ankara	Preference for imported vaccines
12.2	Yigit et al. ‡ (26)	11.12.2020	428	General Population	62,6	-	37,4	Ankara	Preference for domestic vaccines
13	Dolu et al. (27)	15.12.2020	1853	General Population	50,0	-	50,0	Türkiye	
14.1	Yigit et al. □ (28)	15.12.2020	343	Healthcare Professional	52,2	30,9	16,9	Ankara	Preference for imported vaccines
14.2	Yigit et al. □ (28)	15.12.2020	343	Healthcare Professional	55,4	32,4	12,2	Ankara	Preference for domestic vaccines

15	Kaya et al. (29)	15.12.2020	806	Healthcare Professional	16,8	72,7	10,5	Türkiye	
16	Özbalıkcı et al. (30)	15.12.2020	1015	Student	29,2	68,1	2,7	Türkiye	
17	Acar et al. (31)	22.12.2020	494	Healthcare Professional	80,5	13,2	6,3	Türkiye	
18	Kaplan et al. (32)	25.12.2020	1574	Healthcare Professional	84,6	-	15,4	Türkiye	
19	İkişik et al. (33)	25.12.2020	384	General Population	54,7	26,8	18,5	İstanbul	
20	İkişik et al. (34)	25.12.2020	276	Healthcare Professional	50,3	29	20,7	İstanbul	
21	Okuyan et al. (35)	27.12.2020	961	Healthcare Professional	74,7	13,4	11,9	Türkiye	
22	Öncel et al. (36)	27.12.2020	1808	Healthcare Professional	73,2	-	26,8	Türkiye	
23	Goncu et al. (37)	01.01.2021	300	General Population	37,0	-	63,0	Ankara	Pregnant women
24.1	Yurtias et al. □ (38)	04.01.2021	732	General Population	29,2	51,8	19,0	İstanbul	Asked at 3 different groups; Individuals with rheumatic diseases
24.2	Yurtias et al. □ (38)	04.01.2021	763	General Population	34,6	42,1	23,3	İstanbul	Asked at 3 different groups
24.3	Yurtias et al. □ (38)	04.01.2021	320	Healthcare Professional	52,5	26,6	20,9	İstanbul	Asked at 3 different groups
25	Aloğlu et al. (39)	25.01.2021	1708	General Population	56,8	-	43,2	Türkiye	
26	Soysal et al. (40)	28.01.2021	1033	General Population	36,6	34,8	28,6	Türkiye	18-25 age group individuals
27	Karabela et al. (41)	01.02.2021	1216	General Population	54,1	29,7	16,2	Türkiye	
28	Yılmaz et al. (42)	08.02.2021	1035	General Population	59,9	25,4	14,7	Türkiye	
29	Oluklu et al. (43)	11.02.2021	412	General Population	33,3	-	66,7	Ankara	Puerperants
30	Yıldırım et al. (44)	15.02.2021	402	Healthcare Professional	66,7	-	33,3	İstanbul	
31	Marzo et al. (45)	15.02.2021	827	General Population	81,3	-	18,7	Türkiye	
32	Kaya et al. (46)	15.02.2021	739	Student	60,1	25,7	14,2	Elazığ	
33	Unal et al. (47)	21.02.2021	1546	General Population	82,1	8,9	9,0	Türkiye	
34	Korkmaz et al. (48)	22.02.2021	768	Healthcare Professional	80,6	-	19,4	Hatay	

35	Sinan S.N. (49)	01.03.2021	347	Healthcare Professional	82,2	4,3	11,5	Ankara	Those who could not get vaccinated for various reasons were excluded (2.0%).
36	Çelebi E. (50)	18.03.2021	329	Student	45,9	36,5	17,6	Elazığ	
37	Nazlı et al. (51)	12.04.2021	467	General Population	85,0	-	15,0	Türkiye	
38	Erem E. (52)	15.04.2021	208	General Population	67,3	-	32,7	Ankara	
39	Atar E. (53)	05.05.2021	588	General Population	95,3	3,1	1,6	İstanbul	Individuals over the age of 65
40	Erdem et al. (54)	15.05.2021	300	General Population	86,7	6,3	7,0	İstanbul	Oncology patients
41	Öztürk R. (55)	26.05.2021	500	Healthcare Professional	82,0	-	18,0	Ankara	
42	Başaran et al. (56)	01.06.2021	396	General Population	39,4	-	60,6	Mardin	
43	Aslan G. (57)	01.06.2021	343	General Population	77,5	12	10,5	İstanbul	
44	Taşkın N. (58)	01.06.2021	306	Healthcare Professional	76,5	-	23,5	Konya	
45	Deniz B. (59)	07.06.2021	280	Healthcare Professional	96,4	-	3,6	İstanbul	
46	Yeşiltepe et al. (60)	12.06.2021	1187	Student	67,1	-	32,9	Türkiye	Nursing students
47	Yağmur H. (61)	01.07.2021	343	Healthcare Professional	93,3	4,1	2,0	Türkiye	Pregnant women (0.6%) excluded
48	Kara et al. (62)	04.07.2021	3937	Healthcare Professional	83,8	-	16,2	İstanbul	
49	Özkan et al. (63)	27.07.2021	63	Healthcare Professional	96,8	-	3,2	Kayseri	
50	Kandemir G. (64)	01.09.2021	232	General Population	66,4	-	33,6	Ankara	Patients hospitalized with a diagnosis of COVID-19
51	Aydın S. (65)	01.10.2021	301	General Population	89,7	-	10,3	İstanbul	

Table 2- Quality assessment by JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data for studies included in the systematic review, 2022, Çanakkale

No.	Author(s)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Total Y
1	Salali et al.	U	U	Y	Y	Y	Y	Y	Y	U	6
2	Dündar et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
3	Akarsu et al.	Y	N/A	N/A	Y	Y	Y	Y	Y	N/A	6
4	Yıldız et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
5	Kucukkarapinar et al.	Y	N	U	Y	Y	Y	Y	Y	U	6
6	Seyhan NS.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
7	Gönüllü et al.	Y	Y	Y	Y	Y	Y	Y	Y	N	8
8	Özcan et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
9	Yılmaz et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
10	Kurtuluş et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
11	Uçar H.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
12	Yigit et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
13	Dolu et al.	Y	N	U	Y	Y	Y	Y	Y	U	6
14	Yigit et al.	Y	Y	Y	Y	Y	Y	Y	Y	N	8
15	Kaya et al.	Y	N	U	Y	Y	Y	Y	Y	U	6
16	Özbalıkcı et al.	Y	N/A	N/A	Y	Y	Y	Y	Y	N/A	6
17	Acar et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
18	Kaplan et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
19	İkişik et al.	Y	Y	Y	Y	Y	Y	Y	Y	N	8
20	İkişik et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
21	Okuyan et al.	Y	N/A	N/A	Y	Y	Y	Y	Y	N/A	6
22	Öncel et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
23	Goncu et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
24	Yurttas et al.	Y	N	U	Y	Y	Y	Y	Y	U	6
25	Aloğlu et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
26	Soysal et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9

27	Karabela et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
28	Yılmaz et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
29	Oluklu et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
30	Yildirim et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
31	Marzo et al.	Y	N	N	Y	Y	Y	Y	Y	N	6
32	Kaya et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
33	Unal et al.	Y	N/A	N/A	Y	Y	Y	Y	Y	N/A	6
34	Korkmaz et al.	Y	N/A	N/A	Y	Y	Y	Y	Y	N/A	6
35	Sinan S.N.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
36	Çelebi E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
37	Nazlı et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
38	Erem E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
39	Atar E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
40	Erdem et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
41	Öztürk R.	Y	U	U	Y	Y	Y	Y	Y	U	6
42	Başaran et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
43	Aslan G.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
44	Taşkın N.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
45	Deniz B.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
46	Yeşiltepe et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
47	Yağmur H.	Y	U	U	Y	Y	Y	Y	Y	U	6
48	Kara et al.	Y	U	U	Y	Y	Y	Y	Y	U	6
49	Özkan et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
50	Kandemir G.	Y	U	U	Y	Y	Y	Y	Y	U	6
51	Aydın S.	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Total Y		50	27	28	51	51	51	51	51	24	

Y: Yes, N: No, U: Unclear, N/A: Not applicable

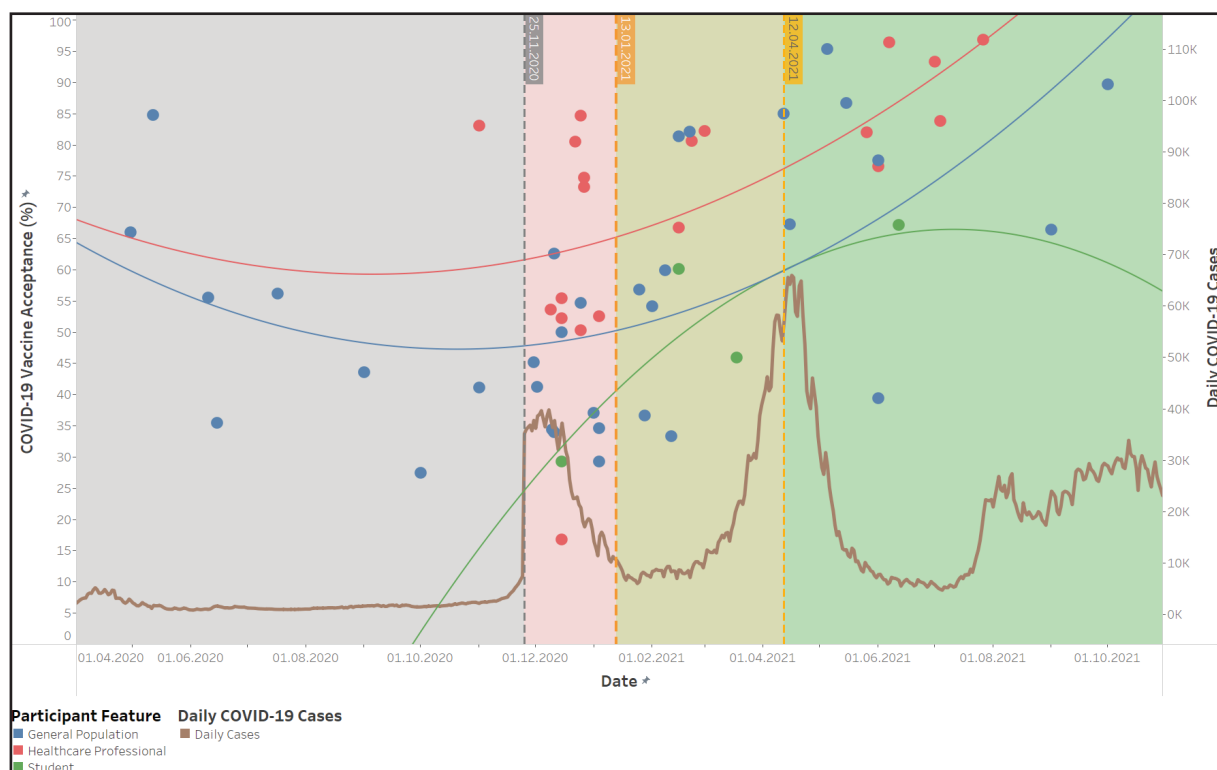


Figure 2- Temporal trends in vaccine acceptance based on participants' features and daily COVID-19 cases in Türkiye

Note: Trend lines were shown as polynomial second-degree models

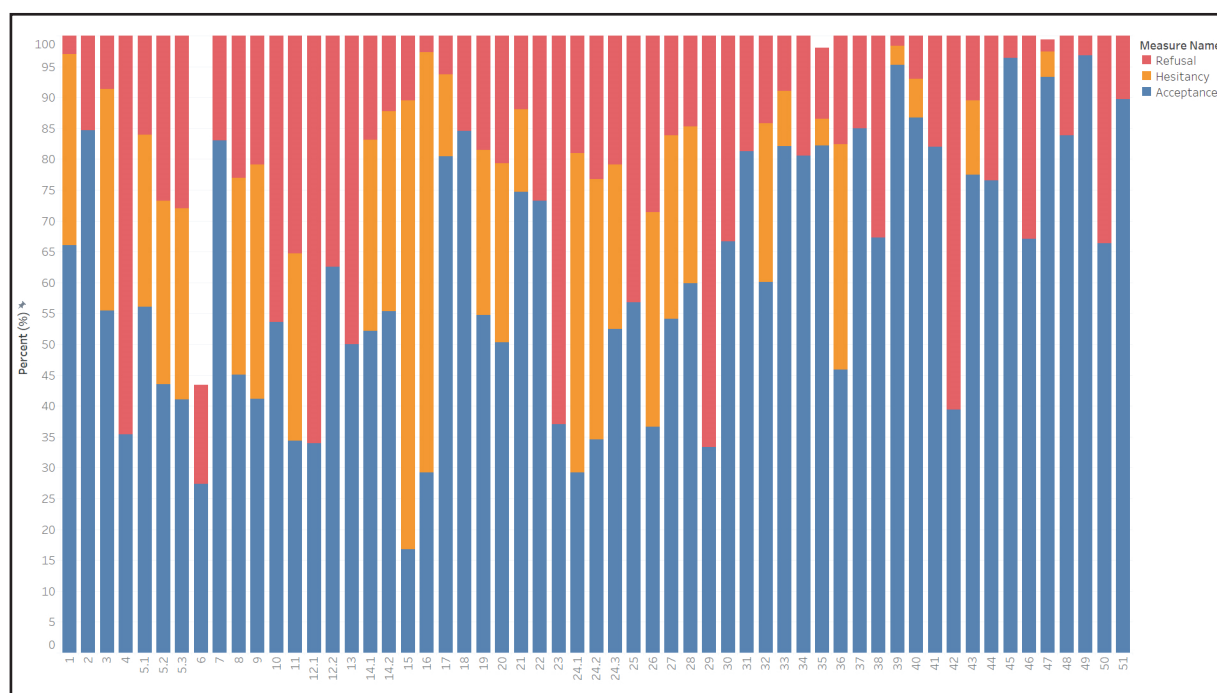


Figure 3- Distribution of acceptance, hesitancy, and rejection for each study

DISCUSSION

Mortality and morbidity due to infectious diseases decreased towards the end of the 20th century, and the significance of infectious diseases has diminished. Thus, some people in society began to have doubts about vaccines. As a result of the COVID-19 pandemic, infectious diseases and vaccines once again gained prominence. Identifying vaccine hesitancy and its underlying causes is crucial for both the COVID-19 pandemic and the prevention of future epidemics/pandemics. Approximately half of the examined studies revealed uncertainty or inadequacy concerning sample size and sampling methods. This situation may introduce limitations regarding the representativeness of the studies and necessitate careful interpretation of the results, especially in studies conducted nationwide in Türkiye using online survey methods.

Until the end of Period 1, vaccine acceptance decreased, according to our study. This could be due to the unpredictability of vaccine development studies, the pessimistic/negative statements made about the effects and side effects of potential vaccines on television and social media platforms, and the infodemic in the media/social media. At the beginning of the pandemic, some scientists predicted that it would finish in the summer; and during the summer, COVID-19 regulations were relaxed. These circumstances may have lessened the risk perception of individuals, and negatively impacted their acceptance of the COVID-19 vaccine. Yılmaz et al. (23) reported, those who believe COVID-19 was manufactured in a laboratory and those who believe COVID-19 is a biological weapon are less likely to accept the vaccine. According to Nazlı et al. (51) individuals who refuse vaccination have a lower score on the Fear of COVID-19 Scale. The study has also shown that participants who did not want to be vaccinated scored higher on both the Conspiracy Mentality Scale and the Vaccine Conspiracy Beliefs Scale. Dağ et al. (66) showed that those who believe that COVID-19 is manufactured have a higher score on the Vaccination Opposition Scale.

As of Period 2, there was a general trend toward greater vaccination acceptance. A possible explanation for this might be that a vaccine (CoronaVac) received emergency use authorization and the Ministry of Health authorities promoted this vaccine. Another possible explanation for this is that Scientists described the vaccine as “the most effective weapon against the pandemic” despite the infodemic.

From the summer of 2020, there were allegations in Türkiye that “the number of COVID-19 cases was underreported.” The Minister of Health declared on 25.11.2020 that the number of patients was announced instead of the number of cases. This declaration astonished both the scientific community and the general public. Loss of trust in decision-makers and healthcare professionals is known to be a factor in vaccine refusal; however, after the aforementioned statement by the Minister of Health, an upward trend in vaccine acceptance was observed. The fact that the progression of the pandemic was worse than originally thought may have induced fear in individuals, leading to a rise in vaccine acceptance. This view is supported by Nazlı et al. (51) who write that individuals who refuse the vaccination have a lower Fear of COVID-19 Scale score. Many recent studies (e.g. Güngör et al. (67); Turan et al. (68); Erdem et al. (54) have shown that a high score on the Fear of COVID-19 Scale increases vaccine acceptance.

In the examined studies, vaccine acceptance/hesitancy/refusal was assessed in a variety of ways, depending on the study's date and the target population. Generally, in studies conducted prior to vaccination, participants were asked, “Will you be vaccinated?” In later studies, the question “Have you been vaccinated?” was posed. Nevertheless, the answer choices for the questions were even more complicated. Some questions had two options (Yes/No, I have/I have not, I will/I will not), some had three (Yes/No/Indecisive, I will/I will not/I am indecisive), and others had four or more. These options made it challenging to classify and standardize study findings in accordance with WHO's definition (69). In addition, the “delay in acceptance of vaccination despite availability of vaccination

services” circumstance in the WHO’s definition was not considered in the studies. People who were vaccinated were not questioned if their vaccination were delayed due to their own actions. Participants’ responses of “I am indecisive” were used to determine vaccine hesitancy. As a result, some individuals who were actually in the vaccine hesitancy group may have been assessed in the vaccine acceptance group.

The WHO’s definitions of vaccine hesitancy and vaccine refusal are relevant to all vaccines. However, in our study, the definitions of vaccine hesitancy and vaccine refusal are related to the COVID-19 vaccine.

Strengths and limitations

One of the strengths of this study is that it systematically reviewed the COVID-19 vaccine acceptance from 01.01.2020 to 01.02.2022 in Türkiye. No previous study has systematically evaluated the temporal trends in COVID-19 vaccine acceptance in Türkiye. Therefore, it is anticipated that our study will make substantial additions to the literature.

A number of limitations need to be noted regarding the present study. First, the temporal trends in COVID-19 vaccine hesitancy were the objective of our study’s planning. But, in the analyzed studies, the vaccination-related questions asked of participants were not standardized. For this reason, it was decided to examine vaccine acceptance, which is the common theme of the studies. As a result, the temporal trends in COVID-19 vaccine hesitancy and refusal could not be deeply analyzed. Second, since the aim of the current study was to determine temporal trends in COVID-19 vaccine acceptance, average effect size was not calculated.

Conclusions and Recommendations

The present study set out to determine the temporal trends in COVID-19 vaccine acceptance in Türkiye and to assess the relevance of these trends to political decisions and practices.

This study has shown that COVID-19 vaccine

acceptance had a decreasing trend until the end of Period 1, and then began to increase. During the first three eras of our research, healthcare professionals tended to have a higher COVID-19 vaccine acceptance rate than the general population, and in Period 4, vaccine acceptance among both populations was nearly equivalent.

Implications for research and policy

We concluded that the declining trend in vaccine acceptance during the Period 1 of our study was due to information pollution and infodemic. In the case of epidemics/pandemics or any other extraordinary situations, it is crucial to inform the public. Additionally, it is also crucial to consider how the information is provided and by whom. Unplanned and uncontrolled sharing of information/opinions that induces confusion and hesitancy in individuals may be more detrimental than beneficial. The findings of this study have a number of important implications for future practice:

In extraordinary situations, the central authority should inform the public in a planned, regular, perspicuous, and impartial manner.

Due to the diversity of the scientific community’s and the general public’s information needs, elucidating should be differentiated between individuals and scientists.

Elucidating must be conducted in accordance with “health communication principles” and “ethical principles”

There has been little research conducted on students. Further research is required to establish the vaccine acceptance of students.

Future research on all vaccines, including COVID-19, should take account WHO’s vaccine hesitancy and vaccine refusal definitions, and should be conducted in accordance with them.

In the present study, the temporal trends in vaccine acceptance and its possible causes were evaluated. Further investigations are needed to determine the causes of vaccine hesitancy and refusal.

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