

Anti-Vaccination and Vaccine Hesitancy in Social Media: A Systematic Review in the Context of Türkiye¹

Sosyal Medyada Aşı Karşıtlığı ve Aşı Tereddütü: Türkiye Bağlamında Sistemik Bir İnceleme

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ABSTRACT

Vaccination is one of the most significant public health interventions, yet vaccine hesitancy and anti-vaccination movements have become increasingly prevalent, particularly on social media. This study systematically reviews academic research on the relationship between social media and vaccine hesitancy in Türkiye, covering studies published between 2015 and 2024. The research examines the dominant themes, arguments and communication strategies used in anti-vaccine narratives on platforms such as X, Facebook, Instagram, YouTube and Ekşi Sözlük. Findings indicate that misinformation, conspiracy theories, and distrust in health authorities significantly influence vaccine hesitancy. Additionally, anti-vaccine accounts often use social media to amplify their messages through engagement strategies, including viral hashtags and coordinated campaigns. The systematic review identifies six major themes: characteristics of anti-vaccine accounts, the relationship between social media and anti-vaccination, propagated conspiracy theories, anti-vaccine content and claims, sentiments towards COVID-19 vaccines, and key actors in vaccine debates. The study highlights the urgent need for interdisciplinary research to combat vaccine misinformation and proposes strategies such as improving digital health literacy, leveraging social media for pro-vaccine messaging and implementing AI-powered content moderation. Addressing vaccine hesitancy requires a comprehensive communication approach that counters misinformation while fostering trust in health authorities. This study provides a foundation for future research and policy recommendations to mitigate the public health risks associated with online anti-vaccine discourse.

Keywords: Vaccine Hesitancy, Anti-Vaccination, Social Media, Misinformation, Systematic Review.

ÖZ

Aşılama en önemli halk sağlığı müdahalelerinden biridir, ancak aşı tereddütü ve aşı karşıtı hareketler özellikle sosyal medyada giderek yaygınlaşmaktadır. Bu çalışma, Türkiye'de sosyal medya ve aşı tereddütü arasındaki ilişkiyi inceleyen akademik araştırmaları 2015-2024 yılları arasında yayınlanan çalışmalarını kapsayacak şekilde sistemik inceleme yöntemiyle gözden geçirmektedir. Araştırma, X, Facebook, Instagram, YouTube ve Ekşi Sözlük gibi platformlardaki aşı karşıtı anlatılarda kullanılan baskın temaları, argümanları ve iletişim stratejilerini incelemektedir. Bulgular, yanlış bilgilendirme, komplo teorileri ve sağlık otoritelerine güvensizliğin aşı tereddütünü önemli ölçüde etkilediğini göstermektedir. Ayrıca, aşı karşıtı hesaplar, viral hashtag'ler ve koordineli kampanyalar da dahil olmak üzere etkileşim stratejileri yoluyla mesajlarını güçlendirmek için sosyal medyayı sıklıkla kullanmaktadır. Sistemik inceleme altı ana temayı tanımlamaktadır: aşı karşıtı hesapların özellikleri, sosyal medya ve aşı karşıtlığı arasındaki ilişki, yayılan komplo teorileri, aşı karşıtı içerik ve iddialar, COVID-19 aşılara yönelik duygular ve aşı tartışmalarındaki kilit aktörler. Çalışma, aşı konusundaki yanlış bilgilerle mücadele etmek için disiplinler arası araştırmalara duyulan acil ihtiyacı vurgulamakta ve dijital sağlık okuryazarlığının geliştirilmesi, aşı yanlısı mesajlar için sosyal medyadan yararlanılması ve yapay zeka destekli içerik moderasyonunun uygulanması gibi stratejiler önermektedir. Aşı tereddütlerinin giderilmesi, sağlık yetkililerine olan güveni artırırken yanlış bilgilendirmeye karşı koyan kapsamlı bir iletişim yaklaşımı gerektirmektedir. Bu çalışma, çevrimiçi aşı karşıtı söylemle ilişkili halk sağlığı risklerini azaltmaya yönelik gelecekteki araştırma ve politika önerileri için bir temel oluşturmaktadır.

Anahtar Kelimeler: Aşı Tereddütü, Aşı Karşıtlığı, Sosyal Medya, Yanlış Bilgilendirme, Sistemik Derleme.

¹ Bu makale 23-24 Mayıs 2024 tarihlerinde hibrit bir şekilde Eskişehir Anadolu Üniversitesi İletişim Fakültesi tarafından düzenlenen SİS X. Sağlık İletişimi Sempozyumu kapsamında çevrimiçi bir şekilde sunulan Sosyal Medyada Aşı Karşıtlığı ve Aşı Tereddütü: Türkiye Bağlamında Sistemik Literatür İncelemesi başlıklı özet bildiriden üretilmiştir.



Introduction

Vaccines are one of humankind's greatest public health achievements by combating epidemics and pandemics on a global scale. However, the prevalence of negative attitudes and behaviours towards vaccination, such as vaccine hesitancy, vaccine refusal and anti-vaccination rhetoric, is increasing. According to the World Health Organization (WHO), vaccine hesitancy refers to the "delay in accepting or rejecting safe vaccines despite the availability of immunisation services" (World Health Organization [WHO], 18.08.2015). It can refer to the acceptance of vaccination according to the recommended schedule but with significant concerns about vaccines, or to the acceptance of only some vaccines and the rejection of others and the purposeful delaying of vaccination (Dube, 2013, p. 1764). All demonstrate a general lack of confidence in their use. Individuals who are hesitant about using specific vaccines, or about vaccination in general, are a heterogeneous group expressing varying degrees of ambivalence (Troiano & Nardi, 2021, p. 245). Since the late 1990s, the existence of "anti-vaccination movements", which question the safety and efficacy of vaccines, has also increased concerns about vaccination (Smith, 2017, p. 1). In fact, "anti-vaccination movements have now become a global trend" and the existence of such movements has been reported in about 90% of countries in the world (Durmaz & Hengirmen, 2022, p. 6). There is a fine distinction between vaccine refusal, defined as the refusal of all vaccines and vaccination through individual choice (Yorulmaz & Karadeniz, 2022, p. 616), and vaccine hesitancy which is a reluctance to be vaccinated (Yılmaz & Bilen, 2022, p. 347). Despite this nuance, social media is the common denominator in aiding the spread of vaccine hesitancy and vaccine refusal. Although vaccine hesitancy is not a new issue, the spread of misinformation about vaccines through social media has accelerated, especially during the COVID-19 pandemic (Wilson & Wiysonge, 2020, p. 1) and anti-vaccine movements tend to use social media as the primary communication channel for disseminating information (Limaye et al., 2021, p. 1). The findings of studies indicate

that exposure to anti-vaccine content affects opinions about vaccination and reduces the preference for it (Puri, 2020, p. 2568). Indeed, social media has led to an uncontrolled spread of misinformation about the COVID-19 pandemic with unfounded content and conspiracy theories about the origin of the virus, prevention, treatment and diagnosis (Durmaz & Hengirmen, 2022, p. 1).

In Türkiye, there are both personal comments and ongoing academic analysis that indicate the existence of a link between social media and vaccine hesitancy and anti-vaccination. Anti-vaccination attitudes, which had been rare in Türkiye before 2010, increased in 2015 as a result of a court case that was seen as a victory for the need to obtain parental consent for vaccination. "The number of families refusing to vaccinate their children was 183 in 2011", but "increased to 980 in 2013", "5,400 in 2015", and "12,000 in 2016" with the number of cases related to vaccine refusal reaching "23,000 in 2018" (Gür, 2019, p. 1). According to the Health Statistics Yearbook published by the Turkish Ministry of Health, the number of families who did not want their children to be vaccinated had increased to 40,000 in 2019. In this context, this study identifies through a systematic review those academic studies that reflect on the expression of vaccine hesitancy and anti-vaccination in the social media in Türkiye. The aim is to reveal how vaccine hesitancy and anti-vaccination have been promoted in the social media in Türkiye, highlighting the underlying arguments, narratives and findings that form the basis for the promotion of such views. It also makes suggestions for developing counter strategies in the social media. A systematic review in this context is important for developing communication-based recommendations to combat anti-vaccination and to guide new studies. Although vaccine hesitancy is a "complex and context-specific" issue that can vary according to "time, place and vaccine", the rise of disinformation, fuelled by the deep penetration of social media into everyday life, is identified as an important factor in influencing vaccine hesitancy (Nguyen & Catalan-Matamoros, 2022,

p. 1). Indeed, research from the early 2000s to the present day shows that anti-vaccine groups have a significant influence in social media, with the majority of posts on popular social media channels having anti-vaccine content (Wilson & Wiysonge, 2020, p. 2). Anti-vaccination groups base their arguments "on a lack of trust in the information about vaccines provided by health professionals and official sources" (Ortiz-Sanchez et al., 2020, p. 2). Anti-vaccination groups utilise the capabilities of social media and digital communication to popularise their claims. For example, activists use all the features of Facebook to reach a wider audience and build a community while Instagram acts as a platform to share short video clips within the anti-vaccination movement and X serves as a tool for anti-vaccination activists to spread their message to wider groups, to amplify the voices of famous influencers and to access mainstream media (Diresta, 2018).

According to Vosoughi et al. (2018, p. 1146), fake news, especially on X, spreads "significantly further, faster, deeper and wider than the truth in all categories of information". Although some social media platforms, such as YouTube, Instagram, Facebook and X, impose various sanctions, such as "removing posts or suspending anti-vaccine accounts, to prevent the spread of misinformation" about vaccines, it is hard to alter the negative attitudes of people who have been influenced by false information about vaccines (Durmaz et al., 2022, p. 2). During the COVID-19 pandemic, social media channels remained a frequently preferred medium for anti-vaccine groups and movements. These platforms became an arena for vaccine discussions with the emergence of a wave of comments attempting to prevent vaccination against the coronavirus even before the official announcement of the vaccine's deployment and after the vaccination programme had begun these negative comments continued (Wawrzuta et al., 2022, p. 1). Even though social media was used as a medium to communicate official information, and to connect during curfews, it was also favoured as a tool for anti-vaccination activities and movements,

so-called "anti-vaxxers" (Chandra et al., 2024, p. 2). In 2019, many social media sites pledged to fight the anti-vaccination movement and in this context Facebook announced that it would no longer recommend content containing misinformation about vaccines to its users (Bulki, 2020, p. 504). Given people's increasing preference for the internet and social media outlets for information, recent literature has specifically examined the link between social media use and attitudes towards public health interventions, particularly COVID-19 vaccines (Cascini, 2022). The key features of anti-vaccination and vaccine hesitancy on social media, the subject of ongoing studies in the literature, can be summarised as follows: anti-vaccination groups use these channels frequently and effectively; inaccurate information about the vaccination process is disseminated on social networks; individuals or groups who are not health experts conduct anti-vaccination campaigns on these channels to influence people's attitudes; anti-vaccination groups negatively affect public health by claiming that health information provided by official sources is not reliable; and finally conspiracy theories, which became more evident during the COVID-19 pandemic, are spread by anti-vaccination groups.

Methodology

This study is based on a systematic review to identify themes and narratives found in scientific research discussing anti-vaccination attitudes in the context of social media in Türkiye. The overarching research question and its sub-research questions guiding the research are delineated as follows:

RQ1: What are the main patterns and recurring themes of scientific research relating social media and vaccine refusal or vaccine hesitancy in the context of Türkiye published between 2015 and 2024?

RQ1a: Which social networks and media were analysed in these studies?

RQ1b: Which research methods were employed in these studies?

RQ1c: In which fields are researchers conducting these studies?

A systematic review is based on examining the relevant literature within the framework of a set of principles that proceed in determined steps accompanied by a set of questions (Victor, 2008; Briner & Denyer, 2012). It is the preferred method in this study because it is an approach that helps identify prominent trends in a wide-ranging literature and to describe the field for academic research (Briner & Denyer, 2012). This differs from traditional literature reviews in that it identifies published studies based on specific questions and the methodology is designed to minimise the biasing effects of selection, publication and data extraction (Nightingale, 2009). In other words, systematic reviews are a way of synthesising data to answer a "specific research question in a transparent and reproducible form" (Lame, 2019, p. 1635). In the present context, this means identifying the prominent themes in the findings of the studies that address anti-vaccination in relation to social media in Türkiye. In the first phase of this study articles and postgraduate theses published in Turkish and English from 2015 to December 2024, when anti-vaccination gained prominence in Türkiye, were reviewed in DergiPark, Web of Science (WoS) and Scopus databases. In addition, master's and doctoral theses and dissertations were identified through the YÖK Thesis Centre website. The databases were searched using the terms "vaccine", "vaccine hesitancy", "anti-vaccination", "social media", "Turkey and Türkiye". Studies included in more than one database were identified and were recorded as data from the first identified database.

Thirty-three articles were found in DergiPark, six in Web of Science and five in Scopus (a total of forty-four) while two doctoral theses and one master's thesis were found in the YÖK Thesis Centre. In addition, an article published in Reflektif Journal of Social Sciences, which was indexed in TRDizin but

not included in the DergiPark database at the time of the study, was included in the analysis. Among the identified studies, five studies that did not have a research design and original research findings were excluded from the review. A total of 43 original studies -40 articles and three postgraduate theses- were systematically analysed. The studies included in the systematic review were separated and evaluated according to their themes.

Findings

The indexes, the Turkish and English keywords, the social media channels and the date range of the research are listed in Table 1. The date range of the research includes articles and dissertations published in Turkish and English between 2015 and 2024.

Table 1
Research Criteria

Indexes	DergiPark, Web of Science (WoS), Scopus, YÖK Tez Merkezi
Keywords Turkish	"aşı", "aşı tereddütü", "aşı karşıtlığı", "sosyal medya", "Türkiye"
Keywords English	"vaccine", "vaccine hesitation", "anti-vaccination", "social media", "Türkiye"
Social Media Platforms	"Instagram", "X", "Facebook", "Youtube", "Ekşi Sözlük", "Teyit.Org"
Time Period	1 June 2015- 31 December 2024

Table 2 shows that the studies cover different social media channels, methods and disciplines based on the systematic review.

If we examine the studies included in the review, then the X-platform, which was analysed the most (twenty-eight times), stands out while Instagram is mentioned eight times, Facebook seven times, YouTube twice, Teyit.org twice and Ekşi Sözlük twice. Both qualitative and quantitative research methodologies are used in the articles although it is observed that mixed methods were preferred and a total of eleven different research techniques were employed. However, the most frequently used research technique was content analysis

(twenty-one articles). Of the forty-three studies, twenty-one are in the field of communication (including journalism, public relations, advertising, marketing, new media and communication while thirteen are in health sciences (such as medicine, nursing, public health and child health)

Thematic analysis of the studies identified six major themes, as presented in Table 3.

Table 2
Included Studies

Number of studies (2015-2024)	48
Number of Studies Reviewed (2015-2024)	43
Social Media Platforms	X (28), Instagram (8), Facebook (7), Youtube (2), Teyid.org (2), Ekşi Sözlük (2)
Research Methods	Content Analysis (21), Survey (5), Sentiment Analysis (4), In-depth Interview (3), Descriptive Analysis (2), Literature Review (2), Critical Discourse Analysis (1), Thematic Analysis (2), Attitude Scale (1), Botometer Analysis (1), Mixed Method (1)
Field of Study	Communication (21), Health Sciences (13), Engineering (3), Sociology (3), Social Work (1), Computer Software (1), Office Services and Secretarial Studies (1)

Table 3
Themes of the Systematic Review

1. Characteristics of Anti-Vaccine Accounts	2
2. Relationship Between Anti-Vaccination and Digital/Social Media	11
3. Propagated Conspiracy Theories	4
4. Anti-Vaccine Content and Claims	17
5. Sentiments Toward COVID-19 Vaccines	4
6. Key Actors and Messages in COVID-19 Vaccine Debates	4

The Relationship between Anti-Vaccination and Digital/Social Media

The recurring theme in the studies concerns determining the relationship between anti-vaccination and social media with a total of eleven

studies identified under this theme. Mansur and Bıyık (2022) placed anti-vaccination in the context of social media and investigated the impact of digital media on an individual's attitude towards the COVID-19 vaccination. The quantitative study, based on 427 participants, found that individuals frequently used digital media tools as a source of information about the COVID-19 vaccine (Mansur & Bıyık, 2022, p. 270). The study also showed that those who had sought information about vaccines in Türkiye had more positive attitudes towards the benefits and protective value of vaccines than those who had not. This was also the case for those who did not feel the pressure of vaccine debates and those who had access to pro-vaccine information rather than anti-vaccine information (Mansur & Bıyık, 2022, p. 271). Another important finding relates to the attitudes towards the vaccination of people who use social media as a main source of information. The study revealed that levels of anti-vaccination and vaccine hesitancy are higher among those who primarily use social media as a source of information than among those who use medical websites. Therefore, the study concluded that there is a positive relationship between receiving information about vaccination from digital media and behavioural intention: in particular, that adequate and accurate information about the vaccine increases positive attitudes towards the benefits of the vaccine and decreases anti-vaccine attitudes (Mansur & Bıyık, 2022, p. 272). Tekin et al. (2022) conducted a quantitative study with 385 participants in Konya Province to determine vaccine hesitancy among individuals over the age of 18 and to examine it in relation to various variables. The study indicated that social media was the second most used source of information about vaccination after scientific publications (Tekin et al., 2022: 2129) and highlighted the importance of using social media to combat vaccine hesitancy (Tekin et al., 2022, p. 2136). Parlak and Ener's (2022) study focusing on COVID-19 vaccine refusal and vaccine hesitancy among adolescents, conducted with 303 participants in the Kahta district of Adiyaman Province, highlighted that social media was a medium that nearly forty per cent of adolescents

used when making decisions about vaccination (Parlak & Ener, 2022, p. 262) although 83.7% of them did not believe the anti-vaccine content they encountered on social media (Parlak & Ener, 2022, p. 262). The study highlighted the need to prevent the spread of unreliable and inaccurate information on social media as an important strategy to combat the spread of anti-vaccine views among young people. A study by Özmen and Aksoy (2022), using 506 participants, "aimed to determine the relationship between vaccine literacy and vaccine hesitancy among university students". It reported that by far the majority of students (97%) preferred digital media as a source of information on vaccine-related issues (Özmen & Aksoy, 2022, p. 550). Among digital media channels, social media ranked second after websites (Özmen & Aksoy, 2022, p. 553).

Research by Narmanlı (2022, p. 28) aimed to find out the following: what issues related to vaccination are discussed on X; what are the reasons for vaccine mistrust; what misinformation is prominent in the tweets of vaccine ambivalent users; and what conspiracy theories form the basis of the arguments of vaccine ambivalent users". In the study, 2,349 tweets were analysed and classified according to their subject. Over a third (35.4%) of vaccine-related tweets were objections and criticisms of the actors, institutions and practices involved in the pandemic process while about 30% were tweets about the safety of COVID-19 vaccines. This was followed by tweets about rights-based objections to vaccination practices and policies (11%), tweets in which users state that they will not be vaccinated and will resist the practices without any argument or justification (6.5%), and tweets about people who distance themselves from vaccination through their speech and actions (4.7%) (Narmanlı, 2022, p. 37). The study revealed that the most intense criticism and objections (23.8%) regarding vaccines and the vaccination process were directed at doctors (Narmanlı, 2022, p. 38). It concluded that the most important factor negatively affecting a belief in the reliability of vaccines is conspiracy theories (Narmanlı, 2022, p. 39). Durmaz et al., (2022), who define vaccine

hesitancy as an important public health problem, investigated the prevalence of vaccine hesitancy among parents and the effect of social media use on attitudes towards vaccine refusal. The study, using an attitude scale in which parents of children admitted to hospitals in three different provinces of Türkiye formed the sample, indicated that those opposed to childhood immunisation programmes in Türkiye were also less positive towards Covid-19 vaccines and that social media played a role in the development of these attitudes (Durmaz et al., 2022). Eslen-Ziya and Pehlivanlı (2022) used a "qualitative content analysis of X posts", along with the content related to "anti-vaccine claims, from the two online news sites" of their study. They pointed out that the arguments used to spread ideas supporting COVID-19 vaccine refusal in Türkiye could be categorised into three themes. The first emphasised "bodily freedom and personal choice"; the second, "the rejection and devaluation of scientific evidence"; and the third, the deepening "polarisation between supporters of COVID-19 restrictions" and opponents of vaccination (Eslen-Ziya & Pehlivanlı, 2022). The authors suggest that there is a correlation between distrust in health experts and anti-vaccine sentiments and the search for alternative knowledge and expert authority (Eslen-Ziya & Pehlivanlı, 2022).

Research by Yıldız et al. (2023), which sought to determine whether university students' health literacy and social media use affected their vaccine uptake during the COVID-19 pandemic, revealed that health literacy and social media use have an influence on the vaccine behaviour. Also related to COVID-19, Ertem and Özbay (2024), using an experimental method in the field of engineering, focused on the detection of COVID-19 vaccine resistance in X data "using a combination of deep learning and feature selection approaches" (Ertem & Özbay, 2024, p. 116). The study proposes the development of a method to effectively detect expressions of COVID-19 vaccine resistance in textual data and aims to provide information for the development of health policies and public information strategies (Ertem & Özbay, 2024, p. 116). An article by Kar et al. (2024) identified "the

relationship between trust in social media and vaccine hesitancy" and attempted to determine "whether different demographic characteristics made a difference in this causal relationship" (Kar et al., 2024, p. 51). The study involving 100 patients admitted to a hospital in Kırıkkale reported that participants' reluctance to be vaccinated was high but their search for excuses not to be vaccinated was not so strong. The study also highlighted that the tendency to verify social media content was high and trust in individual users' posts was weak (Kar et al., 2024, p. 58). Finally, a quantitative study by Akar and Karan (2024) examined the relationship between vaccine hesitancy, health anxiety, and health literacy. The study involved 735 participants from Türkiye and found that 57% of individuals who received negative information about vaccinations obtained it from social media (Akar & Karan, 2024, p. 279).

Characteristics of Anti-Vaccine Accounts

Another recurring theme in articles on anti-vaccination is the method used to promote anti-vaccination accounts. In their study, Taşçı & Gökler (2021) analysed the posts of ten accounts with more than ten thousand followers that posted on Instagram using the anti-vaccine hashtags they identified. The study revealed that the accounts were managed by people with no medical background and that the account managers disseminated their personal experiences, social interactions or information obtained from the internet of uncertain origin. In a study by Aytekin et al., (2023), the researchers directly labelled the accounts sharing anti-vaccine messages on social media as "trolls" and attempted to identify the common characteristics of high-interaction "trolls". They pointed out that anti-vaccine trolls "try to influence X users by using a large number of tweets, with the potential of receiving a large number of retweets, by employing a large number of hashtags and spreading the posts over a long period of time".

Anti-Vaccine Content and Claims

A total of eighteen studies were included in the third theme of the review. The main themes

identified in the studies were as follows: vaccines harm human health, carry risks and are not reliable (Demirhan, 2021, p. 109); anti-vaccine content contains political references with complaints against the state and political parties (Şirzad, 2022, p. 76); and vaccine companies demand legal immunity, health workers who are vaccinated lose their lives, vaccinees are implanted with chips and people are robotised (Irak, 2022, pp.122-126). In their study, Kınay and Atalay (2021) analysed tweets and noted the use of bot accounts to disseminate anti-vaccination content on X, as well as the spread of conspiracy theories regarding vaccination through these accounts. Similarly, Balcı Aydoğan and Abuşoğlu (2022) revealed that claims that vaccines caused heart disease and stroke, that vaccines turn people into zombies, and that vaccines serve global powers and big pharmaceutical companies were widely used in social media posts. If we look at the findings of other studies analysing the justifications used in anti-vaccination accounts on X, the following arguments can be identified: COVID-19 is not real; the virus is man-made and manipulated through conventional media; and it interferes with private life (Şahin, 2022, pp. 582). It has also been noted that existing concerns about vaccination among individuals are transformed into a moral panic by anti-vaccination activists (Çobaner et al., 2022).

In a study using quantitative data that analysed the correlation between anti-vaccination and conspiracy theories on X, it was found an anti-vaccination agenda was created through hashtag with a negative approach to vaccination that were spread on social networks (Kuş, 2022). Özkan (2022), who analysed the anti-vaccine justifications produced by anti-vaccine activists on X who opposed the COVID-19 vaccine for children, found that their justification for their opposition could be categorised under seven different themes: disease, vaccine, religion, trust, nationalism, child and rights-centred. The author concluded that parents who sought scientific information about vaccination were more likely to experience indecision about vaccinating children rather than outright opposition. Two studies conducted on

Ekşi Sözlük, a popular social media platform in Türkiye, demonstrated that people prefer to use this platform to get accurate information about vaccination; however, most titles about vaccination were speculative and an infodemic about vaccination had emerged on this platform due to a blend of accurate and misleading information (Porsuk & Cerit, 2021, p. 356). In addition, it has been suggested that religious groups who claim that vaccination is a “sin” and postmodernists who are sceptical about its reliability are visible in the anti-vaccination content on Ekşi Sözlük (Tılıç & Uz Özcan, 2021, pp. 6-7). In a study conducted on Instagram, the reasons used by anti-vaccination posts to support their views were given as: belief factor; personal previous experience; being influenced by like-minded people; alternative health approaches; and doubting the need for vaccination (Yorulmaz & Karadeniz, 2022, p. 619). It also mentions that the following are frequently posted by anti-vaccinationists on Instagram: a mistrust in the content of the vaccine and the companies that produce it; a disbelief in the vaccine's protection; obscene expressions about the vaccine, a belief in conspiracy theories; disinformation; the highlighting of individual stories; and emphasising that it is a right not to be vaccinated (Utanır-Altay, 2022).

Two other social media platforms that stand out for anti-vaccine content and claims are YouTube and the website Teyit.Org. Analysing the results of the study on YouTube, it is clear that this platform is an important source of reference for those seeking information about vaccination. It was pointed out that the anti-vaccination content on this platform is mostly produced by individual users who are not health experts and that the side effects of vaccines and conspiracy theories about them are often included in the video content (Bilişli, 2022, p. 195). Key findings from an analysis of anti-vaccine claims on the Teyit.Org website were that the majority of anti-vaccine claims are false, distorted, decontextualised and fabricated. In terms of content, the platform found that anti-vaccine posts use conspiracy theories, question the effectiveness of the vaccine, reinforce mistrust

of the vaccine, spread negative experiences and highlight arguments aimed at discrediting the vaccine (Yelsiz & Çalışkan Söylemez, 2023, pp. 58-61). Another study of Teyit.Org highlighted that the source of anti-vaccine content is unknown and that it is mostly shared by anonymous accounts that interact on social media networks, thus devaluing the truth in the context of vaccination (Madsar, 2021). Finally, Konukman (2024) argued that the rapidly spreading infodemic on social media also had an impact on the emergence of anti-vaccination or vaccine hesitancy during the COVID-19 pandemic.

Popularised Conspiracy Theories

Conspiracy theories related to vaccine refusal are the third recurring theme in the studies. There are four studies on this topic. Gülarıslan Değer (2022) identified the conspiracy theories that anti-vaccine accounts use as supporting arguments on social media platforms. They found that anti-vaccine accounts circulated the following conspiracy theories. The pandemic is part of a plan by global powers to establish a new world order and that there is no pandemic. The number of cases increased after vaccination. The pharmaceutical companies aim to make a profit by feeding people's fears about the disease. People are used as guinea pigs in vaccinations. The COVID-19 vaccine is a low-cost, unknown biological weapon produced by Zionism and Western countries. Human genetics are tampered with by vaccines and the future of the human generation is in danger. Finally, the mRNA vaccine will change people's genetic makeup and will eventually eliminate humanity. In a similar study by Kaya (2022), tweets shared on X under the hashtag #AşıDeğilSeriKatil were analysed and the anti-vaccine views in users' posts were classified under eleven headings. These were: citing examples of negative events; citing examples of unvaccinated people, anti-masking; marginalization; believing there are hidden facts; predicting the future negative outcomes if humans continue to use vaccines; insecurity; using accusatory language; being libertarian and anti-freedom; not being anti-vaccine; and being on the agenda. The author emphasised the importance

of transparency on the part of relevant authorities to prevent the spread of conspiracy theories and stated that accurate information sharing can be used to combat the spread of such theories (Kaya, 2022, p. 290).

Tuzcu and Şahin (2023) addressed ambivalence and opposition to the COVID-19 vaccine in Türkiye, with a particular focus on conspiracy theories. The results of in-depth interviews with twenty individuals showed that conspiracy theories on social media created an alternative social reality for them rather than providing scientific knowledge and increased the individual's risk perception concerning COVID-19 vaccines. Following this theme, Gökaliiler and Alikılıç's study analysed 3,939 Turkish tweets shared with the hashtags "#aşıyahayır (#notovaccine), #aşıolmayacağım (#iwontgetvaccinated), #denekolmaTürkiye (#donotbeatestsubjecturkiye) #aşıolmakistemiyorum(#idonotwanttogetvaccinated) and using a purposive sampling method. The tweets were categorised under four main headings: "scientific content; miscellaneous content; content related to conspiracy theories; and general topics" (Gökaliiler & Alikılıç, 2024, p. 72). Within this main heading, conspiracy theories were the most shared (37.7% of tweets). Conspiracy theories were grouped under subheadings such as issues related to the "World Health Organisation, big pharmaceutical companies, Bill Gates and globalists, developed countries, genetic code modification and mRNA". The study suggested that conspiracy theories are prominent in social media and that such theories aid the spread of vaccine ambivalence (Gökaliiler & Alikılıç, 2024, p. 78).

Key Actors and Messages in the Covid-19

Vaccine Debates

There are four studies under this theme, all of which were conducted on the X platform. The article by Durmaz and Hengirmen (2022) includes a social network analysis using social network data from X that aims to "identify community interactions related to vaccines and identify key influencers before and after the pandemic". The researchers collected two datasets related to vaccination

between 1 June 2019 and 11 March 2020 and between 11 March 2020 and 1 January 2021 with the keyword "vaccine". They identified 558 hashtags. While "the number of pro- and anti-vaccination users on X was low before COVID-19", there was a significant "increase after COVID-19". According to the results of the study, "the user accounts that received the most interactions (in terms of degree) on the network before and after COVID-19" were "various newspapers, media members such as writers, TV presenters, and government organisations and authors who wrote books about the side effects of vaccines". After COVID-19, the Minister of Health in Türkiye "received the highest level of interaction within the network" (Durmaz & Hengirmen, 2022, p. 9) although "the COVID-19 pandemic did not affect the rate of interaction between users". The researchers regarded this as an indicator of a one-way flow of information between influencers and network members (Durmaz and Hengirmen, 2022, p. 10). The study also highlighted that while the number of anti-vaccine users increased by 1,400% in the period after COVID-19, the number of pro-vaccine users increased by only 60%. According to the authors, this demonstrated that conspiracy theories, information pollution and rumours spread on social media in the vaccine debates that started with COVID-19 increased anti-vaccination attitudes and made it visible on social media (Durmaz & Hengirmen, 2022, p. 10). The specific recommendations developed by the researchers to combat vaccine hesitancy are also important. The authors suggest that public health experts, institutions and organisations using their own accounts to advise against misinformation on social media would be more effective in countering anti-vaccine rhetoric. They also highlighted the importance of encouraging public figures, scientists, officials and doctors to actively share their experiences through traditional and social media (Durmaz & Hengirmen, 2022, p. 11).

Özdora Aksak et al., (2023, p. 1565) pointed out in their study that during the COVID-19 pandemic the Turkish Ministry of Health preferred to provide up-to-date and relevant information at the national level on prevention and protection methods that

citizens could easily internalise, such as hand washing and mask use. According to the findings of this study, in which X, Facebook and Instagram channels were analysed, X constituted the main social channel of online crisis communication by the Ministry of Health (Özdora Aksak et al., 2023, p. 1558). It was highlighted that the former Minister of Health Fahrettin Koca represented the online face of crisis communication during the COVID-19 period and that during the fight against COVID-19 he communicated with the public daily and openly through online and traditional media (Özdora Aksak et al., 2023, p. 1565). Another study related to this topic (Çakır, 2022) analysed anti-vaccine X accounts opposing COVID-19 measures using actor network theory (which argues that non-human actors can also participate in the propaganda process). This study revealed that anti-vaccination against COVID-19 was initiated horizontally among X users, that anti-vaccination propaganda was produced and disseminated from different sources rather than a single centre and that different anti-vaccination propaganda messages were disseminated by selecting different hashtags containing disinformation and misinformation during the COVID-19 period (Çakır, 2022, p. 204). Yıldız's (2023) study, which used critical discourse analysis to look at masking and anti-vaccine tweets containing extreme hatred, found that social networks were effective in spreading anti-vaccinationist arguments.

Sentiments towards COVID-19 Vaccines

There are four studies on this topic, all of which analysed anti-vaccine tweets shared on X. The studies revealed that the dominant theme of the posts on X concerning vaccines in the context of Türkiye was anti-vaccination (Yılmaz & Bilen, 2022). Yılmaz and Bilen (2022) suggest that anti-vaccine accounts preferred X for searching, sharing and raising awareness of unofficial information about early COVID-19 vaccination. Although many public institutions used "social media to inform and communicate with the public" about the COVID-19 vaccine in Türkiye, "the rapidly changing nature of the pandemic and the spread of misinformation about vaccines on social media had had a significant

impact on public perception" (Yılmaz and Bilen, 2022). It is argued that the majority of the content shared on social media about the COVID-19 vaccine in Türkiye evoked negative emotions (Çılgın et al., 2023). However, it can also be said that the Ministry of Health and professional health organisations in Türkiye effectively used social media to combat anti-vaccine messages circulating on social media about COVID-19 vaccines and negative sentiments against vaccination. In this context, the Turkish Ministry of Health and professional health organisations, which effectively use social media to reach a wider audience, provide accurate information about vaccination, explain it in plain language and present scientific studies that aim to eliminate confusion in society (Mermer & Özseser, 2022, p. 7). Following a similar theme, a large-scale sentiment analysis was conducted by Aygün et al. (2022) on the attitudes of X users towards vaccines and vaccine types during the COVID-19 period in the USA, UK, Canada, Türkiye, France, Germany, Spain and Italy. Two datasets, English and Turkish, were created with "928,402 different vaccine-oriented tweets collected by country". Six different COVID-19 vaccines "with the highest frequency among the datasets were selected and sentiment analysis" was conducted using Twitter content about these vaccines. This study is important as it constitutes one of the first attempts to understand people's views on vaccination and vaccine types.

Conclusion

Considering that the relationship between social media and anti-vaccination and vaccine hesitancy is a frequently discussed topic in both international and Turkish literature, this systematic review shows that anti-vaccination individuals, groups or movements in Türkiye frequently use social media and try to discredit scientific knowledge through these channels, thus preparing the ground for reducing trust in health professionals and public authorities. The anti-vaccine accounts that exist on various social networks, especially X, and the content and claims (especially conspiracy theories) that these accounts produce, undermine the scientific facts about vaccination. They can also cause a serious public health problem with

the potential to negatively affect the attitudes of individuals who are hesitant or ambivalent about vaccination. When we look at the characteristics of anti-vaccine accounts on social media, we see that most of them can be described as trolls and that these troll accounts spread anti-vaccine messages through the tweets they share and the hashtags they post. It can be argued that the anti-vaccine content produced by anti-vaccine groups and movements about coronavirus vaccines, especially during the COVID-19 pandemic and disseminated to large masses through social networks, negatively influenced individuals' feelings and attitudes towards the pandemic and vaccination.

This study that has systematically analysed the expression of anti-vaccination and vaccine hesitancy on social media in Türkiye concludes with five main recommendations:

There is a need for more interdisciplinary work to combat anti-vaccination because knowledge from different fields should provide better ways to approach the anti-vaccination problem along with methodological richness so that proposals for solutions can be enriched from different perspectives.

Considering that social media is an important source of information in vaccine resistance and hesitancy, it can be said that both health literacy and social media management should be used symbiotically in the official social media management of various institutions and actors, especially public institutions and organisations active in the field of health.

Studies linking anti-vaccination and social media are mainly based on the analysis of shared content and provide important data in this context. However, from a communicative point of view, studying how anti-vaccination messages, content and posts are received by different publics will allow us to answer the question as to what makes anti-vaccination messages effective. It can also contribute to the development of effective and efficient strategies to combat anti-vaccination by allowing us to understand which interpretation

processes work best to counter the influence of anti-vaccination posts. By shifting the focus from anti-vaccine messages to vaccine opponents, different levels of knowledge, interests and motivations underlying attitudes towards vaccine hesitancy, vaccine opposition and vaccine refusal can be assessed.

Studies should not treat individuals with anti-vaccine attitudes as a single homogeneous group but rather need to reveal the different characteristics of these groups. Understanding the different motivations and expectations of different target groups can help to diversify communication strategies to counter anti-vaccine messages.

Artificial intelligence-powered digital warning screens could be added to protect users from anti-vaccine content, fake news and misinformation that are spread across social media channels so that misinformation can be prevented.

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Genişletilmiş Özet

Aşılar, bulaşıcı hastalıkların önlenmesinde en etkili halk sağlığı önlemlerinden biri olmaya devam etmektedir. Ancak aşı tereddüdü ve aşı karşıtlığı hareketleri, özellikle sosyal medya platformlarında yaygınlaşarak halk sağlığını tehdit eden önemli

bir sorun haline dönüşmüştür. Türkiye’de bu tür eğilimler, 2015 yılı sonrasında hukuki gelişmelerin yanı sıra dijital medyanın etkisiyle de daha görünür hale gelmiştir. Bu makale, 2015–2024 yılları arasında Türkiye bağlamında aşı tereddüdü, aşı karşıtlığı ve sosyal medya arasındaki ilişkiyi inceleyen akademik araştırmaları sistematik olarak analiz etmektedir. Çalışmanın amacı, dijital ortamda şekillenen aşı karşıtı söylemleri, aktörleri, stratejileri ve platformları yapılmış olan çalışmalar üzerinden ortaya koymak ve halk sağlığı açısından etkili iletişim temelli öneriler geliştirmektir. Çalışmada, DergiPark, Web of Science, Scopus ve YÖK Tez Merkezi’nde belirlenen 40 akademik makale ve 3 lisansüstü tez olmak üzere toplam 43 özgün çalışma analiz edilmiştir.

Çalışmaların seçiminde Türkiye’de aşı karşıtlığı veya aşı tereddüdü ile sosyal medya ilişkisini içermesi ve ampirik veri sunması esas alınmıştır. Makaleye konu edinilen çalışmalarda en sık kullanılan yöntem içerik analizi olmuştur. Kullanılan diğer yöntemler arasında anketler, duyu analizleri ve nitel görüşmeler yer almaktadır. İncelenen çalışmaların çoğu iletişim ve sağlık bilimleri alanlarında çalışan araştırmacılarca yapılmıştır. En çok analiz edilen sosyal medya platformları ise X (eski adıyla Twitter), Instagram, Facebook, YouTube, Ekşi Sözlük ve Teyit.org’dur. Makale kapsamında analiz edilen çalışmaların bulguları altı ana tema etrafında toplanmıştır. Bu temaların ilki aşı karşıtı hesapların özelliklerine ilişkindir. Araştırmaya dâhil edilen çalışmalar bu hesapların genellikle tıbbi bir uzmanlığı olmayan kişiler tarafından yönetildiğini ortaya koymuştur. Bu hesaplar çoğunlukla doğrulanmamış kişisel deneyimleri paylaşmakta ve duygusal anlatılarla etkileşim yaratmaya çalışmaktadır. Bazı çalışmalar, bu yüksek etkileşimli hesapları “troll” hesaplar olarak nitelendirmiş ve kullandıkları yoğun etiket stratejileriyle sosyal medyada geniş kitlelere ulaşmaya çalıştıklarını göstermiştir.

Makalenin ikinci teması, aşı karşıtlığı ve sosyal medya arasındaki ilişki üzerine yapılan çalışmalara odaklanmaktadır. Bu tema altında incelenen on bir çalışmada, sosyal medyayı ana bilgi kaynağı olarak

kullanan bireylerin aşuya karşı daha fazla tereddüt ve güvensizlik sergiledikleri tespit edilmiştir. Özellikle gençler ve üniversite öğrencileri yanlış bilgiye maruz kalmaya açık gruplar olarak öne çıkmaktadır. Bununla birlikte, bazı bireylerin aşı karşıtı içeriklere inanmadığı da görülmüştür. Erişilen doğru ve güvenilir bilgilerin, aşuya yönelik olumlu tutumları artırdığı gözlemlenmiştir. Bu bulgular, sosyal medyanın hem risk hem de fırsat içeren bir bilgi ortamı sunduğunu ortaya koymaktadır. Makalenin belirlediği üçüncü tema sosyal medyada yayılan komplo teorilerine odaklanan çalışmalara ilişkindir. Analiz edilen dört çalışmada, aşı karşıtı söylemlerin küresel güçler tarafından yönetilen planlar, genetik müdahaleler, ekonomik çıkarlar gibi komplolarla ilişkilendirildiği görülmüştür. Bu tür teoriler özellikle COVID-19 pandemisi sırasında daha da yaygınlaşmış ve #aşıdeğilsenkatil gibi etiketlerle dolaşıma sokulmuştur. Komplo teorileri yalnızca yanlış bilgiyi yaymakla kalmayıp, alternatif bir “gerçeklik” sunarak bilimsel bilgiye duyulan güveni de zayıflatmaktadır.

Araştırmanın dördüncü teması, aşı karşıtı içeriklerin ve bu içeriklerde öne sürülen iddiaların ele alındığı çalışmaları kapsamaktadır. Analiz edilen on yedi çalışmada, aşıların zararlı, etkisiz veya gereksiz olduğu yönündeki söylemler incelenmiştir. Aşı karşıtı iddialar içerisinde aşıların ölüme veya kısırlığa yol açtığı, insanlara çipyerleştirdiği, insanlar üzerinde zombileştirme benzeri etkiler yaptığı ve küresel sermaye tarafından yönlendirildiği gibi iddialar yer almaktadır. Çalışmalar bu içeriklerin yayılımında bot hesaplar ve organize troll ağlarının etkili olduğu göstermektedir. Ayrıca siyasi, dini ve alternatif tıp söylemleri de sıklıkla bu içeriklerde yer almaktadır. Beşinci tema, pandemi döneminde aşı tartışmalarında öne çıkan kişi ve söylemleri ele alan çalışmaları kapsamaktadır. Yapılan sosyal ağ analizleri, Sağlık Bakanı ve medya figürleri gibi bazı kişilerin bilgi akışında merkezi aktörler olduğunu göstermiştir. Ancak COVID-19 sonrası dönemde, aşı karşıtı kullanıcı sayısındaki artış, aşı yanlısı kullanıcı artışını fazlasıyla aşmıştır. Bu durum, aşı karşıtı grupların sosyal medyada daha etkili olduklarını ve söylemlerini daha hızlı yayabildiklerini göstermektedir. Bu nedenle, kamu kurumlarının ve

sağlık otoritelerinin daha stratejik ve etkileşimli bir iletişim anlayışına yönelmesi önem taşımaktadır. Son tema çerçevesinde, COVID-19 aşılarına yönelik duygusal yaklaşımlar incelenmiştir. X platformunda yapılan duygu analizlerinde aşılarla ilişkin olarak korku, öfke ve şüphe gibi olumsuz duyguların öne çıktığı görülmektedir. Resmi kurumların doğru bilgi verme çabalarına rağmen, pandeminin hızla değişen doğası ve sosyal medyadaki bilgi kirliliği halkın algısını olumsuz etkilemiştir. Bununla birlikte, Sağlık Bakanlığı ve meslek örgütleri bazı dönemlerde etkili dijital kampanyalarla bu olumsuzlukları azaltmaya çalışmıştır.

Bu sistematik derleme, Türkiye’de sosyal medyanın aşı karşıtı söylemleri yayma konusunda merkezi bir rol oynadığını ve bunun bilimsel bilgiye ve sağlık otoritelerine olan güveni zedelediğini ortaya koymaktadır. Yapılan araştırmalar aşı karşıtlığı ve aşı tereddüdüyle mücadelede iletişim, sağlık bilimleri, sosyoloji ve bilgi teknolojileri gibi farklı disiplinlerin bilgi birikiminden faydalanılması gerektiğini göstermektedir. Kamu kurumlarının, bireylerin çevrim içi sağlık bilgilerini eleştirel biçimde değerlendirme yetkinliklerini geliştirmeye yönelik dijital sağlık okuryazarlığı programları hayata geçirmesi büyük önem taşımaktadır. Bunun yanında konuya ilişkin gelecekte yapılacak araştırmalarda, aşı karşıtı mesajların toplumun farklı kesimleri tarafından nasıl alındığı ve yorumlandığı incelenmeli ve bu sayede bu mesajların hangi koşullarda etkili olduğu anlaşılmasına çalışılmalıdır. Aşı tereddütü taşıyan ve aşı karşıtı olan bireylerin tek tip bir grup olmadığı göz önünde bulundurularak, farklı motivasyonlara ve inançlara hitap eden iletişim stratejilerinin geliştirilmesi de hayatidir. Ayrıca, sosyal medya platformları da yanlış bilgi içeren içerikleri tespit ederek kullanıcıları güvenilir kaynaklara yönlendirecek otomatik uyarı sistemleri ve içerik denetim araçları geliştirmelidir. Tüm bu bulgular, aşı karşıtlığıyla etkili mücadele stratejilerinin, yalnızca doğru bilginin üretilmesiyle değil, bu bilginin hangi mecralarda, kimlere ve nasıl ulaştırılacağına dair iletişimsel bir perspektifle şekillendirilmesi gerektiğini ortaya koymaktadır.

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