UKR Journal of Medicine and Medical Research (UKRJMMR)
Homepage: https://ukrpublisher.com/ukrjmmr/
Email: submit.ukrpublisher@gmail.com
Volume 1, Issue 1, May-June 2025 ISSN: XXXX-XXXX (Online)

A Current Issue: Vaccine Hesitancy

Huseyin Aldemir[1], Serpil Demirag[2]

[1,2] *Adnan Menderes University School of Medicine, Department of Family Medicine, Aydin,*
[1] MD, Resident (Orcid: 0009-0008-7433-9441) , [2] MD, PhD, Professor (Orcid: 0000-0001-8353-2843)
(This article contains a part of author HA's thesis)

ORGINAL ARTICLE

***Corresponding Author:** Serpil Demirag

DOI:

Abstract

Aim: Vaccination is one of the most effective methods for protecting public health by preventing infectious diseases and reducing mortality rates. Despite extensive vaccination programs, vaccine hesitancy has become an increasingly significant issue in many societies, undermining herd immunity and threatening disease control efforts. This study aimed to investigate the presence of vaccine opposition and the associated factors among adults applying to a Family Medicine outpatient clinic.

Method: This analytical and cross-sectional study was carried out between March 1, 2024, and August 31, 2024, with volunteer participants aged 18 and older who attended to the Family Medicine Clinics at Aydın Adnan Menderes University School of Medicine. Data were obtained via a 23-item questionnaire covering sociodemographic features, medical and vaccination histories, internet and social media usage, as well as the 21-item Vaccine Hesitancy Scale (VHS). Statistical analyses were performed using the SPSS version 25.0 software package.

Results: The study was completed with 318 participants who fulfilled the inclusion criteria. The participants had a mean age of 37.2±15.6 years (ranging from 18 to 82 years), and the average total score on the Vaccine Hesitancy Scale was 42.9±15.2. Vaccine hesitancy scores were significantly higher among individuals residing in rural areas, those with lower educational attainment, non-healthcare workers, parents, older participants, those receiving vaccine-related information from television, newspapers or magazines and those influenced by information obtained via social media ($p<0.05$).

Conclusion: The results highlight the necessity for targeted public health interventions, the reinforcement of scientific communication, and the strategic involvement of healthcare professionals in combating misinformation. Addressing these factors is crucial for enhancing public trust in vaccines and strengthening community immunity.

Keywords: vaccination, vaccine delay, vaccine hesitancy, vaccine refusal

INTRODUCTION

Vaccines are considered one of the most effective methods for controlling infectious diseases and protecting public health. Historically the eradication of smallpox, the prevention of major outbreaks such as polio and the significant reduction in fatal diseases like neonatal tetanus demonstrate the contribution of vaccination practices to community health (MacDonald, 2015; Wolfe & Sharp, 2002). Vaccination not only provides individual immunity but also helps break the chain of transmission and prevents the spread of infectious diseases within the community. However, there is a growing suspicion toward vaccination. This issue has led to the emergence of concepts such as vaccine hesitancy, vaccine delay and vaccine refusal (MacDonald, 2015).

Vaccine hesitancy is defined as the delay or refusal of one or more vaccines by an individual, while vaccine opposition refers to a systematic distrust and negative attitude toward vaccines (Dubé et al., 2013). These attitudes pose a threat not only to individual health but also to herd immunity. The World Health Organization listed vaccine hesitancy among the top ten threats to global health in 2019 (Benzian, Beltrán-Aguilar, & Niederman, 2023).

In Turkiye, high vaccine coverage rates have been achieved through the successful implementation of the Expanded Immunization Program (EIP) (Benzian et al., 2023). However in recent years, especially due to misinformation spread via social media, combined with religious and cultural beliefs and discourses on individual rights and freedoms, public confidence in vaccines has been undermined. Indeed according to the Ministry of Health of the Republic of Turkiye, while there were only 183 cases of vaccine refusal in 2011, this number rose to over 23,000 by 2018 (Bebek & Protokolleri, 2020). This rising trend has the potential to reach levels that could jeopardize herd immunity.

The reasons for anti-vaccine opposition are multidimensional. These include the individual's trust in the healthcare system, level of education, religious and cultural beliefs, socioeconomic status, sources of information, and past negative experiences with vaccines (Kalnin et al., 2017). Especially with the widespread use of the internet and social media, access to numerous scientifically unfounded claims has become easier, increasing the public's exposure to misinformation (Kata, 2012).

This study aims to measure the levels of vaccine opposition among individuals over the age of 18 who applied to the outpatient family medicine clinics in our university hospital and to identify the sociodemographic, behavioral, and cognitive factors that influence vaccine opposition. The local data obtained from this study is expected to contribute to the development of public health strategies that can be implemented on a national scale.

MATERIALS AND METHOD

This study was designed as a cross-sectional and analytical research conducted in a Family Medicine outpatient clinic. It aimed to identify the level of vaccine opposition and the factors influencing vaccine hesitancy among adults. Participants included adults over the age of 18 who voluntarily applied to Family Medicine units between March 1, 2024, and August 31, 2024 and agreed to participate after being informed about the nature and purpose of the study.

The data were obtained via surveys and scales. These consisted of a structured questionnaire and the Vaccine Hesitancy Scale (VHS). The questionnaire consisting of 23 items, was designed to gather information on sociodemographic characteristics (such as age, gender, educational level, occupation, and residence), medical history, vaccination history, internet and social media use, and sources of health information. The VHS, a validated 21-item measurement tool that assesses attitudes towards vaccination across multiple dimensions, including trust, perceived necessity, and concerns regarding vaccine safety. The scale was a 5-point Likert-type instrument consisting of 21 items, divided into four subdimensions: Benefit and Protective Value of Vaccines (A), Vaccine Opposition (B), Solutions for Not Being Vaccinated (C), and Justification of Vaccine Hesitancy (D). Each item is scored from 1 (strongly disagree) to 5 (strongly agree).

The scale used in this study lacks a predetermined cut-off point and higher scores indicate greater vaccine opposition and hesitancy, it can be interpreted that participants demonstrated a moderate level of vaccine opposition overall (Kilincarslan, Sarigul, Toraman, & Sahin, 2020).

The collected data were analyzed using the SPSS 25.0 statistical software. Descriptive statistics, including mean, standard deviation, and minimum and

maximum values, were calculated. Independent Samples t-test and Mann-Whitney U test were performed to assess whether there were significant differences between VHS total scores and participants' demographic and various other variables. In this study, a p-value of less than 0.05 was considered statistically significant.

RESULTS

The participants' ages ranged from 18 to 82 years, with a mean age of 37.3±15.7 years. Approximately 51.3% (n=163) of the participants were younger than 35 years, while 48.7% (n=155) were 35 years or older. Females constituted 61.0% (n=194) of the sample, and males accounted for 39.0% (n=124). Regarding marital status, 53.8% (n=171) of the participants were single, and 46.2% (n=147) were married. In terms of education, 51.6% (n=164) had completed high school or attained a lower level of education, while 48.4% (n=154) had a university degree or higher.

14.1% (n=45) of the participants were employed in healthcare fields, whereas 85.2% (n=271) worked in non-healthcare sectors. Regarding income, 63.5% (n=202) reported earning US 1,300 dollars or less, and 36.5% (n=116) reported earning more than 1,300 dollars. In terms of perceived income status, 50.3% (n=160) stated that their income was less than their expenses. Additionally, 47.2% (n=150) of the participants had children, with an average number of 2.0±1.1 children. The majority of participants (79.2%, n=252) resided in urban areas, while 20.8% (n=66) lived in rural areas.

Table 1 summarizes the comparisons of vaccine opposition scores according to different sociodemographic variables. Participants aged 35 years and older had significantly higher vaccine opposition scores compared to those younger than 35 years (**p<0.001**). No significant difference was observed between males and females regarding overall vaccine opposition scores.

Marital status was significantly associated with vaccine opposition, with married individuals displaying higher opposition scores compared to singles (**p=0.008**). Participants who had children also exhibited significantly higher vaccine opposition scores compared to those without children (**p=0.001**).

Educational degree influenced vaccine opposition levels; participants with a high school education or less had significantly higher scores than those with a university degree or higher (**p=0.039**). Occupational differences were also significant, with individuals employed outside the healthcare sector reporting higher vaccine opposition scores than healthcare workers (**p<0.001**). Participants earning 1,300 dollars or less exhibited significantly higher vaccine opposition scores compared to those earning more than 1,300 dollars (**p=0.001**). Additionally, individuals living in rural areas showed significantly greater vaccine opposition than those living in urban areas (**p=0.030**).

Table 1. Mean Scores of VHS According to Sociodemographic Characteristics

Variables		**n**	**VHS (Mean±SD)**	**p**
Age	<35 years	163	39,0±13,4	**<0,001**
	≥35 years	155	47,0±15,9	
Marital Status	Single	171	40,8±14,3	**0,008**
	Married	147	45,3±15,9	
Education Level	High school or less	164	44,6±14,6	**0,039**
	University or higher	154	41,1±15,6	
Occupation	Healthcare workers	45	34,4±13,7	**<0,001**
	Others	273	44,3±15,0	
	≤1,300 Dollars	202	45,1±14,8	

Income Levels	>1,300 Dollars	116	39,1±15,2	**0,001**
Children Status	No	168	40,3±13,8	**0,001**
	Yes	150	45,8±16,2	
Living Area	Rural	66	46,5±13,6	**0,030**
	Urban	252	42,0±15,5	

Table 2 illustrates the relationship between sources of vaccine information and vaccine opposition scores. Participants who received vaccine information from healthcare professionals had lower vaccine opposition scores compared to those who did not (**p<0.001**). On the contrary, individuals who obtained vaccine information from newspapers, magazines or television exhibited significantly higher vaccine opposition scores (**p<0.05**).

However, there was no significance in vaccine opposition scores between participants who used the internet as a source of vaccine information and those who did not.

Table 2. Mean Scores of Vaccine Opposition According to Sources of Vaccine Information

Vaccine Information Source		**n**	**Total Vaccine Opposition (Mean±SD)**	**p**
Healthcare Professionals	Yes	271	40.7±13.6	**<0,001**
	No	47	55.9±17.4	
Newspapers/Magazines	Yes	16	54.7±22.0	**0,038**
	No	302	42.3±14.5	
Television	Yes	112	47.8±15.9	**<0,001**
	No	206	40.3±14.1	

DISCUSSION

In this study our participants' mean scores may be interpreted as reflective of a moderate degree of vaccine hesitancy within the studied population. Notably, individuals with lower educational attainment, residents of rural areas, parents, those employed outside the healthcare sector, and individuals obtaining vaccine-related information from sources such as newspapers and magazines exhibited significantly higher vaccine opposition scores.

Age was found to be an important determinant; participants aged 35 years and older had significantly higher vaccine opposition scores compared to younger individuals. Although previous researches often report that younger populations express greater vaccine hesitancy (Chen et al., 2020; Walton, Orenstein, & Pickering, 2015), our findings differ. Studies by Gokcen indicated a negative correlation between age and vaccine opposition (Gokcen, 2022), and Gust et al. observed that older adults better recognized the benefits of vaccination (Gust, Darling, Kennedy, & Schwartz, 2008). The discrepancy between our results and the existing literature may be due to the relatively high concentration of healthcare professionals within the younger age group in our sample.

There was no significance between males and females regarding overall vaccine opposition scores. This finding aligns with prior research conducted among patients attending family health centers in

Sırnak, where gender was not a significant factor (Copur, 2022). However, the literature remains inconsistent, with some studies suggesting that men demonstrate lower vaccine opposition compared to women (Coskuntuncel, 2022), while others highlight women's heightened concerns regarding vaccination safety (Gust et al., 2008).

Educational level emerged as a critical factor influencing attitudes towards vaccination. Consistent with previous findings, lower educational attainment has been linked to higher levels of vaccine hesitancy and opposition, likely due to increased susceptibility to misinformation (Ozceylan, Toprak, & Esen, 2020; Smith, 2017). Larson et al. emphasized that individuals with lower education are more vulnerable to vaccine misinformation, contributing to greater vaccine opposition (Larson et al., 2015).

Married participants displayed higher opposition levels compared to singles. This result is consistent with findings by Kara, who reported a greater tendency toward vaccine hesitancy among married individuals (Kosmaz Kara, 2021). In contrast, a study from Brazil found no significant association between marital status and vaccine hesitancy (Brown et al., 2018). The elevated opposition among married individuals in our study may stem from heightened concerns about family health and potential vaccine side effects.

Having children was associated with greater vaccine opposition, although the number of children did not further impact the level of opposition. This aligns with the findings of Ozceylan et al., who suggested that parenthood increases vulnerability to misinformation regarding vaccines (Ozceylan et al., 2020). Parents' heightened concern for their children's health may intensify anxiety around potential vaccination risks.

Occupational background showed a significant association with vaccine opposition. Individuals employed outside the healthcare sector exhibited higher vaccine opposition compared to healthcare workers. Similar trends have been observed in other studies, such as in one of them where academic personnel and medical interns displayed lower vaccine hesitancy compared to administrative staff (Coskuntuncel, 2022). This can likely be attributed to greater access to scientific information and vaccination experience among healthcare professionals.

Participants with lower or middle incomes demonstrated higher vaccine opposition than those with higher incomes. While some studies suggest that family income does not significantly influence vaccination status (Altun, 2008), others like Uzum et al.'s study, indicate that lower income correlates with reduced vaccine awareness (Uzum, Eliacik, Orsdemir, & Oncel, 2019). Our findings may be explained by the fact that lower-income individuals often have lower education levels, increasing their vulnerability to misinformation.

Regarding information sources, participants who obtained vaccine information from healthcare professionals exhibited significantly lower vaccine opposition. This finding echoes the study by Sezen and Gol, which showed that parents who relied on healthcare professionals for vaccine information held more positive attitudes toward vaccination (Cay & Gol, 2023). Strengthening public health education via accurate communication by healthcare workers and media outlets remains crucial for safeguarding community health.

Participants who relied on the internet for vaccine information did not exhibit a statistically significant difference in vaccine opposition compared to those who did not. Previous research has shown that approximately 43% of vaccine-related websites on the internet promote anti-vaccination content, potentially exposing users to misinformation (Davies, Chapman, & Leask, 2002). Other studies have highlighted that mass media outlets, including television and internet sources, often present exaggerated or misleading vaccine information (Kata, 2010).

Finally, participants who obtained vaccine information via newspapers, magazines, and television demonstrated significantly higher vaccine opposition compared to those who did not use these sources. This supports findings from a study conducted in Antalya, where many participants reported encountering negative vaccine information primarily via television (Turkay, Ay, & Aktekin, 2017).

CONCLUSION

In conclusion, vaccine opposition should be regarded as a multidimensional issue that poses a threat to public health. Addressing this problem requires the integration of education, communication and policy development efforts targeted at individual attitudes on various levels. The findings of this study provide valuable insight for implementing targeted interventions at the national level.

These results not only confirm the multifactorial nature of vaccine opposition but also highlight the relevance of primary care settings in identifying and addressing vaccine-related concerns. This study contributes meaningful data to the field of preventive medicine and highlights the need for targeted public health strategies to strengthen vaccine acceptance in diverse populations.

FINANCIAL SUPPORT AND SPONSORSHIP

There is no sponsor in this study (design, methods, subject recruitment, data collection, or analysis and preparation of the paper).

CONFLICTS OF INTEREST

No conflict of interest was declared by the authors.

References

1. Altun, Safak. (2008). 6-14 yaş arası çocuklarda aşılanma oranı ve ailelerin özel aşılarla ilgili bilgi düzeyi. *Bakırköy Dr. Sadi Konuk Eğitim ve Araştırma Hastanesi, Uzmanlık Tezi, İstanbul*.
2. Bebek, Çocuk, & Protokolleri, Ergen İzlem. (2020). TC Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü; 2018. In.
3. Benzian, Habib, Beltrán-Aguilar, Eugenio, & Niederman, Richard. (2023). Global health threats are also oral health threats. *Journal of the American Dental Association (1939), 154*(5), 367.
4. Brown, Amy Louise, Sperandio, Marcelo, Turssi, Cecília P, Leite, Rodrigo, Berton, Victor Ferro, Succi, Regina M, . . . Napimoga, Marcelo Henrique. (2018). Vaccine confidence and hesitancy in Brazil. *Cadernos de saude publica, 34*, e00011618.
5. Cay, Betül, & Gol, İlknur. (2023). Ebeveynlerin Çocukluk Dönemi Aşıları İle İlgili Bilgi, Tutum Ve Davranışlarının İncelenmesi. *Avrasya Sağlık Bilimleri Dergisi, 6*(3), 45-54.
6. Chen, Qi, Zhao, Hui, Yao, Xingmei, Lin, Zhijie, Li, Juan, Lin, Bizhen, . . . Wu, Ting. (2020). Comparing immunogenicity of the Escherichia coli-produced bivalent human papillomavirus vaccine in females of different ages. *Vaccine, 38*(39), 6096-6102.
7. Copur, Ebru ÖZTÜRK. (2022). Aile Sağlığı Merkezlerine Başvuran Ebeveynlerin Aşı Tereddütü ve Aşı Karşıtlık Düzeylerinin İncelenmesi. *Yaşam Boyu Hemşirelik Dergisi, 3*(3), 39-54.
8. Coskuntuncel, C. (2022). Üniversite Hastanesi Çalışanlarının Aşı Davranışları ve Aşı Karşıtlığı Düzeyi
9. Uzmanlık Tezi. *[Uzmanlık Tezi]. [Çanakkale]: Çanakkale Onsekiz Mart Üniversitesi Tıp Fakültesi*.
10. Davies, Paul, Chapman, Simon, & Leask, Julie. (2002). Antivaccination activists on the world wide web. *Archives of disease in childhood, 87*(1), 22-25.
11. Dubé, Eve, Laberge, Caroline, Guay, Maryse, Bramadat, Paul, Roy, Réal, & Bettinger, Julie A. (2013). Vaccine hesitancy: an overview. *Human vaccines & immunotherapeutics, 9*(8), 1763-1773.
12. Gokcen, Gozde Betül. (2022). Edirne il merkezinde aile sağlığı merkezlerine başvuran 18-65 yaş arası bireylerde sağlık okuryazarlığının aşı karşıtlığına etkisi.

13. Gust, Deborah A, Darling, Natalie, Kennedy, Allison, & Schwartz, Ben. (2008). Parents with doubts about vaccines: which vaccines and reasons why. *Pediatrics, 122*(4), 718-725.
14. Kalnin, Kirill, Chivukula, Sudha, Tibbitts, Timothy, Yan, Yanhua, Stegalkina, Svetlana, Shen, Lihua, . . . Anderson, Stephen F. (2017). Incorporation of RG1 epitope concatemers into a self-adjuvanting Flagellin-L2 vaccine broaden durable protection against cutaneous challenge with diverse human papillomavirus genotypes. *Vaccine, 35*(37), 4942-4951.
15. Kata, Anna. (2010). A postmodern Pandora's box: anti-vaccination misinformation on the Internet. *Vaccine, 28*(7), 1709-1716.
16. Kata, Anna. (2012). Anti-vaccine activists, Web 2.0, and the postmodern paradigm–An overview of tactics and tropes used online by the anti-vaccination movement. *Vaccine, 30*(25), 3778-3789.
17. Kilincarslan, Mehmet Goktug, Sarigul, Banu, Toraman, Cetin, & Sahin, Erkan Melih. (2020). Development of valid and reliable scale of vaccine hesitancy in Turkish language. *Konuralp Medical Journal, 12*(3), 420-429.
18. Kosmaz Kara, T. (2021). *Erişkin Bireylerde Aşı Reddinin, Çocukluk ve Erişkin Aşılarıyla İlgili Bilgi Düzeyinin, Tutum ve Davranışların Değerlendirilmesi.* (Tıpta Uzmanlık Tezi)
19. Larson, Heidi J, Jarrett, Caitlin, Schulz, William S, Chaudhuri, Mohuya, Zhou, Yuqing, Dube, Eve, . . . Wilson, Rose. (2015). Measuring vaccine hesitancy: the development of a survey tool. *Vaccine, 33*(34), 4165-4175.
20. MacDonald, Noni E. (2015). Vaccine hesitancy: Definition, scope and determinants. *Vaccine, 33*(34), 4161-4164.
21. Ozceylan, Gokmen, Toprak, Dilek, & Esen, Elif Serap. (2020). Vaccine rejection and hesitation in Turkey. *Human vaccines & immunotherapeutics, 16*(5), 1034-1039.
22. Smith, Tara C. (2017). *Vaccine rejection and hesitancy: a review and call to action.* Paper presented at the Open forum infectious diseases.
23. Turkay, Mehtap, Ay, Emine Gulcin, & Aktekin, Mehmet Rifki. (2017). Antalya ilinde seçilmiş bir grupta aşı karşıtı olma durumu. *Akdeniz Tıp Dergisi, 3*(2), 107-112.
24. Uzum, Ozlem, Eliacik, Kayi, Orsdemir, Hacer Hortu, & Oncel, Eda Karadag. (2019). Ebeveynlerin aşı yaklaşımlarını etkileyen faktörler: Bir eğitim araştırma hastanesine ilişkin değerlendirme. *Çocuk Enfeksiyon Dergisi, 13*(3), 144-149.
25. Walton, L Reed, Orenstein, Walter A, & Pickering, Larry K. (2015). The history of the United States Advisory Committee on Immunization Practices (ACIP). *Vaccine, 33*(3), 405-414.
26. Wolfe, Robert M, & Sharp, Lisa K. (2002). Anti-vaccinationists past and present. *Bmj, 325*(7361), 430-432.