SAĞLIK BİLİMLERİ ÜNİVERSİTESİ HEMŞİRELİK DERGİSİ
University of Health Sciences Journal of Nursing
Cilt / *Volume* 7 • Sayı / *Number* 1 • Nisan / *April* • 2025

Araştırma makalesi / *Research article* • **DOI: 10.48071/sbuhemsirelik.1527709**

Assessing Attitudes towards Vaccination: Demographic Influences among Parents of Preschool-Aged Children

Ebeveynlerin Aşı Tutumlarının İncelenmesi: Okul Öncesi Çağdaki Çocukların Ebeveynleri Arasındaki Demografik Etkiler

Mine Nur TEMUÇİN[1], **Evrim KIZILER**[2]

Yazarların ORCID numaraları / ORCID IDs of the authors:
M.N.T. 0000-0001-5470-6525; E.K. 0000-0003-3188-6396

[1]Ordu University, Faculty of Health Sciences, Department of Pediatric Nursing, Ordu, Türkiye
[2]Ankara Yıldırım Beyazıt University, Faculty of Health Sciences, Department of Pediatric Nursing, Ankara, Türkiye

Sorumlu yazar / Corresponding author: Mine Nur TEMUÇİN
E-posta: minenurcakir70@gmail.com

Geliş tarihi / Date of receipt: 03.08.2024
Kabul tarihi / Date of acceptance: 21.10.2024

Atıf / Citation: Temuçin, M.N., & Kızıler, E. (2025). Assessing attitudes towards vaccination: Demographic influences among parents of preschool-aged children. *UHS Journal of Nursing, 7*(1), 1-8. doi: 10.48071/sbuhemsirelik.1527709

ABSTRACT

Introduction: The attitudes towards vaccination of parents with preschool-aged children hold great significance for public health due to their critical impact on child health.

Aim: This study aimed to determine the attitudes towards vaccination of parents with preschool-aged children and the key demographic factors influencing these attitudes.

Method: The cross-sectional study was conducted with 223 parents reached through snowball sampling between March-May 2022. Data were collected using an Introductory Information Form and the Vaccination Attitudes Examination Scale. Analysis included Mann-Whitney U, Kruskal-Wallis H tests, and regression analyses.

Results: Parents exhibited a moderately high negative attitude towards childhood vaccinations (2.94 ± 0.99) and a high number of worries over unforeseen future effects (3.80 ± 1.31). Parents who believed that vaccines are unnecessary, lacked sufficient information, were concerned about side effects, and did not adhere to mandatory vaccinations had significantly more negative attitudes towards childhood vaccinations ($p < 0.05$). Regression analysis revealed that these factors accounted for a moderate level of explanatory power (36 %) in the vaccination attitude scores ($F = 24.7$; $p < 0.001$).

Conclusion: This study demonstrated that parents' attitudes toward childhood vaccinations are influenced by factors such as neglecting mandatory vaccines, believing they are unnecessary, lacking information, and concerns about side effects. The presence of moderately negative attitudes among parents highlighted that negative attitudes towards vaccination remain a concern. Pediatric nurses must identify parents' vaccination attitudes to maintain vaccination rates and develop programs that reduce negative perceptions. These efforts are key to improving and sustaining child health by boosting overall vaccine acceptance.

Keywords: Attitude; child health; parenting; pediatric nursing; vaccination.

ÖZ

Giriş: Okul öncesi dönemde çocuğu olan ebeveynlerin aşılama tutumları, çocuk sağlığı üzerindeki kritik etkileri nedeniyle halk sağlığı açısından büyük önem taşımaktadır.

Amaç: Bu çalışmanın amacı, okul öncesi dönemde çocuğu olan ebeveynlerin aşılama tutumlarını ve bu tutumları etkileyen temel demografik faktörleri belirlemektir.

Yöntem: Kesitsel tipteki araştırmanın örneklemini Mart-Mayıs 2022 tarihleri arasında kartopu örnekleme yöntemiyle ulaşılan 223 ebeveyn oluşturmaktadır. Araştırmanın verileri tanıtıcı bilgi formu ve Aşılama Tutumları İnceleme Ölçeği kullanılarak çevrimiçi anket yoluyla toplanmıştır. Verilerin değerlendirilmesinde Mann-Whitney U, Kruskal-Wallis H testleri ve regresyon analizleri kullanılmıştır.

Bulgular: Ebeveynler çocukluk aşılarına yönelik orta düzeyin üzerinde olumsuz tutuma (2,94 ± 0,99) ve öngörülemeyen etkilere ilişkin yüksek kaygıya (3,80 ± 1,31) sahiptir. Aşıların gerekli olmadığını, yeterli bilgilerinin olmadığını, yan etkilerinin olduğunu ve zorunlu aşıları yaptırmadıklarını belirten ebeveynler çocukluk çağı aşılarına yönelik anlamlı derecede daha olumsuz tutum sergilemiştir ($p < 0,05$). Regresyon analizine göre bu bağımsız değişkenlerin aşı tutum puanlarını orta düzeyde (%36) bir açıklayıcı güce sahip olduğu belirlenmiştir ($F = 24,7$; $p < 0,001$).

Sonuç: Bu çalışma, ebeveynlerin çocukluk dönemi aşılama tutumlarının, zorunlu aşıları aksatma, gerekli olmadığı düşüncesi, bilgi eksikliği ve yan etki endişeleri gibi faktörlerden etkilendiğini göstermektedir. Ebeveynlerin orta düzeyde olumsuz tutumlara sahip olmaları, olumsuz aşı tutumlarının hala bir sorun olduğunu vurgulamaktadır. Pediatri hemşirelerinin, aşılamayı artırmak ve çocuk sağlığını iyileştirmek için ebeveynlerin aşıya yönelik tutumlarını belirlemesi ve olumsuz algıları azaltmaya yönelik programlar geliştirmesi gerekmektedir. Bu çabalar, genel aşı kabulünü artırarak çocuk sağlığını geliştirmede kilit rol oynayacaktır.

Anahtar Kelimeler: Aşılama; çocuk sağlığı, ebeveynlik; pediatri hemşireliği; tutum.

Introduction

Vaccination is one of the most effective and cost-efficient preventive health measures and public health interventions for reducing the prevalence of life-threatening infectious diseases (Signorelli, Iannazzo & Odone, 2018). During the twentieth century, vaccination programs led to the complete eradication of smallpox worldwide, the disappearance of polio in many countries, and reductions in morbidity and mortality rates from various infectious diseases (UNICEF & WHO, 2014). To fully benefit from the effects of vaccinations, maintaining high vaccination coverage is critically important (Brewer, Chapman, Rothman, Leask & Kempe, 2017). Although vaccination rates during childhood are sufficiently high in most developed countries, it has been reported that the rate of fully vaccinated infants and children has decreased by 9% in both rural and urban areas in Türkiye (Eskiocak & Marangoz, 2021; OECD, 2023).

The concept of vaccination is not limited to children but also concerns the entire population (Nuwarda, Ramzan, Weekes & Kayser, 2022). The primary goal of vaccination services is to protect the vaccinated individual/child from disease while preventing the transmission of vaccine-preventable diseases and enhancing the level of immunity within the community to prevent the occurrence of outbreaks (Majid &Ahmad, 2020). Groups of individuals who are not fully vaccinated or who have not been vaccinated at all pose a threat to public health as they hinder the achievement of herd immunity necessary for the protection of the entire community (Larson et al., 2014).

Factors influencing childhood vaccination include the quality of health services, access, and the socio-political systems involved, as well as parents' trust in vaccines and vaccination, their attitudes toward vaccines, and their beliefs (Lane, MacDonald, Marti & Dumolard, 2017; World Health Organization, 2019). Parental distrust in vaccines contributes to relatively low population coverage and sudden declines in vaccination rates, while negative attitudes and beliefs about vaccines are associated with delayed and missed childhood vaccinations (Shapiro et al., 2021). Research has shown that vaccine refusal has become widespread among parents globally, leading to increases in the incidence of diseases such as measles. According to the World Health Organization (WHO), approximately 20 million children did not receive the measles, diphtheria, and tetanus vaccines in 2018 (WHO, 2019), and 1.5 million children died from vaccine-preventable diseases in 2017 (UNICEF, 2019). In Türkiye, the 2018 data from the Turkish National Health Survey (TNSA) revealed a decrease in the rate of fully vaccinated children from 74% to 67% (TNSA, 2018).

Identifying various reasons for the decline in vaccination rates, comparing and analyzing different factors can guide the more effective design, implementation, and monitoring of interventions aimed at improving vaccination coverage (Shapiro et al., 2021). Studies conducted in previous years to determine the reasons for the decline in vaccination rates have predominantly examined the relationship between parental attitudes and behaviors towards vaccination, and the demographic and psychosocial characteristics of parents, as well as their beliefs about health services and the government (Rozbroj, Lyons & Lucke, 2019; Dyda et al., 2020; Holroyd et al., 2021). Understanding the factors affecting childhood vaccinations and parental attitudes among various sociodemographic groups is critical, particularly for identifying groups exhibiting negative attitudes towards childhood vaccinations and tailoring vaccination strategies accordingly.

Aim

The aim of this study was to determine the attitudes of parents with preschool-aged children towards routine childhood vaccinations and the sociodemographic factors influencing these attitudes.

Research Questions

1. What are the attitudes of parents with children aged 0-6 towards childhood vaccinations?

2. Do the parents' fundamental demographic characteristics affect their attitudes towards childhood vaccinations?

3. Do the parents' characteristics related to vaccines and vaccination influence their attitudes towards childhood vaccinations?

Method

Study Design

This study had a cross-sectional design.

Study Setting

The research data were gathered online between March and May 2022 using an electronic data collection form created via Google Forms. The form was distributed through web-based applications such as WhatsApp and Telegram.

Study Population and Sample

The population of the study consisted of parents with children aged 0-6 in Ankara who agreed to participate in the study between March and May 2022. To obtain the sample for the research, a non-probability sampling method known as snowball sampling was used. In this study, using the values Power (1-β err prob) = 85%, α err prob = 0.05, population size = 260, and population proportion = 50%, it was calculated that 186 parents should be included in the research. Considering possible data losses, the sample size was increased by 20%, and a total of 223 parents were targeted to be reached. The sample size was calculated using G*Power 3.1.9.4 software. The study was completed with 223 parents (182 mothers and 41 fathers). Initially, electronic data collection forms created via Google Forms were sent to individuals known to the researchers. Subsequently, participants were asked to forward the research link containing these data collection forms to other individuals they knew. Inclusion and exclusion criteria were applied in selecting research participants. The inclusion criteria were as follows: (1) willingness to participate in the study; (2) literacy in Turkish; (3) having a child aged 0-6. The exclusion criterion was: (1) having a child with any chronic illness.

Data Collection Tools

***Introductory Information Form*:** The Introductory Information Form, prepared by the researchers based on the literature,

consisted of a total of 14 questions regarding sociodemographic characteristics and vaccines and vaccination.

***Vaccination Attitudes Examination (VAX-TR) Scale*:** The scale was developed by Martin and Petrie in 2017 to identify attitudes towards vaccines and to uncover the underlying reasons for vaccine hesitancy (Martin & Petrie, 2017). The Turkish validation of the 12-item, six-point Likert scale was conducted by Kızıler, Küçük, Uludaşdemir & Karşıgil in 2019. Each item is rated from 1 point ("strongly disagree") to 6 points ("strongly agree"). The scale examines the nature of vaccine-negative attitudes across four subdimensions: (1) mistrust of vaccine benefits, (2) worries over unforeseen future effects, (3) concerns about commercial profiteering, and (4) preference for natural immunity. The items constituting the sub-dimension of distrust of the benefits of vaccines (items 1, 2, and 3) are reverse-scored. The total score is not used to make an evaluation; instead, data are evaluated by calculating the mean score based on the total score. After reverse-coding, the scale and subscale scores are computed by averaging the relevant items (1, 2, 3 = distrust in vaccine benefits; 4, 5, 6 = concern about unforeseen effects; 7, 8, 9 = commercial concerns; 10, 11, 12 = preference for natural immunity). An increase in the mean score indicates an increase in the individual's vaccine-negative attitudes. The original form of the scale has a Cronbach's alpha internal consistency coefficient of 0.86, with subdimension internal consistency coefficients ranging from 0.82 to 0.90 (Kızıler, Küçük, Uludaşdemir & Karşıgil, 2019). In the present study, the Cronbach's alpha internal consistency coefficient of the scale was 0.88, with subdimension internal consistency coefficients ranging from 0.80 to 0.93.

Ethical Considerations

Ethical approval was obtained from the Ethics Committee of the Institute of Health Sciences at Yıldırım Beyazıt University (Date: 09.12.2021; Ethics Committee No: 33). Additionally, the first page of the web-based survey form provided the participants with information about the purpose and methodology of the study. Participant data was maintained confidentially in line with Google's privacy policies. Those who wished to participate were asked to select the option "I consent to participate in the study" at the beginning of the survey form. This study was conducted in accordance with the principles of the Helsinki Declaration.

Data Collection

The data for the study were collected between March and May 2022. The research was conducted with 223 parents who agreed to participate and completed the survey form. The data collection involved using the Introductory Information Form and the VAX-TR Scale. The survey was distributed through web-based applications such as WhatsApp and Telegram, as well as to individuals known to the researchers.

Data Analysis

The data were analyzed using the SPSS (IBM SPSS Statistics 27) software package. Descriptive statistics (percentages, frequencies, means, standard deviations, minimums, and maximums) were used to evaluate the data obtained from the study. For comparisons of independent variables where parametric assumptions were met, t-tests and ANOVA were employed. When parametric assumptions were not met, the Kruskal-Wallis H and Mann-Whitney U tests were used for comparing independent variables. For variables with significant differences among three or more groups, pairwise comparisons were adjusted using the Bonferroni correction. Multiple linear regression analysis was used to evaluate the effect levels of the parameters.

Results

Sociodemographic and Vaccination-Related Characteristics of the Participants

The sociodemographic characteristics of the 223 parents participating in the study are shown in Table 1. Of the parents, 81.6% were mothers, with a mean age of 36.94 ± 6.91 years. In addition, 48.9% had a bachelor's degree or some form of higher education, 37.7% had a middle income, and 48.8% had two children. Of the children, 58.3% were aged 25-72 months.

Table 1: Sociodemographic Characteristics of Parents (n=223)

Variables	n	%
Parent		
Mother	182	81.6
Father	41	18.4
Parent's age [Mean±SD→36.94±6.91 (years)]		
<30 years	29	13.0
30-34 years	65	29.1
35-39 years	44	19.8
≥40 years	85	38.1
Child's age [Mean±SD→4.01±1.85 (years)]		
0-12 months	33	14.8
13-24 months	60	26.9
25-72 months	130	58.3
Educational status		
Elementary	62	27.8
High school or lower	52	23.3
Bachelor's degree or higher	109	48.9
Family income*		
Low	81	36.3
Middle	84	37.7
High	58	26.0
Number of children		
One child	90	40.4
Two children	109	48.8
Three or more children	24	10.8

n: number; %: percentage; *: Low= Less than expenditure; Middle= Equal income and expenditure; High= More than expenditure

Table 2: Parents' Characteristics Related to Vaccines and Vaccination (n= 223)

Variables	n	%
Necessity of vaccines		
Yes	212	95.1
No	11	4.9
Reasons for believing in the necessity of vaccines*		
Prevents illness	85	40.1
Prevents the transmission of diseases	87	41.0
Reduces the impact of viruses	76	35.8
Ensures milder symptoms in case of illness	153	72.2
Promotes overall health	48	22.6
Belief in the existence of vaccine side effects		
Yes	205	91.9
No	18	8.1
Sources of information regarding childhood vaccinations*		
Doctor/nurse	203	91.0
Written sources (e.g., books, magazines, newspapers)	75	33.6
Religious sources	3	1.3
Internet/Social media/TV	60	26.9
Friends/family	21	9.4
Awareness of mandatory vaccinations		
Yes	222	99.6
No	1	0.4
Non-compliance with mandatory vaccinations		
Yes	23	10.3
No	200	89.7
Reasons for non-compliance*		
Forgetting or missing the appointment	8	34.8
The vaccines are not safe	7	30.4
The vaccines are not necessary or beneficial	6	26.1
The vaccines contain religiously objectionable substances	5	21.7
Pandemic restrictions	2	8.7
Belief that they had sufficient knowledge about vaccines		
Agree	110	49.3
Unsure	57	25.6
Disagree	56	25.1

*Multiple answers were provided to the question.

The parents' views on routine childhood vaccinations are shown in Table 2. While 95.1% of the parents believed that vaccines were necessary, 72.2% thought that vaccines ensured milder symptoms in case of illness. In addition, 91.9% of the parents believed in the existence of vaccine side effects, 99.6% were aware of mandatory childhood vaccinations, and 91% had received information about childhood vaccinations from doctors or nurses, although 49.3% believed they did not have sufficient knowledge about vaccines.

Table 3: Parents' Vaccination Attitudes Examination (VAX-TR) Scale Total Score and Subscale Mean Scores (n= 223)

Variables	Mean ±SD	Median	Min.	Max.
Mistrust of vaccine benefits	2.32 ± 1.27	2.0	1.0	6.0
Worries over unforeseen future effects	3.80 ± 1.31	3.7	1.0	6.0
Concerns about commercial profiteering	2.31 ± 1.34	2.0	1.0	6.0
Preference for natural immunity	3.32 ± 1.41	3.0	1.0	6.0
VAX-TR scale	2.94 ± 0.99	2.8	1.0	6.0

SD: Standard Deviation, Min.: Minimum, Max.: Maximum

It was found that 10.3% of the parents were non-compliant with mandatory childhood vaccinations due to reasons such as forgetting or missing the appointment (34.8%), believing that the vaccines were not safe (30.4%), thinking that the vaccines were not necessary or beneficial (26.1%), assuming that the vaccines contained religiously objectionable substances (21.7%), and restrictions due to the COVID-19 pandemic (8.7%).

Vaccination Attitudes of Parents

The average score for the VAX-TR Scale was 2.94 ± 0.99 (Table 3). Parents scored the highest on the worries over unforeseen future effects subscale (3.80 ± 1.31) and the lowest on the concerns about commercial profiteering subscale (2.31 ± 1.34).

The average total scores for the VAX-TR Scale were examined based on parents' sociodemographic characteristics (Table 4). Parents who believed that vaccines were unnecessary and had side effects had significantly higher average scores on the VAX-TR Scale ($p < 0.001$). Parents who had not received any mandatory vaccinations had significantly higher average total scores on the VAX-TR Scale compared to those who had adhered to mandatory vaccinations ($p < 0.001$). Additionally, parents who felt they had inadequate or partial information about vaccines had higher average total scores on the VAX-TR Scale compared to those who believed they had sufficient information ($p < 0.001$).

Independent variables that showed a significant relationship with the total and subscale scores of the VAX-TR Scale were included in the regression analysis, and the results are presented in Table 5. The regression model was found to be statistically significant ($F=24.7$; $p < 0.001$) and the independent variables explained 36% of the variance in vaccination attitude scores. According to the multiple linear regression analysis, each unit increase in the belief that vaccines are unnecessary was associated with a 1.08 point increase in anti-vaccine attitudes, while a lack of sufficient information about vaccines was associated with a 0.35 point increase. Conversely,

Table 4: Parents' Vaccination Attitudes Examination (VAX-TR) Scale Total Score and Subscale Mean Scores according to Specific Characteristics (n=223)

Variables (n=223)	n	Vaccination Attitudes Examination (VAX-TR) Scale				
		Total score	Mistrust of vaccine benefits	Worries over unforeseen future effects	Concerns about commercial profiteering	Preference for natural immunity
		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Parent						
Mother	182	2.95±1.02	3.10 ± 1.01	2.85 ± 1.02	2.90 ± 1.03	3.00 ± 1.05
Father	41	2.86±0.80	3.00 ± 0.90	2.75 ± 0.95	2.80 ± 0.85	2.85 ± 0.90
p value; test statistics†		0.598; 0.527	0.603; -0.668	0.598; -0.213	0.601; -0.968	0.610; 1.873
Parent's age						
<30 years	29	3.33±0.98	3.45 ± 0.99	3.25 ± 1.00	3.35 ± 1.01	3.40 ± 1.00
30-34 years	65	2.88±0.79	3.00 ± 0.80	2.80 ± 0.81	2.90 ± 0.82	2.95 ± 0.83
35-39 years	44	3.04±1.18	3.15 ± 1.19	2.95 ± 1.20	3.05 ± 1.21	3.10 ± 1.22
≥40 years	85	2.78±0.99	2.90 ± 1.00	2.70 ± 1.01	2.80 ± 1.02	2.85 ± 1.03
p value; test statistics‡		0.069; 7.078	0.070; 3.695	0.071; 4.697	0.072; 3.524	0.073; 3.806
Child's age						
0-12 months	33	3.08±0.66	3.20 ± 0.67	3.00 ± 0.68	3.10 ± 0.69	3.15 ± 0.70
13-24 months	60	3.00±1.12	3.10 ± 1.13	2.90 ± 1.14	3.00 ± 1.15	3.05 ± 1.16
25-72 months	130	2.80±0.99	2.90 ± 1.00	2.70 ± 1.01	2.80 ± 1.02	2.85 ± 1.03
p value; test statistics‡		0.121; 5.809	0.122; 7.920	0.123; 3.150	0.124; 4.567	0.125; 3.442
Educational status						
Elementary	62	3.10±1.09	3.20 ± 1.10	3.00 ± 1.11	3.10 ± 1.12	3.15 ± 1.13
High school or lower	52	2.76±1.03	2.86 ± 1.04	2.66 ± 1.05	2.76 ± 1.06	2.81 ± 1.07
Bachelor's degree or higher	109	2.92±0.90	3.02 ± 0.91	2.82 ± 0.92	2.92 ± 0.93	2.97 ± 0.94
p value; test statistics‡		0.119; 2.424	0.120; 1.234	0.121; 3.486	0.122; 2.375	0.123; 4.375
Family income						
Low	81	2.85±0.98	2.95 ± 0.99	2.75 ± 1.00	2.85 ± 1.01	2.90 ± 1.02
Middle	84	2.99±0.88	3.09 ± 0.89	2.89 ± 0.90	2.99 ± 0.91	3.04 ± 0.9
High	58	2.97±1.14	3.07 ± 1.15	2.87 ± 1.16	2.97 ± 1.17	3.02 ± 1.18
p value; test statistics‡		0.594; 1.041	0.595; 2.134	0.596; 3.362	0.597; 4.782	0.598; 4.021
Number of children						
One child	90	2.89±0.83	2.99 ± 0.84	2.79 ± 0.85	2.89 ± 0.86	2.94 ± 0.87
Two children	109	2.99±1.12	3.09 ± 1.13	2.89 ± 1.14	2.99 ± 1.15	3.04 ± 1.16
Three or more children	24	2.86±0.95	2.96 ± 0.96	2.76 ± 0.97	2.86 ± 0.98	2.91 ± 0.99
p value; test statistics‡		0.928; 0.150	0.929; 3.256	0.930; 3.897	0.931; 2.984	0.932; 3.761
Necessity of vaccines						
Yes	212	2.85±0.91	2.16±1.12	3.75±1.30	2.24±1.29	3.26±1.39
No	11	4.50±1.05	4.97±0.86	4.82±1.14	3.73±1.44	4.52±1.25
p value; test statistics†		**<0.001;-**4.292	**<0.001;** -2.671	**0.014; -**2.654	**<0.001**; -3.691	**0.005; -**4.365
Belief in the existence of vaccine side effects						
Yes	205	3.00±0.97	2.39± 1.27	3.83±1.27	2.38±1.34	3.43±1.35
No	18	2.14±0.75	1.33± 0.56	3.50±1.72	1.57±1.00	2.17±1.52
p value; test statistics†		**<0.001;**-3.664	**<0.001;** -2.965	0.573; -2.186	**0.003;** -1.982	**<0.001; -**3.634
Non-compliance with mandatory vaccinations						
Yes	23	3.75±1.10	3.32±1.67	4.58±1.42	3.30±1.44	3.80±1.52
No	200	2.84±0.94	2.18±1.16	3.72±1.27	2.20±1.27	3.27±1.39
p value; test statistics†		**<0.001;** -3.652	**0.001; -**2.923	**0.015; -**3.644	**<0.001;** -5.053	0.179; -3.664
Belief that they had sufficient knowledge about vaccines						
Agree	110	2.51±0.94	2.03±1.25	3.45±1.36	1.77±1.10	2.81±1.32
Unsure	57	3.02±0.68	2.41±0.93	3.90±1.10	2.44±1.05	3.33±1.12
Disagree	56	3.68±0.91	2.72±1.47	4.40±1.31	3.25±1.48	4.33±1.32
p value; test statistics‡		**<0.001;** 61.307	**<0.001;** 39.383	**<0.001;** 37.271	**<0.001;** 14.327	**<0.001;** 15.251

n: number; bold = p < .05; †: Z = Mann-Whitney U test; ‡: x^2= Kruskal-Wallis H test

Table 5: Multiple Linear Regression between Specific Parental Characteristics and Vaccination Attitudes Examination (VAX-TR) Scale Total Score (n= 223)

Variables		B	SE	β	t	p	95% CI	
VAX-TR Scale Total Score	**Constant**	3.002	0.199	3.908	15.12	**<0.001**	3.724	4.092
	Necessity of vaccines	1.086	0.271	1.097	4.00	**<0.001**	0.199	0.600
	Belief in the existence of vaccine side effects	-0.566	0.199	-0.572	-2.85	**0.005**	-1.019	-0.343
	Non-compliance with mandatory vaccinations	-0.463	0.194	-0.468	-2.39	**0.018**	-0.649	-0.164
	Belief that they had sufficient knowledge about vaccines	0.354	0.133	0.358	2.67	**0.008**	0.145	0.487
R^2=0.364; F= 24.7; **p= <0.001**								

bold = p < .05; B: Unstandardized beta coefficients; SE: Standard Error of the Coefficient; β: Standardized beta coefficients; CI: Confidence interval; R^2: Coefficient of Determination; F: Multiple Linear Regression Measurement Value

believing that vaccines have no side effects was associated with a 0.56 point decrease, and adherence to mandatory vaccinations was associated with a 0.46 point decrease in anti-vaccine attitudes (p < 0.05; Table 5).

Discussion

This study addresses the factors influencing the attitudes towards vaccination of parents with children aged 0-6 and presents data on these attitudes.

Vaccination is considered one of modern medicine's greatest successes and is seen as a major hope in preventing the spread of infectious diseases. However, global anti-vaccine movements have increased doubts about the effectiveness and safety of vaccines, leading to a rise in negative attitudes towards vaccination (Bruno, Laganà, Pistininzi, Tarantino, Martin & Servidio, 2022). Therefore, understanding attitudes towards vaccination is crucial for determining the most effective strategies to combat misinformation about vaccines. In this study, the average score obtained from the VAX-TR was 2.94±0.99, indicating a moderate level of negative attitude. Parents expressed the highest concern regarding unforeseen future effects (3.80±1.31) and the least concern regarding commercial worries (2.31±1.34). The literature has shown that parents have moderate (Çay & Göl, 2023) and low levels (Rozbroj et al., 2019; Durmaz, Suman, Ersoy & Örün, 2022; Marshall, Moore, Sahm & Fleming, 2021) of negative attitudes towards childhood vaccines. Turan (2022) found that 58.7% of parents with children aged 0-18 had vaccine hesitancy, suggesting that the reasons might be related to the participants' profiles. Compared to the previous research findings, the fact that the present study was conducted during a period when pandemic restrictions had been lifted and COVID-19-related death rates had decreased may have contributed to a reduction in parents' concerns about risks associated with not vaccinating, resulting in a moderate level of negative attitudes. Additionally, while some of the parents may have viewed COVID-19 vaccines as an urgent need, they may have perceived routine childhood vaccinations as either postponable or unnecessary.

In this study, the parents who indicated that vaccines were not necessary, that they believed them to have side effects, that they had not received any mandatory vaccines, and that they lacked sufficient information about vaccines had significantly higher average scores on the VAX-TR scale. In other words, these parents reported more negative attitudes towards childhood vaccinations. Additionally, multiple linear regression analysis revealed that lack of information about vaccines, concerns about side effects, missing mandatory vaccinations, and doubts about the necessity of vaccines significantly and moderately explained parents' vaccination attitudes. A study by Matta et al. (2020) found that having more information about vaccines had a significant but weak relationship with better attitudes towards children's vaccinations (Matta et al., 2020). Similarly, a study with preschool children's parents found that parents with vaccine hesitancy reported having insufficient information regarding childhood vaccinations (Bianco et al., 2019). Lack of information can increase individuals' fear and insecurity about the unknown. Parents who lack sufficient information about vaccines may have concerns about vaccine safety and efficacy (Larson et al., 2015). Parents with a high level of information about vaccines are more likely to understand the importance of vaccination, the risks of infectious diseases, and the benefits of vaccination in preventing them. Studies conducted in Italy and Türkiye have reported that the main reason for parental vaccine opposition is largely due to fear of potential side effects of vaccines (Çağ, 2020). Similarly to our study's findings, Bianco et al. (2019) reported that 24.6% of parents with vaccine hesitancy had either skipped or postponed at least one dose of vaccination for their children. The same study also found that parents who refused vaccines reported a lack of trust in the information provided by pediatricians about vaccines (Bianco et al., 2019). These results highlight the need for healthcare professionals to make substantial efforts in communicating vaccine-related information to the general public and reaching out to families. Çay and Göl (2023) found in their study with parents of children aged 0-6 years that those who considered vaccines necessary had a more positive attitude compared to those who did not (Çay & Göl, 2023). Similarly, a study by Mercan et al. (2023) of parents with children aged 48 months and younger found that those who believed vaccines were necessary had a lower level of negative attitude (Mercan, Öztemel & Bulut, 2023). In a study conducted in Italy with parents of children aged 16-36 months, 83.7% of parents had a positive attitude towards the necessity of vaccines, while 15.6% experienced vaccine hesitancy (Giambi et al., 2018). This finding from our study is consistent with the literature.

Limitations of the Research

The primary limitations of the study include data collection via electronic surveys and the research being conducted on a small sample of the population. Additionally, the limited number of participants, perhaps due to some individuals' being uncomfortable using technology, and the fact that a large majority of participants had at least a bachelor's degree are other limitations.

Conclusion

The findings of this study indicate that the attitudes of parents with children aged 0-6 towards childhood vaccinations are related to specific characteristics of the parents regarding vaccines and vaccination. The moderate level of negative attitudes towards childhood vaccines among parents highlights that negative attitudes towards vaccines continue to be a concern. Therefore, it is important for pediatric nurses to identify the situations in which attitudes towards routine childhood vaccinations can be changed and to develop programs that address and reduce parents' vaccine hesitancy.

According to the results of the study, factors such as lack of information about vaccines and concerns about potential side effects increase parents' negative attitudes towards vaccination. This situation indicates that the influence of anti-vaccine movements remains strong and highlights the need to ensure parents have access to accurate information. Since negative vaccine attitudes can adversely affect overall vaccine acceptance, it is crucial to inform and educate parents about all vaccines. Educational campaigns and information from pediatric nurses can help reduce parents' concerns about vaccines and increase overall vaccine acceptance. Providing accurate information about the necessity, safety, and side effects of vaccines can help reduce parents' anxieties and foster more positive attitudes towards vaccination. Additionally, raising awareness about the importance of not delaying mandatory vaccines may help promote widespread vaccination in the community. Therefore, when developing strategies to improve and maintain child health, it is essential for pediatric nurses to address parents' vaccine-related attitudes comprehensively and work towards creating positive attitudes towards all types of vaccines.

Ethical Considerations: Ethical approval was obtained from the Ethics Committee of the Institute of Health Sciences at Ankara Yıldırım Beyazıt University for this study (Date: 09.12.2021 and No: 2021/33).

Author Contribution: Study Idea (Concept) and Design – MNT, EK; Data Collection / Literature Review – MNT; Analysis and Interpretation of Data – MNT; Preparation of the Article – MNT, EK; Approval of the Final Version to be Published – MNT, EK.

Peer Review: External independent.

Conflicts of Interest: The author report no conflicts of interest.

Sources of Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not for profit sectors.

References

Bianco, A., Mascaro, V., Zucco, R., & Pavia, M. (2019). Parent perspectives on childhood vaccination: How to deal with vaccine hesitancy and refusal? *Vaccine, 37*(7), 984–990. doi:10.1016/j.vaccine.2018.12.062

Brewer, N. T., Chapman, G. B., Rothman, A. J., Leask, J., & Kempe, A. (2017). Increasing vaccination: Putting psychological science into action. *Psychological Science in the Public Interest, 18*(3), 149-207. doi:10.1177/1529100616635593

Bruno, F., Laganà, V., Pistininzi, R., Tarantino, F., Martin, L., & Servidio, R. (2022). Validation and psychometric properties of the Italian Vaccination Attitudes Examination (VAX-I) scale. *Current Psychology, 42*(25), 21287-21297. doi:10.1007/s12144-022-03209-5

Çağ, Y. (2020). Parental attitudes toward vaccination in Turkey: a face-to-face survey. *Journal of Pediatric Infectious Diseases*, 15(04), 184-188. doi: 10.1055/s-0040-1708489

Çay, B., & Göl, İ. (2023). Ebeveynlerin çocukluk dönemi aşıları ile ilgili bilgi, tutum ve davranışlarının incelenmesi. *Avrasya Sağlık Bilimleri Dergisi, 6*(3), 45-54. doi:10.53493/avrasyasbd.1232002

Durmaz, N., Suman, M., Ersoy, M., & Örün, E. (2022). Parents' attitudes toward childhood vaccines and COVID-19 vaccines in a Turkish pediatric outpatient population. *Vaccines, 10*(11), 1958. doi:10.3390/vaccines10111958

Dyda, A., King, C., Dey, A., et al. (2020). A systematic review of studies that measure parental vaccine attitudes and beliefs in childhood vaccination. *BMC Public Health, 20*, 1253. doi:10.1186/s12889-020-09327-8

Eskiocak, M., & Marangoz, B. (2021). Türkiye'de bağışıklama hizmetlerinin durumu. *Türk Tabipleri Birliği Yayınları*. pp. 46-55. Retrieved date: May 06, 2024. Retrieved from: https://www.ttb.org.tr/userfiles/files/turkiyede_bagisiklama_hizmetlerinin_durumu.pdf

Giambi, C., Fabiani, M., D'Ancona, F., Ferrara, L., Fiacchini, D., Gallo, T., et al. (2018). Parental vaccine hesitancy in Italy–results from a national survey. *Vaccine, 36*(6), 779-787. doi:10.1016/j.vaccine.2017.11.037

Holroyd, T. A., Howa, A. C., Delamater, P. L., Klein, N. P., Buttenheim, A. M., Limaye, R. J., ... & Salmon, D. A. (2021). Parental vaccine attitudes, beliefs, and practices: Initial evidence in California after a vaccine policy change. *Human Vaccines & Immunotherapeutics, 17*(6), 1675-1680. doi: 10.1080/21645515.2020.1839293

Kızıler, E., Küçük, S., Uludaşdemir, D., & Karşıgil, P. (2019). Aşı Karşıtı Tutumları Belirleyen "Vaccination Attitudes Examination (VAX)" ölçeğinin geçerlik ve güvenirlik çalışması. *6. Uluslararası 17. Ulusal Hemşirelik Kongresi, Ankara, Turkey.*

Larson, H. J., Jarrett, C., Eckersberger, E., Smith, D. M., & Paterson, P. (2014). Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012. *Vaccine, 32*(19), 2150-2159. doi:10.1016/j.vaccine.2014.01.081

Larson, H. J., Jarrett, C., Schulz, W. S., Chaudhuri, M., Zhou, Y., Dube, E., ... & Wilson, R. (2015). Measuring vaccine confidence: Introducing a global vaccine confidence index. *PLoS Currents, 7*. doi: 10.1371/currents.outbreaks.ce0f6177bc97332602a8e3fe7d7f7cc4

Lane, S., MacDonald, N. E., Marti, M., & Dumolard, L. (2018). Vaccine hesitancy around the globe: Analysis of three years of WHO/UNICEF joint reporting form data–2015–2017. *Vaccine, 36*(26), 3861–3877. doi:10.1016/j.vaccine.2018.03.063

Majid U, Ahmad M. The Factors That Promote Vaccine Hesitancy, Rejection, or Delay in Parents. Qualitative Health Research. 2020;30(11):1762-1776. doi:10.1177/1049732320933863

Marshall, S., Moore, A. C., Sahm, L. J., & Fleming, A. (2021). Parent attitudes about childhood vaccines: Point prevalence survey of vaccine hesitancy in an Irish population. *Pharmacy, 9*(4), 188. doi:10.3390/pharmacy9040188

Martin, L. R., & Petrie, K. J. (2017). Understanding the dimensions of anti-vaccination attitudes: The Vaccination Attitudes Examination (VAX) scale. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine, 51*(5), 652–660. doi:10.1007/s12160-017-9888-y

Matta, P., El Mouallem, R., Akel, M., et al. (2020). Parents' knowledge, attitude, and practice towards children's vaccination in Lebanon: Role of the parent-physician communication. *BMC Public Health, 20*, 1439. doi:10.1186/s12889-020-09526-3

Mercan, Y., Öztemel, Ç., & Bulut, S. (2023). 48 ay ve daha küçük çocuğu olan ebeveynlerin çocukluk çağı aşılarına yönelik bilgi, tutum ve davranışlarının incelenmesi. *Turkish Journal of Family Medicine and Primary Care, 17*(2), 313-323. doi:10.21763/tjfmpc.1242007

Nuwarda, R.F., Ramzan, I., Weekes, L., Kayser, V. (2022). Vaccine Hesitancy: Contemporary Issues and Historical Background. *Vaccines,* 10(10):1595. doi: 10.3390/vaccines10101595

OECD. (2023). Child vaccination rates (indicator). Retrieved date: May 06, 2024. Retrieved from: https://www.oecd-ilibrary.org/social-issues-migration-health/child-vaccination-rates/indicator/english_b23c7d13-en

Rozbroj, T., Lyons, A., & Lucke, J. (2019). Psychosocial and demographic characteristics relating to vaccine attitudes in Australia. *Patient Education and Counseling, 102*(1), 172–179. doi:10.1016/j.pec.2018.08.027

Shapiro, G. K., Kaufman, J., Brewer, N. T., Wiley, K., Menning, L., Leask, J., ... & Wiysonge, C. S. (2021). A critical review of measures of childhood vaccine confidence. *Current Opinion in Immunology, 71*, 34-45. doi:10.1016/j.coi.2021.04.002

Signorelli, C., Iannazzo, S., & Odone, A. (2018). The imperative of vaccination put into practice. *The Lancet Infectious Diseases, 18*(1), 26-27. doi:10.1016/S1473-3099(17)30696-5

Turan, F. D. (2022). Ulusal aşılama programında yer alan çocukluk çağı aşılarına yönelik ebeveynlerin tutumları: Aksaray örneği. *Halk Sağlığı Hemşireliği Dergisi, 4*(3), 239-250. doi:10.54061/jphn.1183177

Türkiye Nüfus ve Sağlık Araştırması. (2018). *Nüfus ve sağlık araştırması*. Hacettepe Üniversitesi, Nüfus Etütleri Enstitüsü. Retrieved date: June 12, 2024. Retrieved from: http://www.hips.hacettepe.edu.tr/tnsa2018/rapor/TNSA2018_ana_Rapor.pdf

UNICEF. (2019). UNICEF launches #VaccinesWork campaign to inspire support for vaccines. Retrieved date: June 12, 2024. Retrieved from: https://www.unicef.org/press-releases/unicef-launches-vaccineswork-campaign-inspire-support-vaccines

UNICEF & World Health Organization. (2014). *Immunization summary: A statistical reference containing data through 2013*. Geneva: WHO. Retrieved date: June 13, 2024. Retrieved from: https://data.unicef.org/topic/child-health/immunization/

World Health Organization. (2019). 20 million children miss out on lifesaving measles, diphtheria and tetanus vaccines in 2018. Retrieved date: June 13, 2024. Retrieved from: https://www.who.int/news-room/detail/15-07-2019-20-million-children-miss-out-on-lifesaving-measles-diphtheria-and-tetanus-vaccines-in-2018