Original Investigation / *Özgün Araştırma*

DOI: 10.5578/ced.20240204 • *J Pediatr Inf 2024;18(2):e88-e97*

Exploring the Impact of Socioeconomic Factors on Special Immunization Rates: A Study in Türkiye

Türkiye'de Sosyoekonomik Faktörlerin Özel Aşılama Oranları Üzerindeki Etkisinin İncelenmesi

Bahar Öztelcan Gündüz(İD), Kazım Kutlutürk(İD), Mehmet Cengiz(İD)

Clinic of Pediatrics, Gülhane Training and Research Hospital, Ankara, Türkiye

Cite this article as: Öztelcan Gündüz B, Kutlutürk K, Cengiz M. Exploring the impact of socioeconomic factors on special immunization rates: A study in Türkiye. J Pediatr Inf 2024;18(2):e88-e97.

Abstract

Objective: In Türkiye, understanding the socioeconomic and sociodemographic factors associated with special immunization is crucial. This study aimed to explore these factors and their influence on vaccination rates.

Material and Methods: This study utilized a cross-sectional design with a snowball sampling method to assess the vaccination status of participants, and data was collected through a Google survey. This study employed a survey-based approach to assess the vaccination status of 2.127 participants in Ankara, Keçiören. Data was collected between September 1, 2022, and December 1, 2022. The surveys were sent electronically to the identified participants who had children aged between 0 and 18 years living in the Etlik region. The questionnaire covered various aspects related to vaccination. It collected demographic information from the participants, including age, sex, and educational background. Additionally, the survey explored parents' general attitudes and knowledge about vaccinations, assessing their understanding of the benefits, safety, and importance of vaccines.

Results: The study involved a total of 2.127 participants, out of which 94.2% were identified as mothers. Furthermore, 66.8% of the participants had a university degree or higher, and 46.7% had an income of 10.000 TL or more ($500 or more). It was noted that 95.8% of the participants believed that vaccines were necessary, and 96.1% reported having prior knowledge of special vaccines. Among those who did not receive special vaccines, 52.8% attributed their decision to the high cost associated with such vaccines. Statistical analysis revealed that fathers had lower levels of awareness about special vaccines than mothers, with significant differences observed across certain occupational groups, education levels, and income brackets (p< 0.05).

Öz

Giriş: Türkiye'de, rutin dışı bağışıklamanın sosyoekonomik ve sosyodemografik faktörlerle ilişkisini anlamak son derece önemlidir. Bu çalışma, bu faktörleri ve aşılanma oranları üzerindeki etkilerini araştırmayı amaçlamaktadır.

Gereç ve Yöntemler: Bu çalışmada, katılımcıların rutin dışı aşı durumunu değerlendirmek için kesitsel bir tasarım ve kar topu örnekleme yöntemi kullanılmıştır. Veriler, Google anketi aracılığıyla toplanmıştır. Çalışma, Ankara'nın Keçiören ilçesindeki Etlik bölgesindeki 2.127 katılımcının aşı durumları ve rutin dışı aşılamayı da içeren durumlarını değerlendirmek için anket tabanlı bir yaklaşım benimsemiştir. Veriler, 1 Eylül 2022 ile 1 Aralık 2022 tarihleri arasında toplanmıştır. Anketler, Etlik bölgesinde yaşayan 0-18 yaş arası çocuğu olduğu belirlenen katılımcılara elektronik olarak gönderilmiştir. Anket, aşıyla ilgili çeşitli konuları kapsamaktadır. Katılımcılardan yaş, cinsiyet ve eğitim düzeyi gibi demografik bilgilerin yanı sıra ebeveynlerin genel tutum ve aşılar hakkındaki bilgileri de değerlendirmektedir. Ayrıca, anket, katılımcıların aşıların faydaları, güvenliği ve önemine ilişkin anlayışlarını ölçerek aşılarla ilgili genel bilgi düzeylerini değerlendirmektedir.

Bulgular: Çalışma, toplam 2.127 katılımcıyı içermekte olup bunların %94.2'si annelerden oluşmaktadır. Ayrıca, katılımcıların %66.8'i üniversite eğitimine veya daha yüksek bir eğitim düzeyine sahipken %46.7'si 10.000 TL veya daha fazla gelire sahiptir (500$ veya daha fazla). Katılımcıların %95.8'i aşıların gerekliliğine inandıklarını belirtmiş ve %96.1'i rutin dışı aşılar hakkında önceden bilgi sahibi olduklarını bildirmiştir. Rutin dışı aşıları almayanların arasında, kararlarını bu tür aşıların yüksek maliyetine bağlayanların oranı %52.8'dir. İstatistiksel analiz, babaların annelere göre özel aşılar hakkında daha düşük bir farkındalık düzeyine sahip olduklarını göstermiş olup, bu farklılıklar belirli meslek grupları, eğitim düzeyleri ve gelir kategorileri arasında anlamlı olarak gözlenmiştir (p< 005).

Correspondence Address/Yazışma Adresi

Bahar Öztelcan Gündüz

Clinic of Pediatrics,
Gülhane Training and Research Hospital,
Ankara, Türkiye

E-mail: baharoztelcangunduz@gmail.com

Received: 21.06.2023 **Accepted:** 17.10.2023 **Available Online Date:** 26.06.2024

©Copyright 2024 by Pediatric Infectious Diseases and Immunization Society.
Available online at www.cocukenfeksiyon.org

Conclusion: Limited access to vaccines among families with lower socioeconomic status can lead to health inequalities. It is important to ensure affordable and accessible vaccination services for all families to prevent diseases.

Keywords: Socioeconomic, sociodemographic, private vaccination, vaccine, expanded immunization program

Sonuç: Daha düşük sosyoekonomik statüye sahip aileler arasında rutin dışı aşıya sınırlı erişim, sağlık eşitsizliklerine yol açabilir. Hastalıkları önlemek için tüm aileler için uygun fiyatlı ve erişilebilir aşı hizmetlerinin sağlanması önemlidir.

Anahtar Kelimeler: Sosyoekonomik, sosyodemografik, özel aşılama, aşı, genişletilmiş bağışıklık programı

Introduction

Vaccination is an effective method for preventing infections (1). In Türkiye, many vaccines are administered free of charge in the national vaccination schedule, including the Bacille Calmette-Guérin (BCG), oral polio vaccine (OPV), diphtheria, tetanus, pertussis (DTP), measles, hepatitis B vaccine (HBV), varicella, and pneumococcal vaccines. The expanded immunization program (EIP) aims for 95% coverage for each antigen and for 90% of children under 1 year of age to complete the vaccination programme (2).

On the other hand, while genital warts are rare in children, the frequency in prepubertal children has increased since the 1990s although the frequency in Türkiye is unknown (3,4). Rotavirus gastroenteritis is one of the most common causes of childhood gastroenteritis in our country (5). A systematic review of 98 studies published on rotavirus between 1987 and 2016 in Türkiye reported that the detection rate of rotavirus under the age of five years was 31.8%, and most of them were observed in winter months (6). In 2009, 56.9% of children hospitalized during the influenza pandemic were under five years of age, and serious complications such as wheezing, pneumonia, pneumothorax, and pneumomediastinum were observed in these children (7). In Türkiye, in 2005-2006, *Neisseria meningitidis* was identified as the causative agent in 138 of 243 meningitis cases collected from 13 centers (8).

However, "special vaccines" such as the Rotavirus vaccine, Influenza vaccine (Influenza), meningococcal and human papillomavirus (HPV) vaccines provide immunity against diseases with high mortality and morbidity and are recommended (9). However, these vaccines are currently available in Türkiye. At the current exchange rate, the selling prices in our country are 1.070 TL ($53) for Rotarix® vaccine, 340 TL ($17) for influenza vaccine, 1.950 TL ($97.5) for Gardasil 9® single dose, and an average of (Nimenrix®, Bexero®, Menectra®), (approximately 3.000 TL, $150) for meningitis vaccines ($1: 20 TL) (10-14). Considering that the minimum wage in our country is $425 (8.506 TL), the burden of vaccination fees on a family's budget can be easily understood.

In today's healthcare landscape, many countries are expanding their routine vaccination schedules to include a broader range of vaccines. For instance, certain vaccines, like Rota vaccine, HPV immunization, and meningitis vaccines, have become part of routine vaccination schedules in 116, 114, and 20 countries, respectively (15-16). These developments are seen not only as means of protecting against infections but also as significant steps toward enhancing public health. However, there remains a need for more information on access and usage of such vaccines in Türkiye.

However, the socioeconomic and sociodemographic factors influencing the uptake of private vaccinations in Türkiye remain understudied. Understanding these determinants is crucial for identifying potential health inequalities and developing targeted interventions to ensure equitable access to vaccination services. Therefore, this study aimed to explore the socioeconomic and sociodemographic factors associated with private vaccination in Türkiye, shedding light on the underlying dynamics of private immunization uptake.

Materials and Methods

This study aimed to assess the vaccination status of 2.127 participants in the Ankara, Keçiören region. The survey data was collected between September 1, 2022, and December 1, 2022. The participants' socio-economic and sociodemographic characteristics were carefully selected to be representative of the district's population. The study area, with a population of 34.280, was specifically chosen to be Keçiören, Etlik region. Gülhane Research and Training Hospital, located in this region, served as the primary facility for data collection. A snowball sampling design was employed as the sampling method for participant selection. Google surveys were sent to individuals who visited the pediatric clinic of Gülhane Research and Training Hospital, agreed to participate in the study, and had children aged between 0 and 18 years living in the Etlik region. Socioeconomic status was categorized into low, medium, and high based on the prevailing minimum wage implementation in the country during the study period. Participants were reached through the Google survey method, and they were requested to complete a questionnaire consisting of 16 questions. The survey covered various aspects, including demographic information, parents' general attitudes and knowledge about vaccinations, and their perspectives on non-routine vaccinations.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics Standard Concurrent User V 26 (IBM Corp., Armonk, New York, USA) statistical software package. Descriptive statistics were presented as unit numbers (n) and percentages (%). Pearson Chi-

square test was used to compare categorical variables. If the Chi-square test results were significant, subgroup analyses were performed using the Bonferroni-adjusted z-test. Statistical significance was set at $p< 0.05$.

The ethics committee evaluated and approved with the meeting number 2023/02 and decision number 2023/51.

Results

There were 2.127 participants in the study. Of the participants, 2003 (94.2%) were mothers, and 124 (5.8%) were fathers. Of the participants, 1.244 (58.5%) were between 31-40 years of age, 1.074 (50.5%) were unemployed/housewives, and 1.420 (66.8%) were university graduates and above. The number of participants with an income above 10.000 TL was 994 (46.7%) and the number of participants with one child was 1.048 (49.3%). The number of participants who thought that vaccines were necessary was 2.038 (95.8%). Of the participants who thought that vaccines were necessary, 1.486 (72.9%) reported that vaccines were necessary for protection against diseases, 827 (38.9%) reported that vaccines were necessary for strengthening immunity, and 783 (38.4%) reported that vaccines were necessary for health. The number of participants who had their children vaccinated regularly was 2.059 (96.8%). Of the participants, 1.941 (91.3%) had their child vaccinated at a family doctor and 478 (22.5%) at a private hospital. The number of participants who had heard of special vaccines other than routine vaccines administered by the Ministry of Health was 2.044 (96.1%). Of the participants who had heard about special vaccines before, 1284 (62.8%) stated that they had heard about special vaccines from a doctor and 846 (41.4%) from the internet. Of the participants, 1.980 (93.1%) stated that they knew about the Rotavirus diarrhea vaccine, 1.838 (86.4%) about meningococcal meningitis vaccine, 1.752 (82.4%) about influenza vaccine, and 1.326 (62.3%) about HPV vaccine. There were 1.273 (59.8%) participants who had or were considering getting the Rota diarrhea vaccine and 1.121 (52.7%) participants who were considering the meningococcal meningitis vaccine. Among those who did not have special vaccines, 249 (52.8%) stated that they did not have special vaccines because the cost was high, and 209 (44.3%) stated that they did not have special vaccines because they thought that the vaccine might have side effects (Table1).

As shown in Table 2, 4.0% of the mothers and 6.5% of the fathers reported that vaccination was not necessary. There was no statistically significant relationship between the necessity for vaccination and the person who completed the questionnaire. Of the participants, 5.6% aged between 18-30 years and 3.9% aged between 31-40 years stated that vaccination was not necessary. There were no statistically significant differences in the distribution of vaccine necessity according to age. The distribution of vaccination necessity showed a statistically significant difference according to the occupation of the participants. The rate of "vaccination is not necessary" and the response rate in tradesmen (12.5%) was statistically higher than that in healthcare professionals (1.6%). The distribution of vaccination necessity showed a statistical difference according to the educational level of the participants. The rate of "vaccination is not necessary" and responses among primary school graduates (6.1%) were statistically higher than those of high school graduates (1.8%). There was no statistically significant difference in the distribution of vaccination necessity according to the income status. There was a significant difference in the distribution of vaccination necessity according to the number of children. The rate of "vaccination is not necessary" was statistically higher among those with three children (6.6%) than among those with two children (2.7%). The "vaccination is not necessary" response rate (64.7%) of the participants who did not have their children vaccinated regularly is statistically higher than those who have regular vaccinations (2.2%).

According to Table 3, 13.7% of the fathers and 3.3% of the mothers had not heard of non-routine vaccination. The rate of fathers not having heard of routine vaccination was statistically higher than that of mothers. There was no statistical difference in the distribution of having heard of non-routine vaccination according to age. There was a statistically significant difference in the distribution of having heard of non-routine vaccination according to occupation. The rate of not having heard of non-routine vaccination was statistically higher in workers (10.8%) than in tradesmen (0.0%) or health workers (0.8%). There was a statistical difference in the distribution of having heard of non-routine vaccination according to educational status. The rate of not having heard of non-routine vaccination among primary (10.2%) and secondary (14.4%) education graduates was statistically higher than that of high school (4.4%) and university (2.7%) graduates. There was a statistical difference in the distribution of having heard of non-routine vaccination according to income status. The rate of those with an income between 5.501-10.000 TL (1.6%) was statistically lower than those with an income between 0-5.500 TL (7.5%) and 10.000 TL (5.0%). There was no statistical relationship between having heard of non-routine vaccination according to the number of children and regular vaccination status of the child.

Discussion

In this study, it was observed that the majority of the families who did not have regular vaccinations thought that special vaccines were unnecessary, were afraid of side effects and could not have them because they were not free of charge, fathers were not as knowledgeable about vaccines as mothers, the rate of those who accessed vaccination information through health personnel and the internet was similar, the rate of those with low education levels, tradesmen, and work-

Table 1. Descriptive statistics of participants (n= 2.127)

Variables	n	%
Person filling in the questionnaire		
Mother	2.003	94.2
Father	124	5.8
Age		
18-30	586	27.6
31-40	1.244	58.5
41-50	279	13.1
>50	18	0.8
Profession		
Housewife/not working	1.074	50.5
Tradesmen	32	1.5
Workers	83	3.9
Civil servant	159	7.5
Teacher	291	13.7
Health workers	243	11.4
Others	245	11.5
Educational status		
Primary education	49	2.3
Secondary education	111	5.2
High school	547	25.7
University and undergraduate	1.420	66.8
Income		
0-5.500 TL	428	20.1
5.501-10.000 TL	705	33.1
>10.000 TL	994	46.7
Number of children		
One	1.048	49.3
Two	790	37.1
Three	243	11.4
Four and above	46	2.2
Do you think vaccinations are necessary?		
Yes	2038	95.8
No	89	4.2
Why are vaccinations necessary?*	n= 2.038	
For health	783	38.4
Fort he prevention of disease	1.486	72.9
To strengthen immunity	827	38.9
Do/did you have your child vaccinated regularly?		
Yes	2.059	96.8
No	68	3.2
Where did you have your child vaccinated? (n= 2127)*		
Family doctor	1.941	91.3
State/university hospital	100	4.7
Private hospital	478	22.5
Private medical practice	151	7.1

Table 1. Descriptive statistics of participants (n= 2.127) (continue)

Variables	n	%
Have you ever heard of special vaccines other than routine vaccines administered by the Ministry of Health?		
Yes	2.044	96.1
No	83	3.9
Where did you hear about special vaccines?*	n= 2044	
Nurse	551	27.0
Doctor	1.284	62.8
Internet	846	41.4
Television	79	3.9
Fro the neighbourhood	439	21.5
Gazate magazine	50	2.4
Which of the special vaccinations do you know?*	n= 2044	
Rotavirus vaccine	1.980	93.1
Meningococcal meningitis vaccine	1.838	86.4
Flu vaccine	1.752	82.4
HPV (cervical cancer vaccine) vaccine	1.326	62.3
Which of these vaccinations have you had/plan to have?		
Rotavirus vaccine	1.273	59.8
Meningococcal meningitis vaccine	1.121	52.7
Flu vaccine	453	21.3
HPV (cervical cancer vaccine) vaccine	269	12.6
None	478	22.5
I do not know	11	0.5
Why have you not had these special vaccinations (rota, HPV, meningococcal, influenza)?*	n= 472	
I thought it could have side effects	209	44.3
The cost was expensive	249	52.8
Never heard of	41	8.7
Do you think these special vaccines should be added to the routine vaccination schedule of the Ministry of Health?		
Yes	1.970	92.6
No	157	7.4

* More than one option could be marked.

ers with occupations were less aware of special vaccines, and people with high income levels knew special vaccines better than people with low income. This study showed that socioeconomic and educational levels were determinants of receiving special vaccines.

In Türkiye, all special vaccines (HPV, influenza, and meningococcal vaccines) can be purchased by families on payment and administered in health institutions. In this study, 3.3% of the mothers and 13.7% of the fathers stated that they had not heard of special vaccines. In the study conducted by Kürtüncü et al. conducted in 2015, it was reported that 27.8% of mothers were aware of paid vaccines (17). This difference in the studies may have resulted from the increase in knowledge and awareness over time. In the study, it was interpreted that participation in the survey was preferred by mothers, and the fact that the participation of fathers was less was interpreted as mothers focusing more on the care of their children. It was observed that one of the reasons why mothers had higher awareness of the basic needs of the child, especially in the field of health, was that mothers were more active in Turkish society in terms of care in previous studies and fathers took care of children more often on the weekend and spent less time with their children outside the home, and thus they did not have sufficient knowledge and experience about children (18,19).

In accordance with previous studies conducted in Türkiye, our results showed that mothers were more aware of

Table 2. Comparisons between those who think that vaccination is necessary and those who do not

	Is a Vaccination Necessary?				Test Statistics	
	Yes		No		χ^2	p
	n	%	n	%		
Person filling in the questionnare						
Mother	1.922	96.0	81	4.0	1.688	0.241
Father	116	93.5	8	6.5		
Age						
18-30	553	94.4	33	5.6		
31-40	1.196	96.1	48	3.9	5.428	0.143
41-50	272	97.5	7	2.5		
>50	17	94.4	1	5.6		
Profession						
Housewife/not working	1.034	96.3	40	3.7[ab]		
Tradesmen	28	87.5	4	12.5[a]		
Worker	80	96.4	3	3.6[ab]		
Civil servant	155	97.5	4	2.5[ab]	**17.839**	**0.007**
Teacher	271	93.1	20	6.9[ab]		
Health workers	239	98.4	4	1.6[b]		
Other	231	94.3	14	5.7[ab]		
Education						
Primary school	46	93.9	3	6.1[a]		
Secondary school	107	96.4	4	3.6[ab]	**12.353**	**0.005**
High school	537	98.2	10	1.8[b]		
University/ undergraduate	1.348	94.9	72	5.1[ab]		
Income						
0-5.500 TL	407	95.1	21	4.9		
5.501-10.000 TL	951	95.7	43	4.3	1.323	0.516
>10.000 TL	680	96.5	25	3.5		
Number of children						
One	998	95.2	50	4.8[ab]		
Two	769	97.3	21	2.7[a]	9.359	**0.020**
Three	227	93.4	16	6.6[b]		
Four and above	44	95.7	2	4.3[ab]		
Do/did you have your child vaccinated regularly?						
Yes	2.014	97.8	45	2.2	641.773	**<0.001**
No	24	35.3	44	64.7		
Do you think these special vaccines should be added to the routine vaccination schedule of the Ministry of Health?						
Yes	1.951	99.0	19	1.0	690.146	**<0.001**
No	87	55.4	70	44.6		

n: Number of units, %: Percentage of rows, χ^2: Chi-square test, a and b superscripts indicate the differences between categories among those who think that vaccination is not necessary. There was no statistical difference between categories with the same superscripts.

Table 3. Comparisons between those who have heard of vaccination other than routine vaccination and those who have not

	Hearing About Vaccination Other Than Routine Vaccination				Test Statistics	
	Yes		No		χ^2	p
	n	%	n	%		
Person filling in the questionnare						
Mother	1.937	96.7	66	3.3	**33.775**	**<0.001**
Father	107	86.3	17	13.7		
Age						
18-30	561	95.7	25	4.3		
31-40	1.197	96.2	47	3.8	6.716	0.068
41-50	271	97.1	8	2.9		
>50	15	83.3	3	16.7		
Profession						
Housewife/not working	1.024	95.3	50	4.7[ab]		
Tradesmen	32	97.1	0	0.0[a]		
Workers	74	89.2	9	10.8[b]		
Civil servant	155	97.5	4	2.5[ab]	**19.081**	**0.002**
Teacher	280	96.2	11	3.8[ab]		
Health worker	241	99.2	2	0.8[a]		
Other	238	97.1	7	2.9[ab]		
Education						
Primary school	44	89.8	5	10.2[a]		
Secondary school	95	85.6	16	14.4[a]	**32.039**	**<0.001**
High school	523	95.6	24	4.4[b]		
University/undergraduate	1.382	97.3	38	2.7[b]		
Income						
0-5.500 TL	396	92.5	32	7.5[a]		
5.501-10.000 TL	978	98.4	16	1.6[b]	**31.330**	**<0.001**
>10.000 TL	670	95.0	35	5.0[a]		
Number of children						
One	1.013	96.7	35	3.3		
Two	758	95.9	32	4.1	3.422	0.310
Three	229	94.2	14	5.8		
Four and above	44	95.7	2	4.3		
Do/did you have your child vaccinated regularly?						
Yes	1.980	96.2	79	3.8	0.734	0.519
No	64	94.1	4	5.9		
Do you think these special vaccines should be added to the routine vaccination schedule of the Ministry of Health?						
Yes	1.899	96.4	71	3.6	**6.327**	**0.012**
No	145	92.4	12	7.6		

n: Number of units, %: Percentage of rows, χ^2: Chi-square test, a and b superscripts indicate the difference between categories among those who think that vaccination is not necessary. There is no statistical difference between categories with the same superscripts.

the immunization program than fathers, and that mothers were more competent in special vaccines as well as routine vaccines (20-25). However, in some studies, the high rate of mothers' lack of knowledge about vaccination may be due to the region in which the study was conducted or education. In a study conducted in Nigeria, it has been observed that mothers' mis-information about vaccination prevented vaccination in children, but mobile phone reminder messages were used as an intervention to complete routine vaccination on time (26). Although factors such as the number of children and maternal age affected vaccination rates in some studies (27), we did not find such a relationship in our study.

In the study conducted by Çıklar et al., it has been shown that income level was not effective in administering special vaccines, while education level was effective (22). Similar to other studies in which education and income levels of parents were found to be factors that increased vaccine awareness (23,28,29), in our study, we found that high education levels and high income levels were factors that increased the rate of receiving special vaccines. Having a high income may have affected access to healthcare providers and physicians and more information about vaccines. Families with higher incomes may have access to better health services and feel safe and confident about the services and vaccines offered. This may have influenced their positive decisions to have their children receive specific vaccines. This shows that if the concerns of the families regarding these issues are eliminated and their confidence is ensured, and if they reach a sufficient level of knowledge, they can have the vaccines by paying for them themselves. This situation shows that families should also be informed about special vaccines during infant and child health follow-ups.

When the rates of paid vaccination according to occupation were examined, laborers and tradesmen were found to have higher rates of not having heard of special vaccines compared to other occupational groups. Being more educated may have led to better communication with health care providers and reduced the risk of acquiring false beliefs about vaccines. This supports the idea that education level is effective.

Various studies have shown that participants with negative attitudes towards vaccines are not vaccinated at a higher rate (30). In this study, we found that families who did not have regular vaccinations did not receive private vaccines because they considered them unnecessary. Other factors for not having vaccines were the thought that vaccines had side effects and their high cost. In this context, the majority of participants thought that special vaccines should be included in the routine vaccination schedule of the Ministry of Health.

Similar to previous studies, most participants said that they obtained information about vaccination from doctors and the internet. Many families can quickly search for health information on the internet. According to the TUIK 2022 data, 94.1% had access to the internet from home, the rate of social media use was approximately 55%, and the rate of health-related searches was 65% (31) .The frequent use of the internet to obtain information about vaccination causes families to adopt misinformation as well as correct information. Correct information should be conveyed to society first-hand through the right channels.

On the basis of specific vaccines, HPV vaccine was the least known among all specific vaccines with 62.3%. Although the participants were aware of it, only 12.6% said that they were thinking of having it done; this rate was 24% in the study by Seven et al. and the rate of having the vaccine done was found to be higher than in our study (32). In the literature, it has been observed that misunderstandings and concerns about HPV vaccines are mostly affected by cultural values, especially immigrant parents having low levels of knowledge about HPV-related diseases and vaccines and having negative perceptions, so it will be possible to increase vaccination rates as the awareness of parents about HPV and the knowledge of health professionals are increased (33).

A study conducted in Italy has shown that economic hardship was a determinant of vaccine hesitancy and that the rates of vaccine refusal were relatively high in families with low levels of education (34). Although the study did not fully examine anti-vaccination and vaccine hesitancy, socioeconomic factors were similarly observed to be effective in receiving some vaccines.

Looking ahead to the potential expansion of Türkiye's vaccination schedule, it is crucial to prioritize vaccines that address prevalent and significant health concerns. Two notable candidates for inclusion in the national vaccination program are the rotavirus and HPV vaccines. The Rotavirus vaccine has shown its effectiveness in preventing severe cases of childhood gastroenteritis, which is a common health issue in our country. Likewise, the HPV vaccine has the potential to significantly reduce the incidence of cervical cancer, which is a global health concern. Extensive research and analysis are needed to determine the feasibility and impact of introducing these vaccines into the vaccination schedule, taking into account factors such as disease prevalence, vaccine safety, and cost-effectiveness. Such a step could contribute significantly to improving public health and further reducing the incidence of preventable diseases in Türkiye.

Limitations

Since only parents who agreed to participate in a certain time period were included in the study, the results reflect a cross-sectional period, and the number of participants is higher than in other studies conducted in Türkiye. Considering the number of participants and the heterogeneity, we believe that our results are reliable.

Conclusion

The findings showed that economic status and education level influenced parents to receive special immunization. Socioeconomic and sociodemographic factors affect access to vaccines, and special interventions are needed to increase accessibility to special vaccines. In this regard, it may be effective for policymakers and public health experts to expand the vaccination schedule to increase community immunity against these common diseases.

Ethics Committe Approval: This study was obtained from T.C. Health Sciences University Gülhane Scientific Researchs Ethics Committee (Decision no: 2023-51, Date: 14.02.2023).

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - BÖG, KK, MC; Design - BÖG, MC; Supervision - BÖG, KK; Resource - MC, KK; Data Collection and/or Processing - MC, BÖG; Analysis and/or Interpretation - BÖG; Literature Search - BÖG; Writing - BÖG; Critical Review - BÖG, KK, MC.

Conflict of Interest: All authors declare that they have no conflicts of interest or funding to disclose.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. *Arvas A. Aşılamada yapılan hatalar. Türk Pediatri Arşivi. 2004;39(1):9-13.*
2. *T.C Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü. Genelge 2018/14. Available from: https://dosyasb.saglik.gov.tr/Eklenti/1117,gbpgenelge2008pdf.pdf?0*
3. *Robinson AJ, Watkeys JEM. Genital warts in children: Problems of management. J Clin Forensic Med 1999;6(3):151-5. https://doi.org/10.1016/S1353-1131(99)90062-7*
4. *Mammas IN, Sourvinos G, Spandidos DA. Human papilloma virus (HPV) infection in children and adolescents. Eur J Pediatr 2009;168(3):267-73. https://doi.org/10.1007/s00431-008-0882-z*
5. *Fletcher SM, McLaws ML, Ellis JT. Prevalence of gastrointestinal pathogens in developed and developing countries: Systematic review and meta-analysis. J Public Health Res 2013;2(1):42-53. https://doi.org/10.4081/jphr.2013.e9*
6. *Tapisiz A, Bedir Demirdag T, Cura Yayla BC, Gunes C, Ugraş Dikmen A, Tezer H, et al. Rotavirus infections in children in Turkey: A systematic review. Rev Med Virol 2019;29(1):e2020. https://doi.org/10.1002/rmv.2020*
7. *Çiftçi E, Tuygun N, Özdemir H, Tezer H, Şensoy G, Devrim I, et al. Clinical and epidemiological features of Turkish children with 2009 pandemic influenza A (H1N1) infection: Experience from multiple tertiary paediatric centres in Turkey. Scand J Infect Dis 2011;43(11-12):923-9. https://doi.org/10.3109/00365548.2011.598872*
8. *Ceyhan M, Gürler N, Ozsurekci Y, Keser M, Aycan AE, Gurbuz V, et al. Meningitis caused by Neisseria Meningitidis, Hemophilus Influenzae Type B and Streptococcus Pneumoniae during 2005-2012 in Turkey. Hum Vaccin Immunother 2021;17(7):2351.*
9. *Arısoy ES, Çiftçi E, Hacımustafaoğlu M, Kara A, Kuyucu N, Somer A, et al. Clinical practical recommendations for Turkish Nat.pdf (2015). Available from: http://www.jpi-turkey.org/upload/documents/201501/1-11y.pdf (Accessed date: 23.02.2023).*
10. *İlaca Bak. Rotarix. Available from: https://ilacabak.com/rotarix-1-5-ml-oral-suspansiyon-iceren-aplikator-22970. (Accessed date: 16.03.2023).*
11. *İlaca Bak. Vaxigrip Tetra. Available from: https://ilacabak.com/vaxigrip-tetra-0-5-ml-im-sc-enj-icin-susp-1-kull-haz-enjektor-19730 (16.03.2023).*
12. *İlaca Bak. Gardasil. Available from: https://ilacabak.com/gardasil-9-im-enjeksiyonluk-suspansiyon-1-enjektor-29219 (16.03.2023).*
13. *İlaca Bak. Bexero. Available from: https://www.ilacabak.com/bexsero-0-5-ml-im-enjeksiyonluk-suspansiyon-iceren-kullanima-hazir-enjektor-22411 (16.03.2023).*
14. *İlaca Bak. Nimenrix. Available from: https://ilacabak.com/nimenrix-0-5-mg-im-enjeksiyon-icin-toz-iceren-1-flakon-ve-cozucu-iceren-kullanima-hazir-1-enjektor-15886 (16.03.2023).*
15. *WHO/UNICEF Joint Reporting Form on Immunization (JRF), WHO Regional and Country offices [Internet]. [cited 2022-08-25]. Available from: https://immunizationdata.who.int/listing.html?topic=vaccine-schedule&location=*
16. *Asad Ali, Rabab Zehra Jafri, Nancy Messonnier, Carol Tevi-Benissan, David Durrheim, Juhani Eskola et al. Global practices of meningococcal vaccine use and impact on invasive disease. Pathog Glob Health 2014;108(1):11-20. https://doi.org/10.1179/2047773214Y.0000000126*
17. *Kürtüncü M, Alkan I, Bahadır Ö, Arslan N. Zonguldak'ın kırsal bir bölgesinde yaşayan çocukların aşılanma durumu hakkında annelerin bilgi düzeyleri. Ejovoc 2017;7(1):8-17.*
18. *Tutkun C. Fathers looking after children in Türkiye in public settings. Educ Res Rev 2022;17(8):219-26. https://doi.org/10.5897/ERR2022.4256*
19. *Türkoğlu B, Çeliköz N, Uslu M. 3-6 yaş aralığında çocuğu olan babaların nitelikli zaman algılarına dair görüşleri. J RET 2013;2(2):54-71.*
20. *Smith PJ, Chu SY, Barker LE. Children who have received no vaccines: Who are they and where do they live? Pediatrics. 2004;114(1):187-95. https://doi.org/10.1542/peds.114.1.187*
21. *Elbur A, Yousif M, Albarraq A, Abdallah M. Knowledge and attitudes on childhood vaccination a survey among Saudi parents in Taif region, Saudi Arabia. Int J Pharm Pract Drug Res 2014;4:92-7.*
22. *Çıklar S, Güner PD. Knowledge, behavior and attitude of mother's about childhood immunization and reasons of vaccination rejection and hesitancy: A study of mixt methodology. Ankara Med J 2020;20(1):180-95. https://doi.org/10.5505/amj.2020.80148*
23. *Yüksel F, Aysun K. Ebeveynlerin çocukluk çağı aşıları hakkındaki bilgi, davranış ve tutumları. Türkiye Çocuk Hast Derg 2021;15(1):35-42. https://doi.org/10.12956/tchd.825092*
24. *Üzüm Ö, Eliaçık K, Hortu Örsdemir H, Karadağ Öncel E. Factors affecting the immunization approaches of caregivers: An example of a teaching and research hospital. J Pediatr Inf 2019;13(3):e114-20. https://doi.org/10.5578/ced.201937*
25. *Matta P, El Mouallem R, Akel M, Hallit S, Fadous Khalife MC. Parents' knowledge, attitude and practice towards children's vaccination in Lebanon: Role of the parent-physician communication. BMC Public Health 2020;20(1):1439. https://doi.org/10.1186/s12889-020-09526-3*

26. *Oladepo O, Dipeolu IO, Oladunni O. Nigerian rural mothers' knowledge of routine childhood immunizations and attitudes about use of reminder text messages for promoting timely completion. J Public Health Policy 2019;40(4):459-77. https://doi.org/10.1057/s41271-019-00180-7*

27. *Al-Zahrani J. Knowledge, attitude and practice of parents towards childhood vaccination. Majmaah J Health Sci 2013;1(1):23-32. https://doi.org/10.12816/0004768*

28. *Özdemir İN, Kadıoğlu H. Validity and reliability of Turkish version of vaccination confidence scale for parents. Florence Nightingale J Nurs 2020;28(1):41-8. https://doi.org/10.5152/FNJN.2020.18079*

29. *Krishna D, Mohd Zulkefli NA, Md Said S, Mahmud A. Sociodemographic and health care factors in determining immunization defaulters among preschool children in Petaling District, Selangor: A cross-sectional study in Malaysia. BMC Public Health. 2019;19:1-11. https://doi.org/10.1186/s12889-019-7561-z*

30. *Akmatov MK, Rübsamen N, Deyneko IV, Karch A, Mikolajczyk RT. Poor knowledge of vaccination recommendations and negative attitudes towards vaccinations are independently associated with poor vaccination uptake among adults-findings of a population-based panel study in Lower Saxony, Germany. Vaccine 2018;36(18):2417-26. https://doi.org/10.1016/j.vaccine.2018.03.050*

31. *TÜİK Kurumsal [Internet]. [cited 2023 Mar 10]. Available from: https://data.tuik.gov.tr/Bulten/Index?p=Hanehalki-Bilisim-Teknolojileri-(BT)-Kullanim-Arastirmasi-2022-45587*

32. *Seven M, Güvenç G, Şahin E, Akyüz A. Attitudes to HPV vaccination among parents of children aged 10 to 13 years. J Pediatr Adolesc Gynecol 2015;28(5):382-6. https://doi.org/10.1016/j.jpag.2014.11.005*

33. *Netfa F, Tashani M, Booy R, King C, Rashid H, Skinner SR. Knowledge, attitudes and perceptions of immigrant parents towards human papillomavirus (HPV) vaccination: A systematic review. Trop Med Infect Dis 2020;5(2):58. https://doi.org/10.3390/tropicalmed5020058*

34. *Bertoncello C, Ferro A, Fonzo M, Zanovello S, Napoletano G, Russo F, et al. Socioeconomic determinants in vaccine hesitancy and vaccine refusal in Italy. Vaccines 2020;8(2):276. https://doi.org/10.3390/vaccines8020276*