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Assessment of childhood vaccination hesitancy among syrian parents under temporary protection

Elif Nur Kocak^{1*}, Betül Zehra Pirdal^{1,6}, Servet Yüce², Muhammed Atak^{3,7}, Hatice Kocak Alkan⁴, Mihriban Aksoy¹ and Osman Faruk Bayramlar⁵

Abstract

Background and Aim Vaccination programs become increasingly crucial during migratory movements driven by conflict and other disruptions. This study aims to determine the prevalence of childhood vaccination hesitancy among Syrian parents under temporary protection and identify areas for targeted interventions.

Method A total of 227 Syrian parents attending three Immigrant Health Centers in Sultangazi were assessed using the Arabic version of the Parent Attitude about Childhood Vaccines (PACV) survey, conducted between October and December 2023.

Results The prevalence of vaccine hesitancy among these parents was found to be 10.6%. An inverse correlation was observed between maternal education level and vaccine hesitancy, indicating that higher education levels were associated with lower levels of hesitancy.

Conclusion The observed rate of vaccine hesitancy among Syrian parents under temporary protection underscores the urgent need for targeted interventions. Tailored vaccination strategies for immigrant populations are essential to improve immunization rates and ensure the health and well-being of these communities.

Keywords Vaccine hesitancy, Migration, Immigrant, Immunization, Childhood vaccinations

*Correspondence:

Elif Nur Kocak
elifnurkocak@gmail.com

¹Department of Public Health, Istanbul Health Directorate, Sultangazi District Health Directorate, Istanbul, Türkiye

²Department of Public Health, Şırnak Provincial Health Directorate, Şırnak, Türkiye

³Department of Public Health, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Türkiye

⁴Department of Pediatrics Clinic, Cerkezkoç Public Hospital, Tekirdağ, Türkiye

⁵Occupational Health, Enerjisa Enerji, Istanbul, Türkiye

⁶Department of Public Health, Istanbul Medipol University, Istanbul, Türkiye

⁷Ministry of Health of Türkiye, Ankara, Türkiye

Introduction

Vaccination is one of the most significant public health achievements of the past century [1]. However, the growing phenomenon of vaccine hesitancy, both globally and within individual countries, threatens to undermine this success. Vaccine hesitancy, now recognized as a major public health challenge, has gained increased attention in recent years. During periods of migration caused by war and other crises, the need for public health interventions becomes more critical, though these efforts can face significant disruptions. Given the importance of vaccination as a public health tool, particularly among immigrant populations, assessing vaccine hesitancy in these groups is essential [2].



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Türkiye, as a neighboring country to Syria, has been significantly impacted by hosting a large population of immigrants seeking refuge from the Syrian conflict [3, 4]. As of 2024, 3,181,222 Syrians are under temporary protection in Türkiye, with 530,170 residing in Istanbul, biggest city of Türkiye, of which 48.4% are under the age of 18 [5]. Due to the high concentration of foreigners in the Sultangazi district of Istanbul—where the foreign population surpassed 20% of the local Turkish population—residence permits were suspended for foreigners in October 2022 [6]. In 2014, the Temporary Protection Regulation mandated that vaccinations for children and basic health services be provided free of charge by the General Directorate of Immigration Management [7].

This study, therefore, aims to assess the prevalence of childhood vaccine hesitancy among Syrian parents under temporary protection and identify the factors influencing vaccine hesitancy in this population.

Methods

Sample size

The sample size for this study was calculated using the OpenEpi software. Based on an assumed frequency of vaccine hesitancy in the population set at $15\% \pm 5\%$, as reported in previous studies [8, 9], with a 95% confidence interval, the required sample size was determined to be 196 participants. To account for a 15% margin of error due to potential incomplete or inaccurately answered surveys, the target sample size was increased to 225 participants.

Patient recruitment

The Arabic version of the Parental Attitudes About Childhood Vaccinations (PACV) Survey was administered to Syrian parents with at least one child, attending one of three Immigrant Health Outpatient Clinics in the Sultangazi district of Istanbul, between October and December 2023. An equal number of participants were recruited from each of the three outpatient clinics.

Childhood vaccinations

The following vaccines, included in the National Childhood Vaccination Schedule of the Ministry of Health of the Republic of Turkey, were provided free of charge: Measles, Rubella, Mumps, Diphtheria, Pertussis, Tetanus, Polio, Chickenpox, Hepatitis B, Hepatitis A, Haemophilus influenzae type B (Hib), Bacillus Calmette-Guérin (BCG), and Pneumococcal vaccines.

Inclusion criteria

To be eligible for the study, participants had to meet the following criteria: voluntary participation, immigrant status, Arabic language proficiency, and having at least one child under 18 years of age.

Exclusion criteria

Individuals unwilling to participate or those under 18 years of age were excluded from the study.

Data collection

The Arabic PACV questionnaire consists of 15 questions categorized into three subscales: behavior (items 1–2), safety and effectiveness (items 7–10), and general attitudes and trust (items 3–6 and 11–15) [10]. A previous study conducted in the United Arab Emirates (UAE) established the reliability of the Arabic version of the PACV questionnaire, with a Cronbach's alpha coefficient of 0.79, indicating a reliable internal consistency [8].

In addition to the PACV survey, demographic information such as parental age, educational attainment, and the number of children were collected. According to the literature, a PACV score of ≥ 50 indicates vaccine hesitancy [8]. PACV scores were computed using established scoring methods from previous studies and then transformed to a 0–100 scale. Parents with scores below 50 were classified as non-hesitant, while those scoring ≥ 50 were categorized as vaccine-hesitant [11].

Statistical methods

Descriptive statistics, including frequencies and percentages for categorical variables, and means with standard deviations for continuous variables, were used to characterize the data. The Pearson chi-square test was applied to assess associations between categorical variables, while continuous variables were compared using nonparametric tests, specifically the Mann-Whitney U test, when the assumption of normality was not met. The Pearson correlation test was used to assess relationships between continuous variables. A p-value of < 0.05 was considered statistically significant. All statistical analyses were performed using SPSS software version 28.0 for Mac (IBM, Armonk, NY, USA).

Results

A total of 227 parents from three Immigrant Health Centers in Sultangazi participated in the study. The mean age of the parents was 30.9 ± 8.1 years. On average, participants had 3 ± 2 children (range: 1–9) and had been residing in Türkiye for 8 ± 3 years (range: 1–15 years). In terms of income distribution, 57.22% of parents reported earning between 8,000 Turkish Lira (286 USD) and 15,000 Turkish Lira (536 USD) (Table 1).

Vaccine hesitancy behavior

In the **Behavior** subcategory, The most common answers were as follows: 77.63 of parents reported not delaying their child's vaccination for reasons other than illness or allergy, and 90.37 stated that they decided to vaccinate their child (Table 2).

Table 1 Demographics of parents at Immigrant Health Centers

Parameters		% (n)
Sex	Female	83.7% (190/227)
	Male	16.3% (37/227)
Income in local currency, Turkish Lira (TL) and USD equivalent	< 8000 TL (286 USD)	20.9% (47/227)
	8000–15,000 TL (286–536 USD)	57.2% (130/227)
	≥ 15,000 TL (536 USD)	21.9% (50/227)
Mother's Education Level	Illiterate	13.2% (30/227)
	Primary school	45.7% (104/227)
	High school	22.8% (52/227)
	College/University Degree	17.8% (40/227)
	Higher education (Master's or PhD)	0.5% (1/227)

Table 2 Participants' responses to PACV Survey

BEHAVIOR (1,2)	Yes (%)	No (%)	Don't know (%)		
1. Have you ever delayed having your child get a shot (not including seasonal flu) for reasons other than illness or allergy?	19.18	77.63	3.20		
2. Have you ever decided not to have your child get a shot (not including seasonal flu) for reason other than illness or allergy?	5.96	90.37	3.67		
GENERAL ATTITUDE and TRUST (3–6)	Mean ± Standard Deviation				
3. How sure are you that following the recommended shot schedule is a good idea for your child? From 0 (not at all sure) to 10 (completely sure)	8.8 ± 2.2				
	Strongly Agree (%)	Agree (%)	Not Sure (%)	Disagree (%)	Strongly Disagree (%)
4. Children get more shots than are good for them.	5.50	14.68	25.69	38.07	16.06
5. I believe that many of the illnesses that shots prevent are severe.	20.29	31.88	28.99	14.98	3.86
6. It is better for my child to develop immunity by getting sick than to get a shot	8.70	28.02	19.81	29.47	14.01
SAFETY and EFFECTIVENESS (7–10)					
7. It is better for children to get fewer vaccines at the same time.	3.88	17.48	28.64	37.86	12.14
	Not at all Concerned (%)	Not too Concerned (%)	Not Sure (%)	Some-what Concerned (%)	Very Concerned (%)
8. How concerned are you that your child might have a serious side effect from a shot?	11.90	26.19	13.33	27.62	20.95
9. How concerned are you that anyone of the childhood shots might not be safe?	13.33	26.19	21.90	23.81	14.77
10. How concerned are you that a shot might not prevent the disease?	17.70	24.88	28.71	21.53	7.18
GENERAL ATTITUDE and TRUST (11–15)	Yes	No	Don't know		
11. If you had another infant today, would you want him/her to get all the recommended shots	78.33	17.73	3.94		
	Not at all Hesitant (%)	Not too Hesitant (%)	Not Sure (%)	Some-what Hesitant (%)	Very Hesitant (%)
12. Overall, how hesitant about childhood shots would you consider yourself to be?	38.28	30.14	17.70	7.66	6.22
	Strongly Agree (%)	Agree (%)	Not Sure (%)	Disagree (%)	Strongly Disagree (%)
13. I trust the information I receive about shots.	33.81	41.43	18.10	4.76	1.90
14. I am able to openly discuss my concerns about shots with my child's doctor.	27.27	36.84	21.53	11.96	2.39
	Mean ± Standard Deviation				
15. All things considered; how much do you trust your child's doctor? From 0 (no trust at all) to 10 (completely trust)	8.07 ± 2.1				
PACV Score Total	26.71 ± 17.58				

Table 3 Examination of factors affecting vaccine hesitancy

	Not Vaccine Hesitant %	Vaccine Hesitant %	<i>p</i>
Sex, %			
Female	92.90	7.10	0.183 ¹
Male	85.20	14.80	
Income, % (<i>n</i>)			
<8000 TL (286 USD)	92.31	7.69	0.507 ²
8-15000 TL (286–536 USD)	89.72	10.28	
≥15,000 TL (536 USD)	87.80	12.20	
Mother's Education Level, % (<i>n</i>)			
Illiterate	76.92	23.08	0.038²
Primary School Graduate	91.11	8.89	
High School Graduate	88.89	11.11	
College/University Graduate	97.14	2.86	
Higher Education	100.00	0.00	
Age, years, mean ± SD, median (min-max)	30.9 ± 8.2, 30 (18–63)	30.8 ± 6, 30 (24–43)	0.966 ³
Number of children, mean ± SD, median (min-max)	3 ± 2, 3 (1–9)	3 ± 1, 3 (1–5)	0.401 ³
Living Time in Türkiye, years, mean ± SD, median (min-max)	8 ± 3, 8 (1–15)	7 ± 3, 8 (2–11)	0.813 ³

¹Pearson Chi-square, ²Linear-by-Linear Chi-square, ³Mann-Whitney U test

*Row percentage value is provided for all parameters in the table

Abbreviations; SD: Standard Deviation, Min: Minimum, Max: Maximum

Table 4 Correlation between PACV and continuous variables

Correlations		Age, years	Living Time in Türkiye, years	Number of Children
Living Time in Türkiye, years	Pearson Correlation (<i>r</i>)	0.107		
	Significance (<i>p</i>)	0.275		
Number of Children	Pearson Correlation (<i>r</i>)	0.514**	0.113	
	Significance (<i>p</i>)	0.001	0.199	
PACV Score	Pearson Correlation (<i>r</i>)	-0.031	0.063	-0.182*
	Significance (<i>p</i>)	0.726	0.445	0.029

** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level

General attitudes and Trust

In the **General Attitude and Trust** category, 78.33% of parents expressed a desire for future children to receive all recommended vaccinations. The percentage of those who agree and disagree with the statement 'It is better for my child to develop immunity by getting sick than to get a shot' is very close to each other (Table 2).

Safety and effectiveness concerns

In the **Safety and Effectiveness** category, 21% of parents said they were very concerned about their children experiencing serious side effects, 14.77% about vaccine safety, and 7.18% about the effectiveness of vaccines in preventing diseases. The least common response was 'being very concerned' that a effectiveness of vaccines in preventing diseases (Table 2).

PACV score and vaccine hesitancy

Based on these scores, the proportion of parents classified as vaccine-hesitant (PACV score ≥ 50) was 10.6% (Table 2).

There was a significant linear-by-linear association between vaccine hesitancy and education level

($p=0.039$). Individuals who were illiterate had the highest rate of vaccine hesitancy, while those with a college/university education or higher had the lowest rate of vaccine hesitancy ($p=0.038$) (Table 3).

A significant positive moderate correlation was observed between age and the number of children, while a weak negative correlation was noted between the number of children and the PACV score (Table 4).

Discussion

Vaccine hesitancy is defined as a delay in acceptance or refusal of vaccines despite the availability of vaccination services [12]. It is noteworthy that free access to childhood vaccinations is provided at all three immigrant health centers where our study was conducted. Paradoxically, as vaccine success increases and the threat of vaccine-preventable diseases decreases, concerns about vaccine safety tend to rise [13]. This phenomenon creates a paradox in vaccine efficacy. Additionally, during migration, parental perceptions of disease risk may be reduced due to the significant stressors associated with displacement. The majority of studies comparing the burden of vaccine-preventable diseases ($n=17.9%$) have shown

a higher burden among migrants than non-migrants, largely due to lower vaccination rates [14]. Thus, our study aimed to assess vaccine hesitancy rates among this migrant population in Türkiye.

Previous research has established a direct association between higher PACV (Parent Attitudes about Childhood Vaccines) scores and childhood underimmunization [15]. A study in Sudan highlighted that hesitancy toward the measles vaccine significantly impacted its uptake, with PACV scores serving as predictors of vaccination status [16]. In our study, the vaccine hesitancy rate among Syrian parents was found to be 10.6%. In contrast, a study of Turkish parents with children under the age of 5 reported a vaccine hesitancy rate of 4.1% using the PACV scale [17]. Another study in Türkiye, involving parents of children up to 6 years old, reported a vaccine hesitancy rate of 13.8%, with 4.8% of parents outright refusing vaccines [18]. Similarly, research conducted within an Arabic-speaking population found vaccine hesitancy in 12% of parents [8]. In Indonesia, pediatric vaccination hesitancy was observed in 15% of survey participants, primarily due to concerns about vaccine safety and efficacy [9].

The average PACV score in our study was 27.71 ± 17.58 , which is comparable to the score of 26.68 ± 4.46 reported in a study conducted among Arab populations [19]. In the United States, the median PACV score was 28 [20], while in Ireland, the mean PACV score was 26.9 (SD 19.1), with 14.4% of the population exhibiting vaccine hesitancy [21].

Sociodemographic factors have been linked to vaccine hesitancy. For example, one study identified being a mother as a significant factor associated with higher vaccine hesitancy compared to being a father [22]. In our study, however, no significant difference was found between genders in terms of vaccine hesitancy. It is worth mentioning that the vast majority (83.9%) of the parents visiting the immigrant health centers were women. Additionally, we observed that the parents attending the centers had significantly low income levels.

Our findings revealed a reduction in vaccine hesitancy as the mother's education level increased. In contrast, a different study reported higher levels of vaccine hesitancy among university-educated mothers, particularly those who had undergone fertility treatment, had not received prenatal education on pediatric vaccines, or followed anti-vaccine groups on social media. Hesitancy was also more common among parents who did not regularly administer vitamin D and iron supplements to their children, relied on non-scientific sources for vaccine information, were concerned about vaccine ingredients (e.g., aluminum, mercury, pork gelatin), or used alternative medicine [18]. It has been shown that parents' willingness to vaccinate their children against COVID-19 is significantly associated with factors such as education

level, prior COVID-19 infection, vaccination status, and PACV scores [19]. In our study, we observed an inverse correlation between the number of children and PACV score, which could be attributed to parents gaining more experience and education over time.

A study from the United Arab Emirates reported that 35% of parents were concerned about vaccine side effects, 17% questioned vaccine safety, and 28% worried about their children receiving too many vaccines [8]. Similarly, a study in Ireland found that the primary reason parents chose not to vaccinate their children was concerns over vaccine safety and effectiveness [21]. In our study, 21% of parents expressed concern that their child might experience a serious side effect from a vaccine. Moreover, concerns about vaccine safety emerged as a major driver of vaccine hesitancy.

Limitations and strengths

This study provides valuable insights into a significant issue of social mobility, particularly highlighting the challenges faced by immigrant populations regarding childhood vaccination. Conducting the research across three different immigrant health centers in Istanbul, where immigrant communities are concentrated, enhances the robustness of the findings. However, the limitation of focusing on a single district may restrict the generalizability of the results to regions with diverse demographic compositions. A notable strength of this study is the administration of the survey in the participants' native language, which likely improved comprehension and response accuracy.

Conclusion

The observed rate of vaccine hesitancy among Syrian parents under temporary protection underscores the urgent need for targeted interventions. This finding highlights the necessity of developing specific strategies to address concerns related to infectious diseases and vaccination among immigrants in temporary protection. Such efforts are crucial for ensuring the health and well-being of both the immigrant population and the broader community.

Author contributions

Project design: ENK, BZP, MA. Literature search: ENK, BZP, SY, OFB. Writing and editing the text: ENK, BZP, SY, MA, MA, OFB, HKA. Language, grammar, and proof-reading: ENK, SY, OFB, HKA. Revisions: ENK, BZP, MA, SY, OFB, HKA. All authors have contributed to and approved the final manuscript.

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Data availability

The data is available as an excel file but has not been published for patient confidentiality. It can be shared with the journal if necessary.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee on June 22, 2023, under decision number 546. Informed written consent was obtained from all Legal guardian or an appropriate representative of these participants prior to their inclusion in the study. All procedures were performed in accordance with the ethical standards of the Declaration of Helsinki and the National Research Committee.

Consent for publication

Not Applicable.

Competing interests

The authors declare no competing interests.

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