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ORIGINAL ARTICLE

The association of vaccine hesitancy with other public health practices in well child care: a cross-sectional study

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Abstract

Vaccination is one of the most successful public health initiatives in human history. Despite all the benefits of vaccination, it is noteworthy that the number of vaccine hesitant parents has increased in recent years. Individuals with vaccine hesitancy are known to have similar attitudes towards other scientific initiatives. In this study, it is investigated the relationship between the attitudes of vaccine hesitant parents and other practices and interventions in well child care. The "Parental Attitudes Towards Childhood Vaccinations (PACV) scale was applied to parents of children aged 2-6 without chronic diseases. A PACV score of 50 or above was considered as vaccine hesitancy. Sociodemographic characteristics, economic status and practices in well child care were questioned. Parents' vaccine hesitancy and their approaches to other practices in well child follow-up were compared. A total of 329 parents were included in the study. The rate of parents with vaccine hesitancy was 22.8% (n=75). In both groups, most participants had an undergraduate/graduate level of education. Those with vaccine hesitancy were less likely to have received vitamin K at birth (81.3% vs. 97.6%, $p<0.01$), and use of prophylactic vitamin D (72% vs. 88.2%, $p<0.01$) and iron supplements in the first year of life (66.7% vs 78.3%, $p=0.038$) were lower. No difference was found for developmental hip dysplasia and hearing screening. The current attitudes of vaccine hesitant parents are not limited to vaccination, but also affect other health initiatives. This study indicates that vaccine hesitant individuals are also opposed and/or reluctant to child health initiatives. Taking this into account when developing strategies to overcome vaccine hesitancy may lead to more effective results.

Keywords: Vaccine hesitancy, well child car, PACV, newborn screening, public health

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Introduction

Vaccination is one of the most successful public health initiatives in human history. Over the past 50 years, it has averted approximately 150 million premature deaths, with 95% of these occurring in children under 5 years old. Furthermore, half of the decline in child mortality over the past five decades can be attributed to vaccination. Vaccination provides personal immunity and limits the spread of disease within society. As diseases become less frequent and people are less exposed to them, the incidence of vaccine-preventable diseases decreases, making the vaccine's effectiveness less apparent. In a way, the vaccine becomes a victim of its own success [1-3]. Vaccine hesitancy is defined by the World Health Organization (WHO) Strategic Advisory Group of Experts on Immunization (SAGE) as delay or complete refusal to vaccinate despite the availability of vaccine services [4]. The number of unvaccinated children and the rate of vaccine hesitancy are increasing in Türkiye and globally, posing a significant threat to public health [5-7]. The decision to vaccinate involves complex decision-making mechanisms influenced by many factors. There are three basic beliefs leading to vaccine hesitancy:

1. Lack of confidence in the efficacy and reliability of the vaccine, the health system, and policymakers regarding the need for vaccination.

2. The belief that vaccination is unnecessary because vaccine-preventable diseases are rare or absent.

3. Inability to be vaccinated due to physical or social reasons [4].

In addition, the impact of socio-cultural factors on vaccine hesitancy has been highlighted by WHO [8]. It is known that vaccine-hesitant individuals often turn to alternative methods [9,10]. At the same time, although it is reported in the literature that these individuals keep their distance from other public health practices and avoid these practices, there are few studies on this subject in our country [10,11]. In this study, it is examined the approaches of vaccine-hesitant parents to healthy child monitoring practices.

Materials and Methods

Ethical approval was obtained from Hacettepe University Ethics Committee (GO 23/481 dated 25.07.2023) within the framework of "Vaccine Hesitancy Study". Prior to the study, permission was obtained from Etlik City Hospital, where the participants were enrolled. The study included parents with children between the ages of 2 and 6 who registered at Etlik City Hospital between July 2023 and September 2023. After obtaining consent, participants were asked about their socio-demographic and economic status and their participation in well child monitoring practices. To assess vaccine hesitancy, they were asked to complete the Parents' Attitudes Toward Childhood Vaccines (PACV) questionnaire developed by Opel et al. [12] and adapted for Turkish validity and reliability by Bulun et al. [13]. Permission was obtained from both authors before using the survey. The PACV survey contains a total of 15 questions, two on parental vaccination behavior, four on safety and effectiveness, and nine on attitudes and confidence. Each participant's responses were scored to obtain a PACV score between 0 and 100 [12]. Those with a PACV score of less than 50 were classified as having no vaccine hesitancy, and those with a PACV score of 50 and above were classified as having vaccine hesitancy, to be consistent with other studies in the literature [12, 14-17]. The article has been edited according to the CONSORT guideline [18].

All statistical analyses were performed using SPSS for Windows, version 22.0 (IBM). Data distributions were assessed using the *Kolmogorov-Smirnov test* and histograms. For data conforming to the normal distribution, mean and standard deviation were used to report statistics. Comparisons between groups were made using the chi-squared test or Student's t-test, as appropriate. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 329 parents were included in the study. The rate of vaccine hesitant parents was found to be 22.8% (n=75). There were no differences between the two groups in terms of children's gender, parents' age, level of education, presence

of chronic illness in the mother, perceived economic situation and family structure. The total number of children was different between the two groups (p=0.02). In the group without vaccine hesitancy, the rate of those with only one child (40.6%) was higher than in the other group (25.3%). The prevalence of chronic diseases in the father was also higher in the vaccine hesitant group (p=0.025) (Table 1).

Among those with vaccine hesitancy, vitamin K administration at birth (81.3% vs. 97.6%, p<0.01), prophylactic vitamin D (72% vs. 88.2%, p<0.01) and iron supplementation (% 66.7 vs. 78.3%, p=0.038) use in the first year were lower. No difference was found in heel prick test, developmental dysplasia of hip (DDH) and hearing screening. Among those with vaccine hesitancy, the frequency of not using vitamin K was 9.49 times higher (95% CI=3.50-25.70), the frequency of not using vitamin D in infancy was 2.9 times higher (95% CI=1.54-5.46), and the frequency of not using prophylactic iron was 1.81 times higher (95% CI=1.03-3.18). -3.18) (Table 2).

Discussion

Vaccine hesitancy and rejection have been present since the discovery of vaccines. However, today, it has escalated to a public health problem of dangerous dimension globally, prompting the WHO to take action [19-21]. In recent years, this issue has attracted the attention of health professionals and authorities in Türkiye and worldwide, leading to the initiation of studies.

Table 1. General characteristics of groups.

	PACV score <50	**PACV score ≥50**	***p*-value**	**Total**
Sex				
Male	130 (79.3)	34 (20.7)	0.373	164 (50.2)
Female	124 (75.2)	41 (24.8)		165 (49.8)
Maternal age (mean ± SD)	34.9 (±6.80)	35.9 (±6.81)	0.270	35.1 (±6.82)
Paternal age (mean ± SD)	37.8 (±6.83)	39.5 (±7.05)	0.527	38.2 (±6.91)
Number of children				
1	103 (40.6)	19 (25.3)		122 (37.1)
2	94 (37)	29 (38.7)	**0.02**	123 (37.4)
3 or more	57 (22.4)	27 (36)		84 (25.5)
Education status of parent*				
Literate/primary/second	29 (11.4)	6 (8)		35 (10.6)
High school	73 (28.7)	24 (32)	0.656	97 (29.5)
University/MSc/PhD	152 (59.8)	45 (60)		197 (59.9)
Maternal chronic disease				
Yes	28 (11)	9 (12)	0.814	37 (11.2)
No	226 (89)	66 (88)		292 (88.8)
Paternal chronic disease**				
Yes	19 (7.5)	12 (16.2)	**0.025**	31 (9.5)
No	234 (92.5)	62 (83.8)		296 (90.5)
Perception of economic situation				
Income less than expenses	61 (24)	21 (28)		82 (24.9)
Income equal to expenses	145 (57.1)	39 (52)	0.714	184 (55.9)
Income more than expenses	48 (18.9)	15 (20)		63 (19.1)
Family status				
Nuclear family	234 (92.1)	70 (93.3)	0.729	304 (92.4)
Extended family	20 (7.9)	5 (6.7)		25 (7.6)

*Survey respondent
**The two deceased fathers were not included in the evaluation.
SD: Standard, deviation, PACV: Parents' Attitudes Toward Childhood Vaccines
Those with PACV scores of 50 and above were considered vaccine hesitant.
Values are given as mean±SD and %, groups were compared using Student-t test and Chi-square test, respectively.

However, the evaluation of trends remains limited due to the scarcity of historical data in Türkiye. The vaccine hesitancy rate in this study was 22.8%. Previous studies on vaccine hesitancy in Türkiye have reported rates ranging from 9.3% to 19.6% [10,22-24]. While the results of this study are in alignment with some previously reported rates, they indicate the highest prevalence of vaccine hesitancy to date. Vaccine hesitancy rates vary between 7% and 27% in different countries, with reports indicating that up to 40% of the population distrust vaccines [25-27]. It is known that vaccination rates are decreasing in Türkiye, and the rapid increase in vaccine rejection may have contributed to the higher rate of vaccine hesitancy observed in this study [5,7]. Another possible reason for the high rate of vaccine hesitancy in this study, conducted after the COVID-19 pandemic, is that distrust in the COVID-19 vaccine may have spilled over into distrust of childhood vaccines, fueled by uncontrolled and exaggerated media reports [28]. It was found that vaccine-hesitant parents were more likely to avoid giving their babies vitamin K at birth and to forego vitamin D and iron prophylaxis in the first year. Among the evaluated parameters, parents with vaccine hesitancy had the highest risk of not giving their babies vitamin K. A pooled analysis of all participants revealed that the utilization rates of vitamin D and iron prophylaxis during the infancy were not at the desired levels. In a study conducted by Koyuncu et al., it was reported that the rate of iron and vitamin D prophylaxis use in babies of parents with vaccine hesitancy was lower, the frequency of resorting to alternative methods was higher, and no significant difference was found in terms of the heel stick test, DDH, and hearing screening [11]. Similarly, Yörük et al. reported that vaccine-hesitant individuals were less likely to use prophylactic iron and vitamin D for their babies and were more likely to use alternative methods [10].

Study limitations

The main limitation of this study is that the population included in the study consisted of people who applied at the hospital. Given that individuals who seek medical care at a hospital have a relatively higher level of trust in the healthcare system and are more likely to do so, there was concern that the rate of vaccine hesitancy observed in this study might be lower than that observed in the general

Table 2. The relationship between well child care practices and vaccine hesitancy.

	PACV score <50	PACV score ≥50	*p*-value	Total	PACV score <50 vs PACV score ≥50 Odds ratio (%95 CI)
Heel stick					
Yes	250 (98.4)	74 (98.7)	0.881	324 (98.5)	0.85 (0.09 – 7.67)
No	4 (1.6)	1 (1.3)		5 (1.5)	
Vitamin K					
Yes	248 (97.6)	61 (81.3)	**<0.01**	309 (93.9)	9.49 (3.5 - 25.7)
No	6 (2.4)	14 (18.7)		20 (6.1)	
Vitamin D					
Yes	224 (88.2)	54 (72)	**<0.01**	278 (84.5)	2.90 (1.54 – 5.46)
No	30 (11.8)	21 (28)		51 (15.5)	
Iron supplementation					
Yes	199 (78.3)	50 (66.7)	**0.038**	249 (75.7)	1.81 (1.03 – 3.18)
No	55 (21.7)	25 (33.3)		80 (24.3)	
Hearing screening					
Yes	251 (98.8)	74 (98.7)	0.916	325 (98.8)	1.13 (0.12 – 11.03)
No	3 (1.2)	1 (1.3)		4 (1.2)	
DDH					
Yes	251 (98.8)	72 (96)	0.109	323 (98.2)	3.49 (0.69 – 17.64)
No	3 (1.2)	3 (4)		6 (1.8)	

DDH: Developmental dysplasia of hip, CI: confidence interval, PACV: Parents' Attitudes Toward Childhood Vaccines
Those with PACV scores of 50 and above were considered vaccine hesitant.

population. Nevertheless, the vaccine hesitancy rate identified in this study was higher than that reported in previous studies conducted in Türkiye. This may still be a limitation of the study. Furthermore, it is possible that those who were reluctant to participate in the study were more likely to be vaccine-hesitant. However, this potential bias was minimized by ensuring that participants were anonymous. In addition, the fact that the participants were from a single city does not make it possible to generalize the results to society.

Conclusion

The findings indicate that vaccine hesitancy is increasing in Türkiye and that vaccine hesitant individuals are hesitant not only about the vaccine but also about other public health initiatives. This situation calls for an expanded approach to include all health practices in interventions to address vaccine hesitancy. Further studies on this subject and the identification of common causes of vaccine hesitancy and distrust in other health practices will enable interventions to be more effective.

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Conflict of interest

The author declares that there is no conflict of interest regarding the publication of this article.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

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