

Parents' perspective on childhood vaccines and the correlation of vaccine hesitancy with health literacy

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Abstract. *Study Objectives:* The purpose of this study was to analyze the parents' perspective on childhood vaccinations and the correlation between vaccine hesitancy the health literacy. *Methods:* The population of this cross-sectional study consists of the parents of the pediatric patients who receive service from the Pediatric Clinic of the Yüksek İhtisas Training and Research Hospital in Bursa, Turkey. Personal Information Form, Vaccine Hesitancy Scale, and Turkey Health Literacy Scale-32 (TSOY-32) tools were used to collect data. *Results:* 78% of the parents being the majority think that unvaccinated children are a threat to their children, 68.8% of them think childhood vaccines are beneficial and 67.1% of them think that mandatory vaccines are necessary. Parents who do not find vaccines helpful are most likely to view the flu vaccine negatively. Families oppose the flu vaccine due to the fact that there are many types of flu vaccines, they are not useful and they are unreliable. The vaccine hesitancy mean score of the participants was calculated as 22.29 and the mean score of TSOY-32 was calculated as 30.39. There is a weak, negative ($r_{\text{spearman}}=-0.211$), and significant ($p=0.005$) relationship between vaccine hesitancy and health literacy. *Conclusion:* It has been observed in this study that a substantial number of parents are against childhood vaccines. Unfounded posts on non-scientific channels such as social media become determinative in parents' negative views of vaccines. This situation can be life-threatening to children. Vaccine hesitancy, albeit weakly, also decreases with the increase in health literacy.

Key words: childhood vaccines, anti-vaccination, vaccine hesitancy, health literacy

Introduction

Vaccines are one of the important public health tools in maintaining public health, fighting and preventing communicable diseases (1). With the vaccination of individuals, precautions are taken to combat infectious diseases that may have a high probability of sequela or mortality. In addition, vaccination is an effective way to provide herd immunity, prevent epidemics and eliminate them (2).

Vaccine hesitancy is defined as the delay or refusal to accept vaccines despite the availability of vaccination services. Individuals experiencing vaccine hesitancy are affected by many factors. The most common causes among them are social, political, cultural factors, as

well as access to sources of misinformation about vaccines. The number of vaccine-preventable diseases is increasing in developed and developing countries both due to individuals experiencing vaccine hesitancy and the decrease in vaccination (3).

According to the World Health Organization (WHO), approximately 5 million children under the age of 5 died worldwide in 2020, mostly from preventable and treatable reasons (4). Again, according to WHO reports, it has been established that the number of children who are not fully vaccinated increased by 3.4 million in 2020, and an estimated 23 million children under the age of one were not given basic vaccinations (5).

In a cohort study of inadequate vaccination conducted in the United States, it has been found that

157.454 (48.7%) of 323.247 children born between 2004 and 2008 were under-vaccinated (6). According to Turkey Demographic and Health Survey (DHS-2018) data and considering the vaccination card and the mother's declaration, it has been reported that 67% of 12-23 month-old children have all age-appropriate vaccinations in the first 23 months of their lives. Also, according to DHS-2018 data, 2% of children aged 12-23 months and 3% of children aged 24-35 months have never been vaccinated. The proportion of children aged 24-35 months who have received all basic vaccines is 72% (7).

Health literacy can be expressed as "the knowledge, motivation, decisions, and competencies of individuals about accessing, understanding, interpreting and applying health information to protect, improve, and maintain their health" (8). In other words, health literacy is a subject that supports the ability to understand and interpret this information by increasing the quality of life of people, contributing to the development of their health, helping them in making decisions on health-related issues, and making individuals aware of the issue (9).

The purpose of this study is to examine the parents' view of childhood vaccines and the correlation of vaccine hesitancy with health literacy.

Methods and Tools

Scope of the Research

Parents of pediatric patients (214 people) who received service from Bursa Yüksek İhtisas Training and Research Hospital Pediatric Clinic between

06.07.2021 and 17.09.2021 constitute the population of this study. 32 parents refused to participate in the study, 9 parents were not included in the study due to insufficient data, and a total of 173 people were evaluated. Since data was collected from the parents of the children who came to the clinic between the relevant dates, the sample was not used in the study.

Data Collection and Evaluation

Personal Information Form, Vaccine Hesitancy Scale, and Turkey Health Literacy Scale-32 (TSOY-32) tools were used to collect data. The Personal Information Form consists of 18 questions prepared in accordance with the purpose of the study. The "Vaccine Hesitancy Scale", which is a Likert-type scale, consists of 9 items, and the 1st, 2nd, 3rd, 4th, 6th, 7th, and 8th items are reverse scored. A minimum of 9 and a maximum of 45 points can be obtained from the scale. The higher the scores are, the higher the vaccine hesitancy becomes. Önal et al. (2021) carried out Turkish validity and reliability study (10).

The TSOY-32 scale was adapted into Turkish from the European Health Literacy Scale. It is used to evaluate the health literacy of people over the age of 15 based on self-report. The Likert type TSOY-32 scale consists of 32 items and each item is graded as 1 (very difficult), 2 (difficult), 3 (easy), and 4 (very easy). With the help of the index=(arithmetic mean-1)*(50/3) formula, the scoring was converted to be between 0-50 as in the European Health Literacy Survey-HLS-EU study. Index means the calculated personal index, arithmetic mean indicates mean of responses given to each item, 1 denotes the lowest possible value of the

Table 1. 2*4 matrix components of TSOY-32 scale and item numbers of components

	Accessing Health-related Information	Understanding Health-related Information	Evaluating Health-related Information	Using/applying Health-related Information
Treatment and service	1, 4, 5, 7	2, 8, 11, 13	3, 9, 12, 15	6, 10, 14, 16
Disease prevention / health promotion	18, 20, 22, 27	19, 21, 23, 25	24, 26, 28, 32	17, 29, 30, 31

With the index score, health literacy is evaluated in four categories.

0-25 points indicate insufficient health literacy

>25-33 points indicate problematic – limited health literacy

>33-42 points denote sufficient health literacy

>42-50 points denote perfect health literacy (11).

mean, and 3 denotes the range of the mean. Turkish validity and reliability study was conducted by Okyay and Abacıgil (2016). While the general internal consistency coefficient of the scale was found to be 0.927, the internal consistency coefficient was found to be 0.932 in this study.

Statistical Analysis

Whether the data conformed to the normal distribution was evaluated with Histogram graph, Simple Scatter Plot, and Kolmogorov-Smirnov Test ($p < 0.05$). Since the data did not meet the parametric conditions, Mann-Whitney U and Kruskal Wallis H tests and Spearman Correlation analysis were used.

Administrative and Ethical Consent of the Study

Administrative permission was obtained for the collection of data with the approval of the Chief Physician of the Turkish Ministry of Health Bursa Yüksek İhtisas Training and Research Hospital, dated 06.07.2021. Ethical approval was obtained with the decision of Bitlis Eren University Ethical Principles and Ethics Committee dated 11.06.2021 and numbered 21/7-5.

Limitations

The results of this study can be generalized to parents of children who applied to Bursa Yüksek İhtisas Training and Research Hospital Pediatric Clinic.

Results

The sociodemographic characteristics of the parents of the children receiving service from the pediatric clinic are presented in Table 2. The average age of the participants was found as 38.52 (min 24 – max 68) years and the average year of marriage was 11.95 (1-35) while the average number of children was 2.23 (1-8).

Children's parents' views on vaccines and the comparison of their vaccination hesitancy scores are given in Table 3.

The parents with 78% being the majority think that unvaccinated children are a threat to their children, 68.8% of them think childhood vaccines are beneficial and 67.1% of them think that mandatory vaccines are necessary. Few of the participants (7 people) have stated that they have been trained by healthcare professionals on vaccination. Nurses provided training on vaccination. The majority of the participants (76.3%) are not indecisive about the Covid-19 vaccine and they want to vaccinate themselves and their relatives. There is a statistically significant difference between the idea of getting a Covid-19 vaccine and vaccine hesitancy ($p < 0.001$). Those who do not want to be vaccinated have a higher vaccination hesitancy score. The reasons for the parents to find the vaccines negative and the factors that affect their negative thoughts are presented in Table 4.

Table 2. The sociodemographic characteristics of the parents

Characteristics		n	%
Gender	Female	85	49.1
	Male	88	50.9
Age	0-29	33	19.1
	30-39	71	41.0
	40 and over	69	39.9
Marital Status	Married	167	96.5
	Divorced	6	3.5
Educational Background	Primary School	52	30.1
	High School	44	25.4
	University	77	44.5
Working Status	Civil Servant	85	49.1
	Private Sector	25	14.5
	Housewife	63	36.4
Number of Children	1	69	39.9
	2	46	26.6
	3 and more	58	33.5
Children Aged 0-6	Yes	75	43.4
	No	98	56.6
Year of Marriage	0-5	41	23.7
	6-10	56	32.4
	11 and more	76	43.9
Total		173	100

The parents in the study with 17.3% (30 people) think that vaccines are not beneficial. Most of the parents who are against the vaccine indicating 70% of them (21 people) have stated that the vaccine companies have commercial purposes, 66.7% (20 people) think they are produced in foreign countries, and 60% (18 people) do not trust the vaccines

because of the ingredients in the vaccines. In the parents' own words, the main factors effective in being anti-vaccinist are social media 63.3% (19 people) and media 46.7% (14 people). Influenza vaccine is the most opposed vaccine and there are many types of flu vaccines, which caused parents to view the vaccine negatively.

Table 3. Parents' perspective on vaccines and vaccine hesitancy

Characteristics		n	%	Median	p
Thinking the Vaccine is Helpful	Yes	119	68.8	20.00	<0.001*
	Partially	24	13.9	21.50	
	No	30	17.3	32.00	
Obtaining Information about the Vaccine from the Health Professional	Yes	7	4.0	20.00	0.895
	No	166	96.0	20.50	
Thinking Mandatory Vaccination is Necessary	Yes	116	67.1	19.00	<0.001*
	No	31	17.9	29.00	
	Partially	26	15.0	24.50	
Perceived Threat Status for Unvaccinated Children	Threat	135	78.0	20.00	<0.001**
	Not a threat	38	22.0	31.00	
The Situation of Self and Family Vaccination for Covid-19	Yes	132	76.3	20.00	<0.001**
	No	41	23.7	30.00	
Purpose of Childhood Vaccination	Disease Protection	39	22.5	21.00	<0.001*
	Treatment	22	12.7	29.00	
	Treatment /Protection	112	64.8	19.00	
Total		173	100		

* Kruskal Wallis H test, **Mann-Whitney U

Table 4. Reasons and effective factors for parents to find the vaccines negative

		n	%*
Parents' Reasons for Finding the Vaccines Negative	Vaccine companies produce for commercial purposes.	21	70.0
	I don't trust them due to being produced in foreign countries.	20	66.7
	I don't trust the ingredients in vaccines.	18	60.0
	I think they will cause infertility.	4	13.3
	They cause hyperactivity or autism.	4	13.3
	First they make us sick, then they produce the vaccine.	3	10.0
	They cause mental retardation.	2	6.7
Factors Affecting Parents' Anti-Vaccination	Social media	19	63.3
	Media	14	46.7
	Negative publications about vaccines	7	23.3
	My relatives	4	13.3
	My friends	2	6.7

Table 4 (Continued)

		n	%*	
Vaccinations That Parents Don't Want Their Children to Get and Reasons	Flu	24	80.0	
	Reason; Lots of types (8 people), Not useful (4 people), I don't trust (4 people)			
	Tetanus- Diphtheria	9	30.0	
	Not a major disease (3 people), I don't trust (1 person)			
	Hepatitis A	9	30.0	
	Not a necessary vaccine (2 people), I don't trust (1 person)			
	Pentavalent vaccine	8	26.7	
	Unnecessary-people around me do not recommend (2 people), I do not trust (2 people)			
	Pneumococcus	8	26.7	
	I haven't heard (1 person), Unnecessary (1 person), I don't trust (1 person)			
	Hepatitis B	7	23.3	
	Chickenpox	5	16.7	
	Measles	8	26.7	

* Percentages were calculated out of 30 people who did not find the vaccine helpful.

Table 5. Classification of TSOY-32 points and vaccine hesitancy

Characteristics		n	%	Median	p
Health Literacy Level	Insufficient-Problematic	95	54.9	21.00	0.021*
	Sufficient-Perfect	78	45.1	20.00	
Total		173	100		

*Mann-Whitney U

Table 6. TSOY-32 and its subcomponents and vaccine hesitancy mean scores of the participants

	n	Min	Max	Mean ¹	SD ²
Vaccine Hesitancy	173	9.00	43.00	22.29	6,15
Health Literacy General Index Score	173	4.17	50.00	30.39	7,03
Treatment and Service	173	6.25	50.00	31.11	7,26
• Accessing Health-related Information	173	0.00	50.00	32.15	8.38
• Understanding Health-related Information	173	12.50	50.00	30.88	8.43
• Evaluating Health-related Information	173	0.00	50.00	30.29	8.51
• Using/Applying Health-related Information	173	8.33	50.00	31.09	8.39
Disease Prevention / Health Promotion	173	2.08	50.00	29.68	8.04
• Accessing Health-related Information	173	0.00	50.00	31.02	8.84
• Understanding Health-related Information	173	4.17	50.00	31.14	9.01
• Evaluating Health-related Information	173	4.17	50.00	28.49	9.64
• Using/Applying Health-related Information	173	0.00	50.00	28.08	10.27

1, Mean; 2, SD: Standard Deviation

The comparison between the general health literacy score of the parents of the children receiving service from the pediatric clinic with sub-dimensions and vaccine hesitancy is shown in Table 6.

The vaccine hesitancy mean score of the participants in the study was calculated as 22.29 and the TSOY-32 score average was calculated as 30.39. The correlation of parents with TSOY-32 and its

Table 7. Correlation of vaccine hesitancy of parents with TSOY-32 and its sub-components

	r*	p
Health Literacy General Index Score	-0.211	0.005
Treatment and Service	-0.218	0.004
• Accessing Health-related Information	-0.238	0.002
• Understanding Health-related Information	-0.179	0.019
• Evaluating Health-related Information	-0.184	0.016
• Using/Applying Health-related Information	-0.205	0.007
Disease Prevention / Health Promotion	-0.189	0.013
• Accessing Health-related Information	-0.191	0.012
• Understanding Health-related Information	-0.216	0.004
• Evaluating Health-related Information	-0.162	0.033
* Using/Applying Health-related Information	-0.126	0.099

* Spearman Correlation Analysis

subcomponents with vaccine hesitancy is presented in Table 7.

There is a weak, negative, and significant relationship between TSOY-32 and its subcomponents and vaccine hesitancy. There is a weakly negative (rspearman=-0.211) and significant (p=0.005) relationship between vaccine hesitancy and health literacy.

Discussion and Conclusion

Vaccination is the most effective method of protection in the protection of children's health, in the fight against infectious diseases, in the prevention and elimination of epidemics. However, there are still insufficient or unvaccinated children in the world (12-14). In this study, parents (17.3% of the participants) do not find the vaccines beneficial for their children and miss an important opportunity for their children's health by not vaccinating them. When we look at the literature studies on vaccines in 1998-2020, it is observed that not finding the vaccines positive varies between 4.5% and 11.9% (13,15-17). Compared to other studies, the higher rate of those finding the vaccine negative in this study may be due to the difference in the sample group.

Health education has an important place in parents' gaining positive attitudes and behaviors towards vaccines. However, it has been seen in this study that

vaccination education is not adequately provided by the health worker. Those receiving trainings constitute only 7% and the training has been provided by the nurse. In the study of Gungor et al. conducted in 2021, they reported that 58.5% of parents had information about vaccines and 62.4% received information from doctors (18). In this study, 67.1% of parents think that mandatory vaccination is necessary. Similar results were found in another study. The parents with 79.1% think that vaccines are necessary (16).

Vaccines are one of the most effective methods of preventing communicable diseases and maintaining public health. Some parents think that the vaccine is only for treatment. In this study, 22.5% of parents reported that vaccines were administered to prevent disease, 12.7% for treatment, and 64.8% for protection with treatment. In one study, 78.4% of parents have stated that vaccines protect against infectious diseases and 81.2% prevent the occurrence of epidemics (18).

Parents who think that vaccines are not helpful have put forward many reasons. The main reasons put forward by parents who do not find the vaccine useful or are hesitant to vaccinate are the opinion that the vaccines are produced commercially (70%), distrust of the vaccine due to being produced in another country (66.7%), and distrust of the ingredients in the vaccines (60%). In the study conducted at the national level in the USA, it has been suggested that parents are concerned about the benefit and safety of the vaccine

regarding vaccine hesitancy (19). Similarly, parents reported in another study in the literature that they had doubts about the safety and efficacy of the vaccine. Moreover, parents question the necessity of vaccination by worrying that their child is too young (20, 21). The most effective factor in parents being anti-vaccinist is the media following social media. Information pollution in social media can be determinant in the ideas of parents. Afterward, it is observed that the media continues in the form of negative publications about vaccines, relatives, and friends. It is seen that there are similar results in the studies in the literature. It has been reported that external factors are closely related to vaccine hesitancy and vaccine anxiety. Insufficient trust in healthcare professionals negatively affects the vaccination decision. In addition, social norms, peer behavior, and attitude also have an impact on anti-vaccination and vaccine anxiety (22-24).

Health literacy is critical in understanding, approving, and making decisions about the individual's health. Considering the health literacy of the parents who receive service from the children's clinic, 45.1% is at a sufficient-perfect level. Health literacy in rural areas in Turkey is higher than in the study (21.3%). Health literacy may differ according to urban and rural areas. In studies performed on vaccines and health literacy, a relationship was found between the increase in pneumococcal, rotavirus, and flu vaccine rates and health literacy (25, 26).

Health literacy can be effective in attitudes towards vaccination practices. Increasing the health literacy level of individuals is an important step in developing a positive attitude towards immunization (27, 28). In this study, a negative significant relationship was found between health literacy, its sub-components, and vaccine hesitancy similar to the literature. However, this relationship is weak.

In conclusion, it was observed that the parents of children who applied to the pediatric clinic were more likely to view the vaccine negatively. Parents' negative perspectives about vaccines and not having their children vaccinated can be life-threatening. Since adequate education on vaccination is not provided, parents obtain information from more unsafe sources such as social media, and this can be decisive for parents. With the increase in health literacy, there is a decrease in

vaccine hesitancy, albeit weakly. Providing health education about vaccines to the parents with insufficient or limited health literacy may help change their attitudes towards vaccine hesitancy.

Discussions on vaccines have increased recently, and people from all parts of life, especially children, have been affected by these discussions. There is a need for implementing studies to increase the health literacy of parents with vaccine hesitancy.

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