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THE EFFECT OF PARENTS' HEALTH LITERACY LEVEL ON THE ATTITUDES AND BEHAVIORS OF CHILDHOOD VACCINATIONS

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Abstract: Health literacy is important for parents to correctly perceive and implement decisions about their children's health. Health literacy of parents can affect their understanding of the requirements of preventive treatments and their positive attitudes and behaviors towards childhood vaccines. The global growth of vaccine hesitations in recent years has led to increasing concern at WHO. Therefore, the level of health literacy may be important in experiencing vaccine hesitancy. For this reason, the study was carried out to determine the relationship between the health literacy level of parents with 0-59 months old children and their attitudes and behaviors towards childhood vaccinations. A cross-sectional and descriptive design was used in the study. The sample group consisted of 1038 parents. As data collection tools in the research; introductory information form containing introductory information, Parents' Attitudes to Childhood Vaccines Scale and Health Literacy Scale were used. Parents were contacted via an online survey link. The mean age of the parents was 35.36 ± 4.93 years, and 81.7% had an undergraduate/graduate degree. A statistically significant difference was found between the parents' scores from the PACV and the status of obtaining information and negative information about vaccines (Z=2.431, P=0.015; Z=8.707, P=0.000, respectively). Vaccine hesitancy was higher in those who did not obtain information about vaccines than those who did, and in those who obtained negative opinions about vaccines from health personnel than those who did not. As scores from the T-SOY increased, the scores from the PACV decreased. As parents' health literacy levels increased, their vaccine hesitancy decreased. It is thought that initiatives targeting health literacy can improve vaccination coverage and that knowing these relationships well will benefit determining the strategies for combating vaccine opposition and their effectiveness. In our study, vaccine hesitancy was higher in parents who obtained negative opinions from healthcare professionals. This striking result of our study is important in showing that it is not possible to fight against vaccine opposition without building the trust in vaccines among healthcare professionals.

Keywords: Vaccination, Vaccine hesitancy, Vaccine rejection, Parental attitudes, Health literacy levels

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1. Introduction

Health literacy is having the ability to understand and apply health-related information (Guzys et al., 2015). According to the World Health Organization, it is the cognitive and social skills of individuals about their ability to access, understand and use information to maintain healthy well-being and improve health, and their desires (WHO, 2014). Based on these definitions, health literacy is important for a person to correctly perceive and implement decisions about their health (Copurlar and Kartal, 2016). Because individuals with low level of health literacy use preventive health services less, cannot manage their chronic diseases well, and their access to care is limited (Copurlar and Kartal, 2016; Levy and Janke, 2016). Studies show that people with low health literacy have difficulty in understanding the instructions, recommendations and health education of health professionals, and they may not have enough information about immunization (Smith et al., 2015; Cam et al., 2021).

Health literacy levels differ in national and international literature. In a large-scale field study in Türkiye, 64.6% were found to have insufficient health literacy (Yilmazel and Cetinkaya, 2016). In a health literacy study conducted in eight European countries (Germany, Austria, Bulgaria, Netherlands, Ireland, Spain, Poland, Greece), it was stated that 47.6% of the participants had limited health literacy (Tas and Akis, 2016). There are many factors affecting the inadequacy of health literacy such as advanced age, black race, female gender, low education level, low-income level and immigration status (Gunes et al., 2013).

Health literacy plays an important role in protecting the individual and their children from diseases. Individuals need to be vaccinated to become immune to diseases before they get sick. Vaccination has been one of the most successful and cost-effective public health initiatives in protecting and promoting health globally for years (Bloom et al., 2018; Helps et al., 2019). For this reason,

the World Health Organization (WHO) has defined vaccination as a human right. On the other hand, the United Nations Children's Fund (UNICEF) has shown vaccination as a right for all children.

WHO indicates that more than 1.5 million deaths from preventable causes per year can be prevented with vaccination (WHO, 2019). But while the proven benefits of vaccination are well known, the global growth of parental childhood vaccine hesitations has led to increasing concern in WHO (WHO, 2018). According to the Türkiye Demographic Health Survey (2018), it was determined that 2% of 12–23-month-old children were never vaccinated, while only 50% of 24–35-month-old children were vaccinated appropriate for their age (TNSA, 2018). The latest statistics have been published for 2019 and it has been determined that there has been a 9% decrease in the rate of being fully vaccinated in infants and children in the last 10 years (TTB, 2019). Moving from this direction, researchers have conducted studies for this attitude of parents. As a result of the studies, they introduced the terms "vaccine hesitancy" or "vaccine rejection" (Gur, 2019). After the emergence of these concepts, WHO has made various definitions. The term vaccine hesitancy refers to the rejection or delay of vaccines despite the availability of vaccine services (WHO, 2016). Individuals who are hesitant about vaccination are not only considered as individuals who delay or refuse vaccination. Even if parents accept vaccination, the anxiety they experience is also included in the concept of "vaccine hesitation" (ttb.org). These concerns and hesitations include concepts such as reluctance, doubt and insecurity (Paretti-Watel et al., 2015).

Vaccine hesitancy is a situation specific to the personal situation of individuals, and it is a complex situation that varies according to the environment, time, place and type of vaccine (Hausman et al., 2014). This situation of parents about vaccination has led to the frequent use of the word "hesitancy" in the literature. However, what is meant here is not just the meaning of the word, but the underlying reasons (WHO, 2014). Behavioral reflection of the psychological state is observed primarily under the situation that is considered as the parents' hesitance to vaccinate (Yaqub et al., 2014). Parents may refuse vaccination due to psychological problems, distrust of the vaccine, political reasons and social decisions (Berry et al., 2017). Parents who are hesitant about vaccination are also increasing day by day (Gesser-Edelsburg et al., 2017).

When the literature is examined, it is seen that many studies have been conducted on vaccine hesitancy, but there are very few studies examining the relationship between vaccine hesitancy and health literacy (Brown et al., 2018; Ready, 2018; Yuksel and Topuzoglu, 2019). In studies on vaccination rates, it has been determined that being young, incomplete and incorrect information, low education, socioeconomic and sociocultural status affect the level of vaccination negatively. However, in recent years, families with high socioeconomic status in our country and developed countries have been reported to refuse vaccination or remain undecided on this issue (Johri et al., 2015; Veldwijk, 2015; Aharon et al., 2017). Effective communication with parents can be an effective method to overcome anti-vaccination. In vaccine studies, the positive effect of using correct, effective and reliable communication methods between healthcare professionals and patients was emphasized (Lorinia et al., 2018). In addition, it is very important to inform parents about the effects of the vaccine, to understand and interpret it correctly (Gur, 2019). Therefore, it is possible to say that the level of health literacy is important in experiencing vaccine hesitancy.

This study was carried out to determine the relationship between the health literacy level of parents with 0-59 months old children and their attitudes and behaviors towards childhood vaccinations.

In this study, answers to the following questions were sought:

1. What is the health literacy level of parents?
2. Is there a relationship between parents' socio-demographic characteristics and health literacy levels?
3. What are the attitudes and behaviors of parents towards childhood vaccinations?
4. Is there a relationship between the socio-demographic characteristics of the parents and their attitudes and behaviors towards childhood vaccinations?
5. Is there a relationship between parents' health literacy levels and their attitudes and behaviors towards childhood vaccines?

2. Materials and Methods

2.1. Participants

This cross-sectional and descriptive study was conducted between 15.02.2021 and 26.03.2021. The quantitative research method was used and the study was designed and conducted by the researchers. Data was collected via an online survey link from Microsoft Office 365 Forms due to COVID-19 restrictions. The questionnaire was completed by any device with internet access, such as a mobile phone, tablet, and personal computer. Individuals were recruited through social media tools (e.g. Facebook, Instagram, Twitter, WhatsApp, etc.) and personal networks. The sample size in the study was determined according to the confidence interval and reliability level developed by Lot Quality Technique (LQT) for field applications in WHO immunization studies. The sample size was calculated as 1036 people from the table developed by WHO, with a confidence interval of ±4% and a confidence level of 99% for the study (WHO, 1996). The sample group consisted of 1038 parents who met the inclusion criteria by random sampling method. The inclusion criteria were to be parents (mother and father) who had access to the questionnaire, had a child aged 0-59 months, and participating the survey voluntarily.

Parents who did not have children in the 0-6 age group and did not want to participate voluntarily were not included in the study.

2.2. Data Collection Tools

Study data were collected using a Descriptive Information Form, which included questions on participants' descriptive characteristics, the Parent Attitudes about Childhood Vaccines Survey (PACV), and the Türkiye Health Literacy Scale-32 (T-SOY-32).

2.2.1. Descriptive information form

This questionnaire, which was prepared by the researchers, included 18 questions on the participants' age, educational status, employment status, family type, income level, number of children, vaccination education status, information resources, and attitudes towards vaccination (Brown et al., 2018; Ready, 2018; Yuksel and Topuzoglu, 2019).

2.2.2. Parent attitudes about childhood vaccines survey (PACV)

The Turkish validity and reliability of this scale, which was developed by Opel et al. (2011), was established by Cevik et al. (2020) who adapted the scale to the Turkish context. The scale consists of 15 questions and three sub-dimensions: behavior, general attitudes, safety and efficacy. Items 1 and 2 make up the behavior sub-dimension; 3, 4, 5, 6, 11, 12, 13, 14, and 15 belong to the attitudes sub-dimension; and items 7, 8, 9, and 10 are in the safety and efficacy sub-dimension. There are 5-point Likert-type scale items such as "Children are vaccinated more than necessary", "I believe most of the diseases that vaccines prevent are serious diseases", "Fewer vaccinations at the same time are better for children". In addition, there are questions that require marking between 0-10. E.g.; "How sure are you that it is a good idea to follow the recommended vaccination schedule for your child?". The total raw score is recalculated to fit a scale with values ranging from 0 to 100 (Opel et al., 2011; Cevik et al., 2020). An increase in the total score indicates an increase in parents' hesitance about childhood vaccines. The Cronbach's alpha value was found to be 0.84 for the overall scale (Ataseven and Acuner, 2020). In this study, the Cronbach's alpha value was found to be 0.87.

2.2.3. Türkiye health literacy scale-32 (T-HLS -32)

This scale, which was based on the conceptual framework developed by the European Health Literacy Survey Consortium by Okyay and Abacigil (2016) was developed to assess health literacy among literate people over the age of 15. The scale consists of two dimensions related to health (treatment and service, prevention from diseases and health promotion) and health-related decision-making and four processes of obtaining information about applications (access, understanding, evaluation, and use/application). The scale was defined as knowledge, motivation, and social and cognitive competence which enables individuals to reach the health information needed to make decisions about their health/health status in their daily lives, to protect and improve their health, to increase and maintain their quality of life, to understand the information obtained, to evaluate the understood information and to use the evaluated information appropriately. On the scale, 0 points indicate the lowest health literacy and 50 points indicate the highest health literacy. Health literacy levels can be evaluated categorically as shown below. Insufficient health literacy: (0-25 points); problematic - limited health literacy: 26-33 points); sufficient health literacy: (34-42 points); excellent health literacy: (43-50 points). The Cronbach's alpha value was found to be 0.95 for the overall scale. In this study, the Cronbach's alpha value was found to be 0.96 (HLS-EU Consortium, 2012; Okyay and Abacigil, 2016).

2.3. Procedure

Parents included in the study were contacted via an online survey link. After the necessary permissions were obtained from the site administrators of the social media accounts, the survey was shared on these sites. All participants were informed that participation in the study was voluntary and their written informed consent was obtained in advance online. Responses were not anonymous. The survey was created via Google forms and only researchers could access the information. The questionnaires were filled in approximately 10-15 minutes.

2.4. Statistical Analysis

Statistical analyses were conducted using the SPSS (IBM SPSS Statistics 24) software package. Frequency tables and descriptive statistics were used for the interpretation of the findings. Nonparametric methods were used for measurement values that were not suitable for normal distribution. In accordance with nonparametric methods, the Mann-Whitney U test (Z-table value) was used to compare the measurement values of two independent groups, and the Kruskal-Wallis H test (χ^2-table value) was used to compare the measurement values of three or more independent groups (Önder, 2018). Bonferroni correction was used for pairwise comparisons of variables that yielded a significant difference in three or more groups. Spearman correlation coefficient was used to examine the relationships of two quantitative variables that did not have a normal distribution.

3. Results

The following information was detected; the mean age of the mother was 34.36±4.73 (years), the mean age of the father was 38.14±3.71 (years), the mean age of the children was 26.20±19.15 (months) and the mean number of children was 2.16±1.43. It was determined that 943 people (90.8%) were mothers, 848 (81.7%) were at university/higher education level, and 610 (58.8%) were working. It was determined that 549 (52.9%) were middle-income and 963 (92.8%) had social security (Table 1).

Table 1. Distribution of parents' socio-demographic characteristics

Variable (N=1038)	X ± SD*	X ± SD*
Mean age of the mother (years)	34.36±4.73	20-46
Mean age of the father (years)	38.14±3.71	21-49
Mean age of the children (months)	26.20±19.15	1-59
Mean number of children	2.16±1.43	1-5
	n	%
Age groups		
20-29	102	9.8
30-39	726	69.9
40-49	210	20.3
Parent		
Mother	95	9.2
Father	943	90.8
Level of education		
Primary education	20	1.9
High school	170	16.4
University and above	848	81.7
Working status		
Yes	610	58.8
No	428	41.2
Level of income		
Low	181	17.4
Middle	549	52.9
High	308	29.7
Social insurance		
Yes	963	92.8
No	75	7.2

The averages of the parents' T- HLS and PAVC scale scores are included. T- HLS scale total score was 36.84±8.78 and PACV scale total score was 34.29±22.92 (Table 2). It was determined that the parents were at the level of "adequate health literacy".

A statistically significant difference was found in terms of T-HLS scores between parents' age groups, genders, income levels, getting vaccination education and trusting healthcare personnel ($P<0.05$). T- HLS scores of those who are younger, mothers, those with a high income, those who receive vaccination education, and those who trust healthcare personnel are higher (Table 3).

A statistically significant difference was found between the parents' PACV scores and age groups, their status of getting vaccination education and their trust in healthcare personnel ($P<0.05$). The PACV scores of those who are young, who do not have vaccination education, and who do not trust healthcare personnel are significantly higher (Table 4).

It was determined that vaccine follow-up of 704 people (67.8%) was done by the family health center, 932 people (89.8%) received vaccination education, 841 people (81.0%) received information about childhood vaccines from health personnel, and 921 (88.7%) of them trust the health personnel. It was determined that 877 (84.5%) of them had all the mandatory childhood vaccinations, 124 (77.0%) of those who refused the vaccines decided not to have the vaccine together with their spouses, and 110 (68.3%) were afraid that the vaccines might cause side effects (Table 5).

Table 2. Distribution of the parents' scores from the scales

Scale (N=1038)	Mean	S.D.	Median	Min.	Max.
T-HLS	36.84	8.78	35.4	0.0	50.0
Treatment and service					
Access to information about health	39.31	8.86	41.7	0.0	50.0
Understanding information about health	38.90	9.35	37.5	0.0	50.0
Evaluation of information about health	33.20	10.69	33.3	0.0	50.0
Using/applying information about health	40.68	9.11	41.7	0.0	50.0
Protection from diseases/promotion of health					
Access to information about health	38.22	10.22	37.5	0.0	50.0
Understanding information about health	38.05	10.05	37.5	0.0	50.0
Evaluation of information about health	34.04	11.87	33.3	0.0	50.0
Using/applying information about health	32.34	11.92	33.3	0.0	50.0
PACV	34.29	22.92	27.0	0.0	97.0
Behavior	2.18	4.41	0.0	0.0	13.00
Attitude	13.15	16.21	7.0	0.0	60.00
Safety-efficacy	18.93	7.67	20.0	0.0	27.00

Table 3. Comparison of the scores from the T-HLS by findings of parents

Variable (N=1038)	n	Scores from the T-HLS		Statistical analysis Probability
		$\overline{X} \pm$ S. D.	Median [IQR]	
Age groups				
20-29 (1)	102	38.55±8.73	38.5 [14.6]	χ^2=8.568
30-39 (2)	726	36.96±8.71	35.9 [14.1]	P=0.014*
40-49 (3)	210	35.60±8.88	33.9 [12.5]	[1-3]
Parent				
Mother	95	34.62±8.20	33.3 [10.4]	Z=-2.675
Father	943	37.07±8.80	35.9 [14.6]	P=0.007*
Level of education				
Primary education	20	33.91±8.10	33.3 [15.4]	χ^2=3.656
High school	170	37.36±9.36	37.8 [14.2]	P=0.161
University and above	848	36.81±8.66	35.4 [14.1]	
Working status				
Yes	610	36.50±8.89	34.4 [14.6]	Z=-1.707
No	428	37.33±8.60	36.5 [13.5]	P=0.088
Level of income				
Low	181	34.94±9.14	34.4 [12.8]	χ^2=26.012
Middle	549	36.32±8.81	34.4 [14.6]	P=0.000*
High	308	38.89±8.11	40.1 [14.5]	[1,2-3]
Social security				
Yes	963	36.82±8.74	35.4 [14.1]	Z=-0.542
No	75	37.09±9.33	37.0 [13.0]	P=0.588
Obtaining vaccine				
education	932	37.25±8.79	35.9 [14.1]	Z=-4.711
Yes	106	33.23±7.79	32.6 [10.3]	P=0.000*
No				
Trusting health personnel				
Yes	921	36.62±8.71	35.4 [13.5]	Z=-2.611
No	117	38.60±9.11	40.1 [14.1]	P=0.009*

Table 4. Comparison of the scores from the PACV scale by findings of parents

Variable (N=1038)	n	Scores from the PACV		Statistical analysis Probability
		$\overline{X} \pm$ S. D.	Median [IQR]	
Age groups				
20-29 (1)	102	40.63±26.14	28.5 [37.8]	χ^2=7.742
30-39 (2)	726	33.99±22.40	27.5 [23.0]	P=0.021*
40-49 (3)	210	32.21±22.62	27.0 [20.0]	[1-3]
Parent				
Mother	95	32.16±19.66	27.0 [20.0]	Z=-0.329
Father	943	34.50±23.23	27.0 [23.0]	P=0.742
Level of education				
Primary education	20	43.50±26.15	36.5 [34.0]	χ^2=3.402
High school	170	35.18±22.88	27.0 [27.0]	P=0.183
University and above	848	33.89±22.83	27.0 [23.0]	
Working status				
Yes	610	33.09±22.51	27.0 [20.0]	Z=-1.799
No	428	35.99±23.43	27.0 [27.0]	P=0.072
Level of income				
Low	181	34.98±19.03	30.0 [24.0]	χ^2=3.702
Middle	549	33.62±22.80	27.0 [23.0]	P=0.157
High	308	35.07±25.18	27.0 [27.0]	
Social security				
Yes	963	34.20±22.91	27.0 [23.0]	Z=-0.145
No	75	35.36±23.31	27.0 [33.0]	P=0.884
Obtaining vaccine				
education	932	33.90±23.00	27.0 [23.0]	Z=-2.431
Yes	106	37.69±22.09	33.0 [27.0]	P=0.015*
No				
Trusting health personnel				
Yes	921	31.46±20.61	27.0 [17.0]	Z=-8.707
No	117	56.51±27.76	67.0 [51.5]	P=0.000*

Table 5. Distribution of findings about parents' attitudes and behaviors towards vaccines

Variable (N=1038)	n	%
Getting vaccine education		
Yes	932	89.8
No	106	10.2
Information sources about childhood vaccines*		
Healthcare staff	841	81.0
Internet/social media	550	53.0
School	126	12.1
Newspaper / magazine	70	6.7
Books / brochures	159	15.3
TV-Radio	78	7.5
Friends/relative	252	24.3
Trusting health (midwife, nurse, doctor) personnel		
Yes	921	88.7
No	117	11.3
Delaying any of the mandatory childhood vaccinations		
Yes	180	17.3
No	858	82.7
Refusing any of the mandatory childhood vaccines		
Yes	161	15.5
No	877	84.5
The person deciding to refuse vaccines*		
The participant	24	14.9
The participant and the spouse together	124	77.0
The participant made the decision by consulting family/friends	4	2.5
The participant made the decision by consulting a healthcare worker	31	19.3
Reasons for refusing vaccines*		
Insufficient knowledge of vaccines	18	11.2
Fear of side effects of vaccines	110	68.3
Not believing in the benefit of vaccines	86	53.4
Distrust due to the production of vaccines by foreign countries	83	51.6
Thinking that their child is too young	23	14.3
Sickness of the child	13	8.1
Fear of injection (needles)	2	1.2
Forgetting about the appointment	1	0.6
Missing the appointment	1	0.6
Following anti-vaccine groups	42	26.1
Religiously questionable vaccine ingredients	78	48.4

A statistically significant negative correlation was found between T- HLS scores and PACV scores. As T- HLS scores increase, PACV scores decrease. Likewise, as T-HLS scores decrease, PACV scores increase (r=-0.113; P=0.000) according to Spearman rank correlation. As the health literacy level of the parents increases, the vaccine hesitancy decreases. Likewise, as the health literacy level of parents decreases, vaccine hesitancy increases.

4. Discussion

The research findings conducted to determine the relationship between parents' attitudes towards childhood vaccines and health literacy were discussed in line with the research questions and the information obtained from the literature. It was determined that the health literacy of the parents was at a sufficient level (36.84). In other studies, conducted in our country and in other countries, the levels of health literacy were found to be in the range of 32.5-37.4 and at a similar level (Veldwijk et al., 2015; Okyay et al., 2016; Aharon et al., 2017; Tanriover et al., 2020).

Similar to our study, there are studies showing that the level of health literacy decreases as age increases (Van der Heide et al., 2016; Deniz et al., 2018). On the other hand, in the literature review, it was found that there was no difference between age and health literacy levels (Akbolat et al., 2016). In our study, the health literacy level of mothers from parents was also higher than that of fathers. But Oncu et al. (2018) found that men have a higher level of health literacy than women. This may be due to the fact that young parents demand more health care services during pregnancy and raising their children compared to older age and mothers compared to fathers. In addition, we think that the fact that women are more

anxious and sensitive than men affects health-seeking behavior and therefore health literacy.

In this study, it was determined that the health literacy level of parents with a high-income level was also high. In studies on the subject, similar to our study, there are studies showing that health literacy levels increase as income status increases (Sen, 2016; Duman, 2017), but there is also a study in which vaccine literacy is low despite high income (Robert et al., 2014). In addition, some studies did not find a significant difference between income status and health literacy (Veldwijk et al., 2015; Aharon et al., 2017; Brandstetter et al., 2020). Although there are different results in the literature, it is possible to say that advantages such as increasing the welfare of the society in parallel with the income level and facilitating access to quality health services affect health literacy positively.

In our study, it was determined that the health literacy of the parents who did not receive vaccination education and did not trust the health workers was low and the vaccine hesitancy was higher. Health workers play a very important role in the vaccination education of parents (Dube et al., 2018). However, with the emergence of individuals who do not need vaccines, trust in healthcare professionals has begun to decline (Yuksel and Topuzoglu, 2019). With the decrease of this trust, the training given by the health workers has lost value in the society. Parents, relying on these hearsay opinions and information, refuse to vaccinate their children (Anuk and Cetin, 2019). The shares created on social media platforms are one of the biggest reasons for this situation. In Australia, parents who hesitated and refused their children to be vaccinated named vaccinated children as "Unhealthy" (Attwell et al., 2018). In our country (2015), a prosecutor refused to vaccinate his twins and a lawsuit was filed against him by the provincial directorate of family health and social services. According to the lawsuit, the father endangered the lives of his children by neglecting their health. On the other hand, the father, the prosecutor, won the case by counter-suing due to the violation of individual rights and the necessity of consent, and this event received wide coverage in the media. Newspapers and televisions made very serious claims and statements for vaccine rejection. After this event, parents started to support both the event and the hesitancy about vaccination, which was widely covered in the media (Bozkurt, 2018). In our study, young parents were more hesitant about vaccination. Similarly, Alben (2019) found that young people experience a lot of hesitation. The reasons for this may be that young people witness and believe more in negative propaganda on social media. It may also be because they think that nothing will happen to them because they are young.

In our study, it was found that one of the seven parents did not have any of the compulsory childhood vaccines (15.5%) and delayed any of them (17.3). Similarly, in a study conducted in Italy, it was reported that 24.6% refused the vaccine (Bianco et al., 2019). A study conducted in Canada found that 40% of parents hesitated to have their children vaccinated (Dube et al., 2016). Vaccine hesitancy has been addressed in various studies and different results have been revealed. It has been suggested that individuals who are hesitant about vaccination do not attend the trainings, remain indifferent, and experience psychological problems or difficult periods (Rozbroj et al., 2019). Some individuals also argue that it is wrong to be blindly attached to the health system and that it is necessary to make free and original decisions about children (Pretti-Watel et al., 2019). In some other studies, it has been reported that parents' attitudes and behaviors towards childhood vaccinations are affected by education and income level variables. Sandhofer (2017) reported that as the education level of the parents increased, the attitude towards the vaccine was positive, but in another study, it was found that the rate of vaccine hesitancy increased with the increase in the education level (Gur, 2019). Gilbert et al. (2017) stated that vaccine hesitancy decreases with the increase in income, while Larson (2014) stated that vaccine hesitancy is higher in low-income individuals. In our study, it was determined that the education and income levels of the parents did not affect their attitudes and behaviors towards childhood vaccines.

In our study, it was determined that there was a significant and negative relationship between the level of health literacy of the parents and the hesitancy of vaccination. Accordingly, it is predicted that as the parent's health literacy level increases, the vaccine hesitancy will decrease. Johri et al. (2015) concluded that with improvements in mothers' health literacy, their children's immunizations would improve. Wang et al. (2018) stated that there is a positive relationship between vaccine trust and vaccination intention, and health literacy. These results support our study. Increasing the health literacy of parents can enable them to understand the requirements of preventive treatments and turn into positive attitudes and behaviors towards childhood vaccines.

5. Conclusion

It was determined that the health literacy levels of the parents were sufficient and there were no hesitations about vaccination. In addition, it was determined that the health literacy levels of the parents were affected by the variables of age, gender, income level, getting vaccination education and trusting the health personnel, while their attitudes and behaviors towards childhood vaccinations were affected by the variables of age, getting vaccination education and trusting the health personnel. In our study, it was determined that most of the parents received information about vaccines, the first source of information was the health personnel, but some of them did not trust the health personnel. In the study, it was found that one out of seven parents refused one of the

mandatory childhood vaccines. Parents who refused the vaccine were afraid of the side effects of vaccines and did not think they were beneficial. Parents who received negative opinions from the healthcare personnel were more likely to refuse any of the vaccines and exhibit vaccine hesitancy. Also, as parents' health literacy levels increased, their vaccine hesitancy decreased.

Initiatives targeting health literacy can improve the coverage of vaccination and knowing these relationships well in the fight against vaccination may be beneficial in terms of determining the strategies and effectiveness of the struggle. Community health workers (midwife, nurse, doctor) should direct vaccination services to bring them closer to parents and aim to raise vaccination awareness. Home visits for far-reaching interventions by midwives and high-quality communication tools can be an opportunity to increase knowledge and awareness about vaccines.

It is thought that the dissemination of simple, intelligible, and evidence-based scientific information about vaccination may be effective in eliminating information confusion. In the current COVID-19 pandemic, which brings a great financial and moral burden onto all of us, vaccination is the only way we are all waiting and perhaps the only way of getting rid of the pandemic. Considering the current situation, we must develop necessary strategies on the basis of countries and adopt the approach at all times to prevent vaccine hesitancy. Longitudinal studies are needed to understand when, how and why vaccine hesitations occur.

Limitations

The results of our study should be interpreted considering its limitations. The reliability of the data is limited by the accuracy of the information given by the interviewers. Another limitation is that the data was collected via an online survey; this means that people who do not have access to the internet or who not regular users are either excluded or overlooked as potential contributors. The child's immunization status was based on the parent's responses and, therefore, it should be noted that this may have resulted in recall bias which could result in over- or underestimation of coverage.

Author Contributions

The percentage of the author(s) contributions is present below. All authors reviewed and approved final version of the manuscript.

	E.D.	F.N.T.
C	50	50
D	50	50
S	50	50
DCP	50	50
DAI	50	50
L	50	50
W	50	50
CR	50	50
SR	50	50
PM	50	50
FA	50	50

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

Conflict of Interest

The authors declared that there is no conflict of interest.

Ethical Approval/Informed Consent

Ethics committee approval was obtained from Cukurova University Faculty of Medicine Non-Interventional Ethics Committee with the decision no. 108/48 dated 12.02.2021 for the study to be implemented.

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