*Original Research / Orijinal Araştırma*

# *The Effect of Health Literacy Knowledge of Parents with Children aged 0-5 years on Their Attitudes about Childhood Vaccines*

# 0-5 Yaş Çocuğu Olan Ebeveynlerin Sağlık Okuryazarlığı Bilgilerinin Çocukluk Aşılarına İlişkin Tutumlarına Etkisi

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## Abstract

**Objective:** To determine the effect of health literacy knowledge of parents with children aged 0-5 on their attitudes towards childhood vaccines.

**Method:** In the study using the relational screening model, the sample consisted of 1008 parents with children aged 0-5, living in XXX city between October 2022 and January 2023. Data were collected via Personal Information Form, Health Literacy Index, and Parental Attitudes Towards Childhood Immunizations (PACV).

**Results:** It was revealed that the variables of education level, place of residence, number of children, children's vaccination status, opinions about vaccines and making the first applications when they get sick affect health literacy knowledge. Their views about vaccines affected parents' attitudes toward childhood vaccines.

**Conclusion**: In order to improve the health literacy of the parents and reduce their vaccine hesitancy, it is recommended to give general health information and organize trainings on the benefits of vaccines and the consequences of being non-vaccinated.

**Keywords:** Attitude, child, cross-sectional study, health literacy, parent, vaccine

## Özet

**Amaç:** 0-5 yaş arası çocuğu olan ebeveynlerin sağlık okuryazarlığı bilgilerinin çocukluk çağı aşılarına ilişkin tutumlarına etkisini belirlemek amaçlanmaktadır.

**Yöntem:** İlişkisel tarama modelinin kullanıldığı çalışmada, örneklem Ekim 2022 ile Ocak 2023 tarihleri arasında XXX şehrinde yaşayan, 0-5 yaş arası çocuğu olan 1008 ebeveynden oluşmuştur. Veriler Kişisel Bilgi Formu, Sağlık Okuryazarlığı Endeksi ve Çocukluk Aşılarına İlişkin Ebeveyn Tutumları (PACV) ile toplandı.

**Bulgular:** Eğitim düzeyi, yaşanılan yer, çocuk sayısı, çocuklarının aşılanma durumu, aşılara ilişkin görüşler ve hastalandıklarında ilk uygulamaları yapma değişkenlerinin sağlık okuryazarlığı bilgisini etkilediğini, değişkenlerin ise sağlık okuryazarlığı bilgisini etkilediğini ortaya koymuştur. Aşılanma durumu ve aşılara ilişkin görüşleri ebeveynlerin çocukluk çağı aşılarına yönelik tutumlarını etkilemiştir.

**Sonuç:** Ebeveynlerin sağlık okuryazarlığını geliştirmek ve aşı tereddütlerini azaltmak için genel sağlık bilgilerinin verilmesi ve aşıların yararları ve aşılanmamanın sonuçlarına ilişkin eğitimlerin düzenlenmesi önerilmektedir.

**Anahtar Kelimeler:** Tutum, çocuk, kesitsel çalışma, sağlık okuryazarlığı, ebeveyn, aşı

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## Introduction

Today, health literacy has become a major need for achievememt of a lifelong sustainable health. It is a multifaceted concept that addresses individual's capacity to meet detailed health demands in society.[1] It refers to an individual's capacity to assess a range of health-related behaviors and is defined as one's ability to access, comprehend, evaluate and utilize information for the protection and maintenance of health.[2] The definition of the term is multi-dimentional including the capacity to diagnose illnesses, recognize symptoms, utilize health services, and make informed decisions regarding personal health. The quality, effectiveness, and efficiency of health care are determined by the decisions made by individuals.[3,4]

Health literacy plays an important role in protecting the individual and their children against diseases. Immunization is a critical component of primary health care and an essential element in the prevention of diseases. It is also a fundamental human right.[5] The World Health Organization states that immunization prevents approximately three million deaths every year. In particular, immunization against infectious diseases is achieved by vaccination. Vaccination is considered among the greatest public health achievements of the 20th century.[6] The data from the World Health Organization indicate that immunization results in a reduciton in the mortality in children under the age of five, a decline in the maternal mortality rate, and a decrease in the incidence of infectious diseases.[7,8] Although the impact of vaccines in preventing and eliminating diseases has been proven, the uptake of routine childhood vaccination is decreasing in many countries.[1,6] Despite solid evidence, temptation to ignore this evidence leads significant reluctance to get vaccinated globally. A combination of suspicion about the effects of vaccines and distrust of governments and healthcare professionals has resulted in lower rates of vaccination uptake. However, recently, there have been indicatiors that anti-vaccine behavior may lead to the reapperance of diseases that are supposed to be almost completely eliminated.[9] In recent years, there has been a perception that serious infectious diseases are not encountered especially in the young generation all over the world. It has been reported that individuals who are hesitant about vaccination tend to have a high socioeconomic status and high level of income and are educated.[10] Modern parents with high income levels experiencing confusion due to conflicting information on social media and the internet.[11] Additionally, some parents are expressing their concerns about deliberate poisoning of children with vaccines, by pharmaceutical companies to create interests, and doctors take advantage of this situation. Such misinformation about vaccines has made it challenging to discuss and communicate the benefits of vaccination.[12]

Therefore, the aim of this study is to determine the effect of health literacy knowledge on attitudes toward childhood vaccination in parents of children aged 0-5 years.

## Method

### Model of the Study

In this study, correlational survey model was used to examine the effect of health literacy knowledge on attitudes about childhood vaccines in parents with children aged 0-5 years. In a correlational survey model, the objective is to examine the correlation between at least two variables and if there is any correlation, make predictions based on these correlations.[13]

### Sample and Population

The study consisted of 1008 parents who had children aged between 0 and 5 years, were residing in the city of XXX between October 2022 and January 2023, and voluntary to participate in the study. The power analysis was performed by G Power 3.1.9.4 reveals that the effect size of the study was 0.44, the power was 100%, and the α-type error estimation was 0.05. This indicates that the sample size is sufficient.[14]

### Strengths of the Study

Health literacy and vaccine hesitancy are issues with global relevance. This insights gained from this study will contribute to a deeper global understanding of these challenges and may potentially inform international public health strategies.

One of the primary strengths of this study is its methodological robustness, which permits adaptation and implementation of its findings across various demographic and cultural contexts. This versatility ensures that the findings can provide valuable guidance for diverse populations, enhancing the external validity of the study. The participants are parents, who make final decision for immunization of their children. By focusing on this particular group, the study addresses the demographic most critical to improving immunization rates. This enhances the potential impact on public health outcomes. This research will contribute to the existing body of knowledge regarding the factors that influence vaccine hesitancy and the role of health literacy. The objective of this stuidy is to provide a robust empirical foundation for future research and to inform the development of targeted educational and intervention strategies. The findings from this study can significantly inform public health initiatives, including the design and implementation of educational campaigns and interventions aimed at increasing vaccine acceptance.

By improving health literacy among parents, the study has the potential to positively influence immunization rates and, consequently, public health.

**Data Collection Tools**

In the study, the following data collection tools were utilized: , a personal information form for the participants, the "*Health Literacy Index*" whose Turkish validity and reliability study was conducted by Aras and Temel (2017), and the "Parent Attitudes About Childhood Vaccines (PACV)" whose Turkish validity and reliability study was conducted by Cevik, Günes, and Eser (2020).[15,16]

***Health Literacy Index***

In this study, the 47-item Health Literacy Survey in Europe (HLS-EU) form developed by Sorensen was revised and simplified jointly by Toçi, Bruzari and Sorenson and they renamed the scale as Health Literacy Index and tested its validity and reliability.[15] This form was translated into Turkish as "Health Literacy Index". The scale, whose Turkish validity and reliability study was conducted by Aras and Bayık in 2017, consists of 25 items.[16] Access to Information subscale comprises five items (items 1-5) and the minimum and maximum scores for this subscale are 5 and 25, respectively. The standard deviation in the first prepared scale is 0.95, and the internal consistency coefficients (Cronbach's alpha) determined for the subscales ranged from 0.90 to 0.94.[15]

Parent Attitudes About Childhood Vaccines (PACV)

In the study, the 'Parent Attitudes About Childhood Vaccines' scale developed by Opel et al., was used. The scale comprises 3 subscales and 15 items with following dimensions: behavior, attitude, and safety- efficacy. If there is at least one unanswered question or the questions 1 or 2 are answered as 'I don't know' and therefore excluded as missing data, the corrected value is taken for total raw score. For example, if an answer is missing or excluded, total raw score ranges between 0-28; if two answers are missing or excluded, total raw score ranges between 0 - 26.[17] A higher total score signifies an increase in parents' hesitance about childhood vaccines.

**Ethical Principles of Research**

The necessary ethics committee approval for the study was obtained from the Iğdır University Scientific Research and Publication Ethics Committee. (Dated 12.09.2022 and numbered E-73972246-900-78065)

**Data collection**

After obtaining the necessary legal permissions, the researchers used Google Forms to design a survey link that would include the following components: Sociodemographic Characteristics Form, "Health Literacy Index" and "Parental Attitudes Towards Childhood Immunizations (PACV)". The created link was distributed to the participants.

Participants were invited to complete the survey via WhatsApp groups set up specifically for this purpose using the snowball sampling method. Participants were asked to share the survey link with other parents via Google Docs settings using the "send once" button to avoid duplicate entries and maintain data integrity. In addition, a form with data collection tools was prepared for face-to-face interviews with the researchers and participants were asked to complete this form. After obtaining permission from the necessary institutions, data were collected by visiting family health centers in the province.

To ensure that the data collection was comprehensive, researchers conducted face-to-face interviews with parents who could not be reached via the online link. As all participants, lived in the same region regardless of the data collection method, there was no difference in our results. This methodological approach ensured the robustness and reliability of the collected data.

The process of filling out the form took approximately 15 minutes.

**Data Analysis**

The data from this study were analyzed using the statistical software package SPSS 23. In order to ascertain the requisite statistical methodology for data analysis, the normality of the data was evaluated to determine the optimal statistical approach for analysis.

The initial step was to examine the results of the Kolmogorov–Smirnov analysis in order to ascertain whether the data were normally distributed. The results of the analysis indicated that the data were not normally distributed ($p < 0.05$). Subsequently, the skewness and kurtosis values were examined. It was observed that the skewness and kurtosis values were not within the range of -1.5 to +1.5. In light of these findings, it was concluded that the data did not exhibit a normal distribution.

Nonparametric tests are used when the data are not normally distributed. The Mann–Whitney U Test was used for two groups, the Kruskal–Wallis H Test for three or more, and Spearman Rank correlation analysis for scales.

## Results

Table 1 shows the demographic characteristics of the participants. Most participants were female and had a college degree. Most were between 25 and 34 years old. Most lived in the city center. A total of 96.8% of the participants stated that they had vaccinated their children while 83.7% stated that vaccination is absolutely necessary. A majority of participants (72.6%) indicated that they sought medical attention at a hospital when they became ill. Additionally, the mean number of children per participant was 1.75.

According to educational status of the participants, significant difference was identified in the scores of "Access to Information" subscale of the "Health Literacy" ($p<.05$). Participants with a bachelor's degree or higher scored lower than those with high school diploma or lower.

**Table 1.** *Frequency and Percentage Distribution of Demographic Characteristics of Participants*

| | | n? | % |
|---|---|---|---|
| **Gender** | Female | 876 | 86.9 |
| | Male | 132 | 13.1 |
| **Educational level** | Primary school | 40 | 4.0 |
| | High school | 168 | 16.7 |
| | Bachelor's degree and Higher | 800 | 79.4 |
| **Age** | 18-24 years | 28 | 2.8 |
| | 25-34 years | 700 | 69.4 |
| | 35 years and over | 280 | 27.8 |
| **Place of Residence** | City center | 856 | 84.9 |
| | District/Village | 152 | 15.1 |
| **Have you had your children vaccinated?** | Yes | 976 | 96.8 |
| | No | 32 | 3.2 |
| **What do you think about vaccines?** | Unnecessary | 24 | 2.4 |
| | Undecided | 140 | 13.9 |
| | Absolutely necessary | 844 | 83.7 |
| **What do you do first when you get ill?** | I go to the hospital | 732 | 72.6 |
| | I search on the Internet | 224 | 22.2 |
| | I ask my relatives | 52 | 5.2 |
| **Number of children (Mean±SD)** | 1.75±.769 | | |
| **Total** | | **1008** | **100.0** |

Table 2 shows that there's a significant difference in access to information based on where they live ($p<.05$). Participants who lived in the district/village had lower average scores than those who lived in the city center.

A significant difference was found in the "Access to Information" subscale of the "Health Literacy" scale with respect to the vaccination status of their children ($p<.05$). Mean scores of the individuals who did not have their children vaccinated were lower than the mean scores of the individuals who did.

The analysis results indicated a significant difference in the overall "Health Literacy" index and the subscales in terms of views about vaccines ($p<.05$). The significant differences observed in all subscales, indicate that the mean scores of the participants who expressed ambivalance about vaccination were lower than the mean scores of those who viewed vaccination is an absolute necessity. Furthermore, the mean scores of the participants who indicated that vaccination is unnecessary were lower than the mean scores of those who comsidered that vaccination is absolutely necessary.

A significant difference was observed in the "Understanding Information" sub-dimension of the "Health Literacy" scale according to the initial action taken by individuals upon the onset of an illness ($p<.05$). This significant difference indicated that the mean scores of those who searched on the Internet were lower than the mean scores of the individuals who went to the hospital and consult with their relatives.

Scores of total index and its subscales showed weak correlation with the number of children. Positive and weak significant correlation was found between the total score of the "Health Literacy" index and the number of children [$r_{(1008)}=0.11$ $p<.05$]. Positive and weak significant correlations were also found between the "Access to Information", "Evaluating Information", and "Applying Information" subscales ($p<.05$).

**Table 2.** *Comparison of the Mean Scores of the Participants for the Health Literacy Index and its Subscales in Terms of their Descriptive Characteristics*

| Variables | Access to Information | Understanding Information | Evaluating Information | Applying Information | Index Total |
|---|---|---|---|---|---|
| | X±SD | X±SD | X±SD | X±SD | X±SD |
| **Gender** | | | | | |
| Female | 22.86±3.132 | 31.39±4.142 | 35.89±4.862 | 22.18±2.964 | 112.33±13.257 |
| Male | 23.42±2.260 | 31.51±4.318 | 35.21±5.606 | 21.66±3.566 | 111.81±13.721 |
| **TEST** | U= 13204.0<br>p>.05 | U= 13946.0<br>p>.05 | U= 14092.0<br>p>.05 | U= 13566.0<br>p>.05 | U= 14320.0<br>p>.05 |
| **Age** | | | | | |
| (1) 18-24 years | 23.00±2.000 | 30.00±4.000 | 36.28±3.074 | 22.57±2.064 | 111.85±7.950 |
| (2) 25-34 years | 22.80±3.238 | 31.51±4.316 | 35.74±5.112 | 21.98±3.047 | 112.04±13.795 |
| (3) 35 years and over | 23.27±2.549 | 31.28±3.763 | 35.90±4.762 | 22.40±3.134 | 112.85±12.507 |
| **TEST** | KW= 1.256<br>p>.05 | KW= 5.244<br>p>.05 | KW= 0.155<br>p>.05 | KW= 3.145<br>p>.05 | KW= 1.194<br>p>.05 |
| **Educational level** | | | | | |
| (1) Primary school | 24.30±1.301 | 32.70±2.597 | 37.20±4.537 | 22.90±2.125 | 117.10±7.953 |
| (2) High school | 23.59±2.217 | 31.92±3.445 | 36.04±4.967 | 22.50±3.027 | 114.07±10.999 |
| (3) Bachelor's and higher degree | 22.73±3.208 | 31.23±4.344 | 35.68±4.984 | 21.99±3.088 | 111.64±13.884 |
| **TEST** | **KW=10.529<br>p<.05<br>3<1<br>3<2** | KW= 1.977<br>p>.05 | KW=4.583<br>p>.05 | KW= 3.365<br>p>.05 | KW= 3.790<br>p>.05 |
| **Place of residence** | | | | | |
| City center | 23.08±2.912 | 31.54±4.081 | 35.98±4.706 | 22.16±2.993 | 112.77±12.739 |
| District/Village | 22.10±3.568 | 30.63±4.539 | 34.81±6.170 | 21.84±3.366 | 109.39±15.927 |
| **TEST** | **U= 13962.0<br>p<.05** | U= 14556<br>p>.05 | U= 15024.0<br>p>.05 | U= 15666.0<br>p>.05 | U= 14986.0<br>p>.05 |
| **Have you had your children vaccinated?** | | | | | |
| Yes | 22.98±3.027 | 31.45±4.087 | 35.84±4.903 | 22.16±2.960 | 112.45±13.060 |
| No | 21.50±3.055 | 29.87±5.987 | 34.50±6.653 | 20.62±5.031 | 106.50±19.036 |
| **TEST** | **U= 2438.0<br>p<.05** | U= 3364.0<br>p>.05 | U= 3750.0<br>p>.05 | U= 3586.0<br>p>.05 | U= 3136.0<br>p>.05 |
| **What do you think about vaccines?** | | | | | |
| (1) Unnecessary | 21.83±4.063 | 29.50±4.253 | 34.50±5.616 | 20.00±4.786 | 105.83±14.677 |
| (2) Undecided | 21.82±3.443 | 29.57±4.994 | 32.68±6.277 | 20.45±3.677 | 104.54±15.750 |
| (3) Absolutely necessary | 23.15±2.890 | 31.76±3.916 | 36.36±4.494 | 22.45±2.758 | 113.72±12.329 |
| **TEST** | **KW= 10.597<br>p<.05<br>2<3** | **KW= 17.610<br>p<.05<br>2<3** | **KW= 27.800<br>p<.05<br>2<3** | **KW= 20.989<br>p<.05<br>2<3** | **KW= 27.504<br>p<.05<br>1<3<br>2<3** |
| **What do you do first when you get ill?** | | | | | |
| (1) I go to the hospital | 23.02±2.781 | 31.60±3.954 | 35.84±4.930 | 22.16±3.033 | 112.63±12.849 |
| (2) I search on the Internet | 22.58±3.728 | 30.50±4.798 | 35.48±5.226 | 22.08±3.044 | 110.66±14.831 |
| (3) I ask my relatives | 23.23±3.178 | 32.53±3.523 | 36.69±4.315 | 21.46±3.361 | 113.92±12.594 |
| **TEST** | KW= 2.434<br>p>.05 | **KW= 10.096<br>p<.05<br>2<1<br>2<3** | KW= 4.592<br>p>.05 | KW= .873<br>p>.05 | KW= 5.000<br>p>.05 |
| **Number of Children$^{r}$** | **.103*** | .037 | **.103*** | **.129*** | **.110*** |

Note: *=p<.05, $^{r}$= Spearman's Rank Correlation, U= Mann Whitney U test, KW= Kruskal Wallis test

Table 3 shows frequency and percentage distributions of the participants for vaccine hesitancy. According to the table, 33.3% of the participants were hesitant about vaccines but 66.7% of them were not. A significant difference was found in the overall PACV in terms of the vaccination status of children (p<.05). It was observed that the mean scores of participants who did not have their children vaccinated were higher than the mean scores of those who had their children vaccinated.

Moreover, a significant difference was found in the overall PACV in terms of the views of the participants about the vaccine (p<.05). The results demonstrated that the mean scores of participants who indicated that vaccination is unnecessary or undecided about vaccination were higher than the mean scores of participants who considered vaccination to be an essential measure.

**Table 3.** *Vaccine Hesitancy of the Participants*

| | | *f* | % |
|---|---|---|---|
| **Vaccine Hesitancy** | Yes | 336 | 33.3 |
| | No | 672 | 66.7 |

Upon examination of the correlation between the overall scale and the number of children in Table 4, no significant correlation was identified between the number of children and the total score of PACV (p>.05).

**Table 4.** *Comparison of Mean Scores of the Participants for Parent Attitudes About Childhood Vaccines (PACV) Scale According to Their Descriptive Characteristics*

| **Variables** | **Scale Total** |
|---|---|
| | **X±SD** |
| **Gender** | |
| Female | 10.88±5.115 |
| Male | 11.93±6.358 |
| **TEST** | U= 13302.0<br>p>.05 |
| **Age** | |
| (1) 18-24 years | 10.85±4.347 |
| (2) 25-34 years | 10.83±5.239 |
| (3) 35 years and over | 11.52±5.528 |
| **TEST** | KW= .994<br>p>.05 |
| **Educational level** | |
| (1) Primary school | 11.20±5.502 |
| (2) High school | 12.42±6.201 |
| (3) Bachelor's and higher degree | 10.72±5.044 |
| **TEST** | KW= 5.053<br>p>.05 |
| **Place of residence** | |
| City center | 11.20±5.288 |
| District/Village | 10.02±5.283 |
| **TEST** | U= 14092.0<br>p>.05 |
| **Have you had your children vaccinated?** | |
| Yes | 10.86±5.180 |
| No | 15.81±6.725 |
| **TEST** | **U= 2271.5**<br>**p<.05** |
| **What do you think about vaccines?** | |
| (1) Unnecessary | 19.83±3.157 |
| (2) Undecided | 17.25±4.732 |
| (3) Absolutely necessary | 9.74±4.393 |
| **TEST** | **KW= 129.678**<br>**p<.05**<br>**3<1**<br>**3<2** |
| **What do you do first when you get ill?** | |
| (1) I go to the hospital | 11.12±5.331 |
| (2) I search on the Internet | 10.91±5.107 |
| (3) I ask my relatives | 10.11±5.757 |
| **TEST** | KW= 1.369<br>p>.05 |
| **Number of children$^{r}$** | -.040 |

Note: *=p<.05, $^{r}$= Spearman's Rank Correlation, U= Mann Whitney U test, KW= Kruskal Wallis test

Table 5 shows the results of the Spearman's Rank correlation analysis conducted to determine the correlation between the "Health Literacy" index and its subscales, as well as PACV and its subscales. The results of the

analysis indicated a negative and low-level significant correlation between the total score of the "Health Literacy" index and the total score of PACV [$r_{(1008)}$= -.198; p<.05]. Results indicated that as the health literacy level of the participants increased, their attitudes towards childhood vaccines decreased. When the correlation between the subscales of the "Health Literacy" index and PACV was examined, the highest correlation was determined between the "Evaluating Information" subscale and the "Attitude" subscale, and there was a negative significant correlation between the subscales [$r_{(1008)}$= -.237; p<.05]. The lowest correlation was observed between the "Understanding Information" subscale and the "Safety/Efficacy" subscale and there was a positive significant correlation between the subscales [$r_{(1008)}$= .126; p<.05].

**Table 5.** *Results of the Correlation Test for the Correlation Between the Scales Used in the Study*

| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
|---|---|---|---|---|---|---|---|---|---|
| **(1) Access to Information** | 1 | | | | | | | | |
| **(2) Understanding Information** | .615* | 1 | | | | | | | |
| **(3) Evaluating Information** | .558* | .722* | 1 | | | | | | |
| **(4) Applying Information** | .489* | .546* | .669* | 1 | | | | | |
| **(5) Health Literacy Total** | .720* | .866* | .900* | .808* | 1 | | | | |
| **(6) Behavior** | **.215*** | .077 | **.154*** | .070 | **.142*** | 1 | | | |
| **(7) Attitude** | **-.165*** | **-.171*** | **-.237*** | **-.202*** | **-.231*** | .202* | 1 | | |
| **(8) Safety/Efficacy** | .043 | **.126*** | .055 | -.009 | .061 | .272* | .293* | 1 | |
| **(9) PACV Total** | **-.138*** | **-.136*** | **-.198*** | **-.190*** | **-.198*** | .482* | .938* | .548* | 1 |

Note:*=p<.05, PACV = Parent Attitudes About Childhood Vaccines Scale

**Dıscussıon**

The results of the study, conducted to determine the effect of parental health literacy knowledge on their attitudes towards childhood vaccines, were presented alongside a review of the relevant literature. Health literacy plays an important role in protecting the individual and their children from diseases.[6] The analysis results indicated no significant difference in the overall “Health Literacy Index” and its subscales according to the gender and age of the participants (p>.05). Likewise, in their study, Çatı et al., found no significant correlation between gender and health literacy.[18] Other studies conducted with parents have reported that gender and age do not affect health literacy.[19,20] Our results were concordant with the literature.

Score of "Access to Information", subscale of the Health Literacy Index showed significant difference with respect to educational level (p<.05). Mean scores of the participants with a bachelor's degree or higher were lower than the mean scores of individuals with high school degree or lower. As yet, no study has been identified in the literature that has evaluated the subscales of the index. However, similar to the present study, a study investigating the correlations between maternal health literacy of pregnant women and their antenatal care and pregnancy outcomes reported that the majority of the participating women were high school and university graduates and their health literacy was low.[21] In another similar study, the difference between parental education and health literacy was found to be insignificant.[5] Some Turkish studies which found a significant correlation between educational level and health literacy claimed participants with high educational level showed high health literacy.[2,19,22] In another study, it was found that the health literacy level of individuals with a low educational level was also low.[21] In light of these findings, it is believed that health literacy is not solely a function of formal education and should be assessed in a manner distinct from that of formal education, given its technical nature..[21,23]

"Access to Information", score of pariticipants also showed siginificant relation with respect to their place of residence (p<.05). Mean scores of the parents living in the district/village were lower than the mean scores of those living in the city center. A study, found no relation between the longest lived place of residence and health literacy.[23] In other studies evaluating the health literacy of individuals, it was found that the health literacy level of those who spent most of their lives in villages or towns was lower.[6,24] It is believed that the absence of health centers or healthcare professionals in rural areas, where individuals can obtain information, restricts access to knowledge.

We found a weak, positive correlation between number of children and total and subscale scores of Health Literacy Index. Correlated subscales were “Access to Information”, “Evaluating Information” and “Applying Information” (p<.05). Contrary to our study, the studies have indicated that as the number of children increased, health literacy levels decreased. [2,19,25] It is thought that the resulting difference was due to the fact that the study was conducted in different samples.

In the present study, there were significant difference between scores of overall and subscales of “Health Literacy Index” in terms of the views of the participants about vaccines (p<.05). m

Mean scores of the participants who have vaccine hesitancy were lower than the mean scores of those who considered that vaccination is absolutely necessary. Furthermore, the mean scores of participants who indicated that vaccination is unnecessary were lower than the mean scores of those who considered vaccination to be essential. Likewise, a study conducted to determine the effect of the health literacy level of the society on the attitudes toward vaccination applications reported that health literacy positively affected these attitudes.[26] Furthermore, Johri et al., emphasized that immunization of children would be improved by improving mothers' health literacy.[27] The results of this study align with those of the previous one.

Health literacy affects a person's ability to access and use health services, interact with healthcare professionals, and take care of themselves and their children.[28]According to the results of the study, significant difference found in the "Health Literacy" in the "Understanding Information" subscale in terms of the first practices that participants used when they became ill. Mean scores of the participants who searched the Internet were lower than the mean scores of those who went to the hospital and asked their relatives. In a similar study, it was found that the first choice of individuals for obtaining health information was healthcare professionals, and the second choice was the internet.[23]Again, in a similar study, the physician took place on the top; whereas, internet use was ranked as the second. Although the initial practices of the participants in the present study when they became ill are similar to the literature, no study examining the effect of health literacy was found in the literature.

In Turkey, the "anti-vaccine" movement has emerged in recent years.[29] In the present study, a significant difference was found in the overall "Parent Attitudes About Childhood Vaccines (PACV)" scale according to the vaccination status of the participants'children. Mean scores of the participants who did not have their children vaccinated were higher than the mean scores of those who had their children vaccinated. According to this result, vaccine hesitancy of individuals who did not have their children vaccinated was higher than those of those who had their children vaccinated. Likewise, in the study by Turan, parents who did not have their child vaccinated for any reason or delayed were found to have a high vaccine hesitancy.[30] One study found that the likelihood of unvaccination or undervaccination of the child increse 10.5 times with the presence of parental vaccine hesitancy [31]

In the present study, a significant difference was found in the overall "Parent Attitudes About Childhood Vaccines" scale according to the views of the participants about the vaccine ($p<.05$). Mean scores of the participants who stated that vaccination is unnecessary and are undecided about vaccination were higher than the mean scores of those who considered that vaccination is absolutely necessary. In a study investigating the knowledge and attitudes of parents towards childhood vaccines, the vaccine safety scores of the parents who thought that it is necessary were found to be significantly higher than those of the parents who thought that vaccination is unnecessary. In the same study, vaccine safety scores were also significantly higher among parents who did not support the anti-vaccine movement.. The total vaccine safety score of parents who were in contact with anti-vaccine people in their circle was lower. These results support the findings of this study..[32]

In the present study, as individuals' health literacy level increased, their attitudes about childhood vaccines decreased. In other words, as the health literacy level of the parents increased, the vaccine hesitancy decreased. In the study by Dogan, parents' hesitancy about childhood vaccines increased as health literacy decreased.[33] Other studies have found that as parental health literacy increases, vaccine hesitancy decreases..[34,35]

These findings are consistent with the results of the present study.

**Conclusıon and Recommendatıons**

In order to improve the health literacy of the parents and reduce their vaccine hesitancy, it is recommended to provide general health information and organize trainings in villages and districts on the benefits of vaccines and the consequences of not-vaccinated. Given that second information source of the parents is internet, it is suggested to increase health literacy especially via the internet and provide to access secure information given by healthcare professionals in particular.

The fact that our study was conducted in a single center and that it was difficult to reach parents in the target age group were identified as limitations of our study.

**Key points for policy, practice and/or research**

- Patients, family members, and caregivers are experts on the impact of their health conditions and should be involved in health literacy efforts, including the importance of childhood immunizations..
- Nurses can educate families about improving health literacy and diseases that can be prevented by childhood vaccinations.
- The age group discussed is a very sensitive group for development, and they can be protected from infectious diseases with the work done by pediatric nurses.
- Families should be trained by nurses in terms of active use of health literacy.

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