

# COVID-19 and Vaccine Hesitancy: Could Health Literacy be the Solution?

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April 05, 2024

## Abstract

**Aim:** Practices such as the use of masks, cleaning measures, and social distancing have come to the fore to prevent the COVID-19 pandemic. In addition to this, the most important way to fight the epidemic seems to be vaccination. However, “vaccine hesitancy” is seen as an important obstacle to attempts to control the pandemic. With this study, we have aimed to evaluate the effects of having inadequate or incorrect information, one of the possible determinants of attitudes towards the COVID-19 vaccine. **Study Design:** A cross-sectional design was used. **Methods:** The data were collected via an online questionnaire from patients who agreed to participate in the study. Sociodemographic Data Form, Turkey Health Literacy Scale-32 (THLS-32) and Anti-Vaccine Scale are filled by 496 participants in total. **Results:** According to the results of our study, 7.5% of the participants stated that they would not be vaccinated and 14.3% are indecisive. We have found a negative correlation between vaccine refusal and health literacy, thus confirming the main hypothesis of our study. Also, education year was a negative predictor of vaccine hesitation. **Conclusions:** Currently, the most important approach in fighting the pandemic is the vaccination of society. Having the right information is extremely important to fight vaccine refusal attitudes. The fight against vaccination requires joint efforts from governments and media resources, including social media.

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**Keywords:** COVID-19, COVID-19 vaccine, health literacy, vaccine hesitancy.

### What is already known about this topic?

- The vaccine is the best tool to control the COVID-19 pandemic.
- A lack of confidence and misinformation contribute to the low acceptance rates of the COVID-19 vaccine among the public.
- Vaccine hesitancy remains an obstacle to population vaccination against COVID-19.

### What does this article add?

- Less than half of the participants stated that they were confident in the effects of the vaccine and would be vaccinated.
- There is a negative relationship between vaccine refusal and health literacy.
- Accurate information is vital to fight vaccine rejection.

## INTRODUCTION

The COVID-19 pandemic not only affected the health of individuals but also brought many social and economic problems. Works to control the pandemic and to reduce all these negative effects are continuing worldwide.<sup>1</sup> Since the beginning of the epidemic, false information and fake news about COVID-19 started to spread rapidly, confusing people. Beliefs in prevention and treatment from COVID-19 negatively affected, as well. In Iran, for instance, misinformation about alcohol intake to eradicate the COVID-19 virus has resulted in the deaths of hundreds.<sup>2</sup> Previous studies have reported that fake news may be at the center of vaccine hesitancy.<sup>3, 4</sup> Many conspiracy theories have been put forward with the rapid spread of fake news and unidentified information in society. Exposure to COVID-19 vaccine refusal conspiracy theories also affects vaccination intention.<sup>5</sup> Health literacy (HL), a way of preventing the spread of misinformation in society, affects people's ability to access reliable information and make informed decisions.<sup>6</sup> HL is generally known to help distinguish fake news.<sup>7</sup>

Practices such as the use of masks, cleaning measures, and social distancing have come to the fore to prevent the COVID-19 pandemic. In addition to this, the most important way to fight the epidemic seems to be vaccination. However, "vaccine hesitancy" is seen as an important obstacle to attempts to control the pandemic. While many studies in the scientific world have focused on the effectiveness of the vaccine recently, the concepts of vaccine hesitancy and vaccine rejection appear to be an important public health problem. WHO has identified "vaccine hesitancy" as one of the top ten threats to global health. Vaccination programs can only be effective when they are accepted by large sections of the population.<sup>8</sup> Discussions about vaccination applications have been coming up all over the world recently.<sup>9</sup> In addition to the current vaccine refusal attitudes, concerns about the safety and effectiveness of the vaccine have arisen due to reasons such as the emergence of the disease and the rapid production of the vaccine.<sup>10</sup> Regarding previous vaccination practices, studies examining anti-vaccine websites have found that the information on these sites underestimates the risk and severity of diseases.<sup>11, 12</sup> It is seen that these vaccine refusal campaigns are increasingly continuing in the COVID-19 pandemic.<sup>13</sup> Hence, it is of great importance that people have access to correct and sufficient information in order to cope with the problems related to vaccine hesitancy and vaccine refusal.

The World Health Organization (WHO) defines health literacy as "personal characteristics and social resources that enable individuals and societies to access, understand, evaluate, and use the information to make health-related decisions".<sup>14</sup> It is known that poor health literacy in chronic diseases is associated with increased healthcare expenditures and mortality.<sup>15</sup> According to a meta-analysis evaluating the relationship between health literacy and infectious diseases, a low level of health literacy also affects protective behaviors such as vaccination and hand hygiene.<sup>16</sup> With the emergence of the COVID-19 pandemic, it has emerged that health literacy is also important in communicable diseases. Low health literacy scores are associated with 'vaccine hesitancy'.<sup>6, 17</sup>

With this study, we have aimed to evaluate the effects of having inadequate or incorrect information, one

of the possible determinants of attitudes towards the COVID-19 vaccine. For this reason, we measured the “health literacy” levels and “vaccine refusal” attitudes of people and put forward the hypothesis that people with incomplete or incorrect information would have more negative attitudes towards vaccination.

## METHODS

### Sample and Procedure

The forms for the study are sent online to 750 participants in total. All participants are informed about the study. A total of 512 people participated in the study. The results of 12 participants due to random marking and 4 people due to short survey completion times (less than 15 minutes) are not taken into consideration and analyzes are conducted with 496 participants in total.

### Data Collection Tools

#### Sociodemographic Data Form

It is specially prepared for this study by the research team. It is a form in which the demographic data of the participants such as age, gender, occupation, and the preliminary opinions of the people about the vaccination application are asked.

#### Turkey Health Literacy Scale-32 (THLS-32)

The scale is developed by the Republic of Turkey Ministry of Health in 2016 in line with the “European Health Literacy Survey-HLS-EU”.<sup>18</sup> It consists of 32 questions in total and consists of 2 dimensions, “prevention from diseases/health promotion and treatment/service”, and 4 processes “accessing health information, understanding health information, evaluating health information and applying/using health information”. High scores indicate high health literacy.

#### Anti-Vaccine Scale

It is created to evaluate the factors related to vaccine refusal.<sup>19</sup> The scale includes 21 items and 4 factors: “vaccine benefit and protective value, vaccine refusal, solutions not to be vaccinated and legitimization of vaccine hesitancy”. High scores indicate high vaccine refusal.

### The ethical aspect of the research

In order to conduct the study ethics committee approval is obtained from \*\*\* non-invasive clinical research ethics committee (Date: 05.04.2021, Number: 13) Besides, permission is obtained from the authors who developed the scales by e-mail. On the first page of the data collection form, participants are presented with an information form describing the study objectives and procedure (if the participants checked the “I understand the study and want to participate” box at the bottom of the information form), and those who wanted to participate are enabled to answer the survey questions.

### Statistical Method

All data (categorically and continuously) are analyzed using the Statistical Package for Social Science windows version 22.00 (SPSS) web software. Quantitative data are evaluated as percentage mean and standard deviation. Participants are grouped according to their attitudes towards the vaccine, and normal distribution conditions are evaluated using the Kolmogorov-Smirnov test. Categorical variables are evaluated with the Pearson Chi-square test and mean scores of independent variables between groups are evaluated with the Independent Sample t-test. The Pearson Correlation test is used to evaluate the correlations between scale scores. Multiple linear regression analyzes are applied while evaluating the precursor factors of vaccine refusal. For all analyzes,  $p < .05$  is taken as a basis for significance.

## RESULTS

A total of 135 male and 361 female participants are included in the study. The socio-demographic characteristics of the participants are shown in Table 1. Interestingly, while the participants whose turn is vaccinated

made up 63.7% of all participants, only 5.2% stated that they are not vaccinated even though it is the time of vaccination, and 7.5% stated that it would not be vaccinated when it came to vaccination. 42.1% of the participants stated that they trust the effects of the vaccine and that they will be vaccinated.

The ages ( $p < .001$ ) and years of education ( $p = .002$ ) are found to be significantly higher in those who are accepted to the vaccine. Furthermore, it is found that the intention of vaccination is lower in women than in men ( $p = .013$ ). Lastly, it is determined that the group with the low intention to the vaccine had higher scores on vaccine refusal scales ( $p < .001$ ) and lower HL scores ( $p = .008$ ) (Table 2).

The relationships between the total and sub-dimension scale mean scores of the participants against vaccination and the total and sub-dimension mean scores of Health Literacy are shown in Table 3.

In the linear regression analysis, it is determined that education year and age negatively predicted vaccine refusal scores (Table 4).

## DISCUSSION

According to the results of our study, we have found a negative correlation between vaccine refusal and health literacy, thus confirming the main hypothesis of our study. In addition, we have found that the negative predictors of vaccination opposition are not only health literacy, but also education year.

In a study examining the articles between 2007 and 2017, it is found that HL and vaccine hesitancy are associated with age, country, and vaccine type.<sup>16</sup> In this collecting, it is reported that most of the studies originated from the USA and high-income European countries, data on low-income countries are scarce, hence geographical representation may be weak. Therefore, it is important to present these studies from different countries. In fact, vaccine hesitancy is also an important problem in the pre-pandemic period. A study conducted in Italy in 2016 reported that 16% vaccine hesitancy-vaccine refusal among parents.<sup>20</sup> Studies evaluating the relationship between the frequency of pneumococcal and influenza vaccination and health literacy indicated that as the level of health literacy increased, the vaccination rates increased.<sup>21, 22</sup> The significant relationship between low health literacy and vaccine hesitancy has also been demonstrated by COVID-19 studies.<sup>6</sup> This finding is in line with the findings of our study, in which we have found a negative relationship between HL scores and vaccine refusal attitudes.

Currently, the most important approach in fighting the pandemic is the vaccination of society. However, vaccine hesitancy-vaccine refusal is a major obstacle to this situation. In the study conducted with 7664 people from seven European countries, 18.9% of the participants stated that they are not sure about being vaccinated and 7.2% of them do not want to be vaccinated.<sup>23</sup> Despite the intervening period of nearly 1 year, according to the results of our study, 7.5% of the participants stated that they would not be vaccinated and 14.3% are indecisive. In a previous study, 31% of the participants in Turkey stated that they are ambivalent or negative about vaccination administration.<sup>24</sup> In the same study, this rate is found to be 14% for the participants in the UK. In a study conducted with 745 students in Italy, 13.9% of the participants stated that they would not vaccinate or are indecisive.<sup>9</sup> When the studies in the literature are analyzed, it can be considered that the vaccine instability-opposition attitudes in Turkey are higher than in other European countries. Hence, it is extremely significant to reveal the reasons for this attitude.

Having the right information is extremely important to fight vaccine refusal attitudes. For instance, previous studies have shown relationships between believing that the COVID-19 is an artificial virus produced in the laboratory and vaccine refusal.<sup>24</sup> People's interest in such conspiracy scenarios negatively affects the prevention or treatment strategies. In particular, conflicting news in the media regarding the effectiveness, reliability, and side effects of the COVID-19 vaccine may cause vaccine hesitancy or vaccine refusal in individuals. In this context, it is important to share clear and reliable information about the vaccine in the media, which is the source that individuals frequently use to access vaccine-related data. In a recent study conducted with 1153 people in Germany, only 49.9% of the participants are found to have sufficient HL.<sup>25</sup> In the study, it is reported that the lowest scores of the participants are related to the capacity to "decide on the reliability of the information in the media". The relationship between misinformation and vaccine

hesitancy has also been highlighted in previous studies.<sup>4</sup>

Another important finding of our study is the negative correlation between age and vaccine refusal. This finding is consistent with the results of the studies evaluating the relationship between age and vaccine acceptance, resulting in lower vaccine hesitancy in the older age group.<sup>26</sup> This situation can be interpreted as the elderly group preferred to be vaccinated with the risks rather than getting the disease, due to the frequency/severity of getting COVID-19 and complications as the age increases. Therefore, for a successful vaccination program, it should include non-formal education programs on the safety and efficacy of the vaccine, especially for the untrained and young age groups with high vaccine hesitancy.<sup>27</sup> In addition to this, it should be taken into consideration that it is important to inform the public correctly; however, HL skills should also be developed in order for the information to provide attitude change.<sup>28</sup> As the level of HL increases, it will be possible for individuals to become aware of the reasons behind medical advice and to evaluate the consequences of their actions.<sup>29</sup>

Besides, a specific emphasis on the concept of 'vaccine literacy' is vital to understanding the determinants of attitudes towards vaccination and enabling change of attitude.<sup>30</sup> The Erice Declaration, which is prepared in Italy to address issues related to vaccine attitudes before the pandemic, emphasizes the promotion of the concept of HL and vaccine literacy and the inclusion of the media in this movement.<sup>31</sup> Given the uncertainty created by the pandemic and the confusion of information in the media, the concept of vaccine literacy can be a fundamental basis for a way out from the pandemic.<sup>32</sup>

#### 4.1. Limitations

The present study has several limitations in interpreting the results. First, using an online survey may be limited to people who have smartphones and can access the internet. However, given the situation, this was the best possible methodology for reaching people. Additionally, responses are self-reported and may be subject to self-report bias. Despite these limitations, our findings are considered to contribute greatly to assessing COVID-19 vaccine hesitancy and its relationship with health literacy level.

#### CONCLUSION

Currently, the most important approach in fighting the COVID-19 pandemic is seen as the vaccination of society. Besides, just finding an effective vaccine may not be enough to control the epidemic. It has been reported that 60-75% of the individuals in society should be vaccinated in order to prevent the transmission and spread of the virus.<sup>33, 34</sup> The fight against vaccine opposition requires joint efforts of governments and media resources, including social media. It is significant to provide accurate, comprehensive, reliable, and transparent information among the public through reliable channels that defend the safety and effectiveness of currently available vaccines, and to improve health literacy for individuals to distinguish correct information.

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