Araştırma makalesi
Research article

Investigation of the Effect of COVID-19 Vaccine Literacy on COVID-19 Vaccine Attitude

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ABSTRACT

Aim: This descriptive research was conducted to determine the relationship between COVID-19 vaccine literacy and public attitude towards the COVID-19 vaccine.

Material and Methods: The research data were collected by convenience sampling between June and September 2021. The population of the research consisted of 1112 individuals aged 18 and over. The data were collected online using a personal information form, the COVID-19 Vaccine Literacy Scale, and the Attitudes Towards the COVID-19 Vaccine (ATV-COVID-19) Scale.

Results: The mean COVID-19 Vaccine Literacy scale total score was 2.91±0.43, while the mean ATV-COVID-19 scale total was 3.68±0.76. A statistically significant and positive relationship existed between the participants' COVID-19 VL scale total scores and their ATV-COVID-19 scale total scores.

Conclusion: The vaccine literacy of the participants was relatively high, and their attitudes toward the COVID-19 vaccine were positive. As vaccine literacy increased, positive attitudes toward vaccines also increased.

Keywords: COVID-19, vaccine attitude, vaccine literacy

ÖZ

COVID-19 Aşı Okuryazarlığının COVID-19 Aşı Tutumu Üzerine Etkisinin İncelenmesi

Amaç: Tanımlayıcı tipteki bu araştırma, COVID-19 aşı okuryazarlığı ile toplumda COVID-19 aşısına yönelik tutum arasındaki ilişkiyi belirlemek amacıyla yapıldı.

Gereç ve Yöntem: Araştırmanın verileri kolayda örnekleme yöntemi ile Haziran 2021 ile Eylül 2021 tarihleri arasında toplandı. Araştırmanın evrenini 18 yaş ve üzeri 1112 birey oluşturdu. Veriler, kişisel bilgi formu, COVID-19 Aşı Okuryazarlığı Ölçeği ve COVID-19 Aşısına Yönelik Tutumlar Ölçeği kullanılarak çevrimiçi olarak toplandı.

Bulgular: Katılımcıların COVID-19 Aşı Okuryazarlığı ölçeği toplam puan ortalaması 2,91±0,43'tü. Katılımcıların COVID-19 Aşısına Yönelik Tutumlar ölçeği toplam puan ortalaması 3,68±0,76'ydı. Katılımcıların COVID-19 VL ölçeği toplam puanları ile ATV-COVID-19 ölçeği toplam puanları arasında istatistiksel olarak anlamlı ve pozitif bir ilişki vardı.

Sonuç: Bu araştırmada katılımcıların aşı okuryazarlığı göreceli olarak yüksekti ve COVID-19 aşısına yönelik tutumları olumluydu. Aşı okuryazarlığı arttıkça aşılara yönelik olumlu tutumlar da arttı.

Anahtar kelimeler: Aşı okuryazarlığı, aşı tutumu, COVID-19

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INTRODUCTION

Vaccination is one of the most critical discoveries in medicine[1]. The principles of vaccination continue to evolve to this day, with the development of various vaccines, from the first voluntary immunizations a few centuries ago to Jenner and Pasteur, who invented vaccines[2]. The first vaccine developed slowly over the centuries with the idea of weakening virulent infections. The first vaccine was invented when Jenner used a smallpox virus to prevent smallpox[1,3].

Vaccines have significantly reduced the burden of infectious diseases worldwide. As infections such as HIV, SARS, and Ebola cause communicable diseases, developing vaccines has become more important to prevent the rapid spread of diseases and pandemics[4]. Today, the most striking example is the Coronavirus pandemic, which has affected the world[5]. The disease is alarming, with high rates of contagiousness and mortality, inadequate medical care, and a wide reservoir distribution[6]. Vaccination is seen as the most effective way to prevent the disease. According to current data from the World Health Organization (WHO), the development of new vaccines continues rapidly in addition to the existing ones[7]. Although expert opinions regard the vaccine as the most effective method to end the pandemic, there are some negative attitudes among the public toward the current vaccines. According to WHO, there are several reasons for these attitudes[8]. Among these, the most significant factor that causes people to have a negative attitude about vaccinating is discourses not based on scientific knowledge. This incorrect attitude about COVID-19 vaccines can be prevented by improving the health literacy of individuals[9]. Health literacy is a concept that refers to the knowledge and skills needed to meet modern society's complex health demands. Less healthy choices, risky behaviors, worse health, less self-management, and more hospitalizations have all been linked to low health literacy[10]. Vaccine literacy is based on the same principles as health literacy: it is defined as "not only knowing about vaccines but also developing a simplified system for communicating and delivering vaccines as a critical component of a functioning health system."[11]. To tackle the COVID-19 pandemic, it is necessary to raise awareness among the public about vaccines.

Aim

This descriptive research was conducted to determine the relationship between COVID-19 vaccine literacy and the community's attitude toward the COVID-19 vaccine.

MATERIAL and METHODS

Study Design

This descriptive research was conducted online between June and September 2021 to determine the relationship between COVID-19 vaccine literacy and the community's attitude toward the COVID-19 vaccine.

Study Sample

The population size of the research was not calculated since it was impossible for the researchers to determine it in the digital environment, and the data were collected within a certain period. Therefore, convenience sampling, a non-probabilistic sampling method, was used. The research sample comprised 1112 people aged 18 and over who voluntarily participated between June and September 2021. Therefore, the sample of our research provides the necessary conditions (12 predictive variables×10=120 participants-minimum)[12].

Data Collection Tools

The research data was collected with The Personal Information Form, the COVID-19 Vaccine Literacy (COVID-19 VL) Scale, and the Attitudes Towards the COVID-19 Vaccine Scale (ATV-COVID-19) Scale.

Personal Information Form: The form was used to collect information about the participants' sociodemographic features and illness statuses. The authors created it by examining the studies related to this subject. The form contains eight questions: 5 about people's introduction information (age, gender, education level, marital status, chronic disease) and three about their disease status.

COVID-19 VL Scale: The "COVID-19 VL" scale, validated and reliable in Turkish by Durmuş et al. (2021), was used in the research. There are 12 items on the scale, divided into two sub-dimensions: functional and communicative/critical. The scale's Cronbach's alpha value was reported to be 0.87[13]. In this research, the reliability of the COVID-19 VL scale was 0.67.

ATV-COVID-19 Scale: The “ATV-COVID-19” scale, developed by Geniş et al. in 2020, has nine items and has two sub-dimensions (positive and negative attitudes). For each sentence on the scale, the following responses are provided: "I strongly disagree: 1 point," "I do not agree: 2 points," "I am undecided: 3 points," "I agree: 4 points," or "I strongly agree: 5 points." The items in the negative attitude sub-dimensions were coded backward. Individuals with high scores on the positive attitude sub-dimension have a positive attitude toward the vaccination. The negative attitude sub-dimension items are scored after they have been reversed, and high scores in this sub-dimension indicate that individuals have less negative attitudes toward vaccination. The scale's Cronbach's alpha value was reported to be 0.80[14]. In this research, the Cronbach alpha value of the ATV-COVID-19 scale was calculated as 0.90.

Data Collection

The individuals participating in the research were informed about the purpose of the study and that they could leave the research at any time through a Google form. Individuals who voluntarily participated in the study selected the option indicating voluntariness before filling out the questionnaire. Participants who did not choose this option were blocked from accessing parts of the survey. One thousand one hundred twelve people who volunteered for the research and answered all questions completely were included in the study.

Data Analysis

The data obtained in the research were analyzed using the SPSS (Statistical Package for Social Sciences) for Windows 25.0 program. Descriptive statistical methods (number, percentage, min-max values, mean and standard deviation) were used while evaluating the data. “Reliability Analysis”

was conducted to test the reliability of the scales. The Shapiro-Wilk test was used to show whether the data were normally distributed. In the comparison of quantitative data in normally distributed data, an independent t-test was used for the difference between two independent groups, and one-way analysis of variance was applied when comparing more than two independent groups, and Bonferroni was used to find the group that made a difference when there was a difference. Significant variables were evaluated in more detail by keeping the variable with the highest frequency constant in the multiple linear regression model. As a result of statistical analysis, values of $p<0.05$ were accepted as significant.

Ethical Considerations

Permission was obtained from the responsible authors for the use of the scales. In order to conduct the research, approval was obtained from the Ethics Committee of Non-Invasive Clinical Researches of Toros University (Date: 09.07.2021. No: 77). The research was carried out within the framework of the ethical principles stated in the Declaration of Helsinki, after obtaining online consent from the participants.

Limitations

The results of this research show the COVID-19 vaccine literacy levels and attitudes towards vaccines of Turkish adults who are literate and have internet access. This shows the limitations of this research.

RESULTS

67.5% (n= 751) of the participants were women, 69.6% (n= 774) were single, 61.3% (n= 682) had an undergraduate degree or higher, and more than half of them were between the ages of 18 and 26 (30.34±13.46). In addition, the majority of the participants (87.4%) did not have a chronic disease, 80% (n= 899) did not have COVID-19, and 89.6% (n= 996) had received one of the vaccines developed for COVID-19.

There was a statistically significant difference between the mean scores of the COVID-19 VL scale according to the educational status of the participants, the status of having COVID-19, and the type of COVID-19 vaccine administered ($p<0.05$). It was determined that an education level of an undergraduate degree or higher, not having had COVID-19 before, and receiving the BioNTech vaccine were influential on COVID-19 vaccine literacy.

There was a statistically significant difference between the mean scores of the ATV-COVID-19 scale according to the participants' sex, age, marital status, educational background, having COVID-19, being vaccinated against COVID-19, having COVID-19 in their family, and COVID-19 vaccine type ($p<0.05$).

The participants over the age of 45, who were married, who had an undergraduate degree or higher, who had not had COVID-19 before, who had had a previous COVID-19 vaccine, who had no family history of COVID-19, and who had been vaccinated with Sinovac + BioNTech had a positive attitude towards the vaccine (Table 1).

Table 1. The Distribution of the Total Main Scores of the Participants from the COVID-19 VL Scale and the ATV-COVID-19 Scale According to Their Introductory Information

Characteristic	n (%)	COVID-19 VL Scale	ATV-COVID-19 Scale
		X̄±SS	X̄±SS
Age			
18-26[1]	625(56.2)	2.88±0.42	3.61±0.72
27-35[2]	191(17.2)	2.92±0.48	3.62±0.85
35-45[3]	97(8.7)	2.91±0.45	3.64±0.77
45-54[4]	83(7.5)	3.00±0.41	3.85±0.77
54<[5]	116(10.4)	2.94±0.43	4.02±0.65
p		0.144	**<0.001****
Post-hoc			5,4>1,2,3
Gender			
Female	751(67.5)	2.91±0.43	3.65±0.75
Male	361(32.5)	2.90±0.45	3.72±0.78
p		0.193	0.885
Marital Status			
Married	774(69.6)	2.92±0.44	3.78±0.77
Single	338(30.4)	2.90±0.43	3.63±0.75
p		0.080	**0.004***
Education			
Literate[1]	54 (4.9)	2.76±0.42	3.37±0.65
Elementary school[2]	19 (1.7)	2.65±0.59	3.70±0.79
High school[3]	357 (32.1)	2.86±0.42	3.62±0.72
University or higher graduate[4]	682 (61.3)	2.95±0.43	3.73±0.78
p		**<0.001****	**0.003***
Post-hoc		**4>1,2,3**	**4>1**
Presence of chronic disease			
Yes	140 (12.6)	3.61±0.86	3.61±0.86
No	972(87.4)	3.68±0.74	3.68±0.74
p		0.472	0.346
COVID-19 transmission status			
Yes	213(19.2)	2.85±0.47	3.55±0.78
No	899(80.8)	2.92±0.42	3.71±0.75
p		**0.049***	**0.006***
COVID-19 vaccination status			
Yes	996(89.6)	2.91±0.43	3.78±0.68
No	116(10.4)	2.84±0.44	2.80±0.83
p		0.086	**<0.001***
Relatives with Covid-19			
Yes	458(41.2)	2.90±0.43	3.61±0.77
No	65(58.8)	2.91±0.43	3.72±0.75
p		0.583	**0.011***

The ratios of the independent variables, determined to affect the participants' mean COVID-19 VL scale score on the total scale score, were evaluated by multiple linear regression analysis. It was determined that 0.12% (R2: 0.128) of the variance in the COVID-19 VL scale total score of the participants was explained by education status, COVID-19 status, and COVID-19 vaccine type. Considering the significance tests of the regression coefficients, it was determined that none of the variables affected the mean score of the COVID-19-VL scale (Table 2).

The ratios of the independent variables that affect the participants' mean ATV-COVID-19 scale score to the total scale score were evaluated by multiple linear regression. It was determined that 0.40% (R2: 0.406) of the variance in the total score of the participants on the ATV-COVID-19 scale was predicted by age, marital status, education level, COVID-19 status, and COVID-19 vaccine type.

Table 2. Linear Regression Analysis with COVID-19 VL Scale of Independent Variables Identified in Participants (n=1112)

Independent variables	ß	COVID-19 VL Scale		
		B	%95 CI	p
Education (Ref: University or higher graduate)				
Literate	-0.185	-0.185	-0.305-(-0.066)	0.964
Elementary school	-0.304	-0.304	-0.500-(-0.107)	0.983
High school	-0.086	-0.086	-0.142-(-0.031)	0.952
COVID-19 transmission status (Ref: No)				
Yes	-0.060	-0.066	-0.131-(-0.002)	0.983
COVID-19 vaccine type (Ref: Biontech)				
Sinovac	0.031	0.043	-0.040-0.126	0.312
Sinovac+Biontech	-0.001	-0.001	-0.096-0.093	0.946
Diğer	0.001	-0.001	-0.151-0.149	0.905
Unvaccinated	-0.042	-0.060	-0.145-0.025	0.956
R^2: 0.128				

B: Regression coefficient, ß (Standardized Beta): Partial regression coefficient, R^2: Determination coefficient, COVID-19 VL: COVID-19 vaccine literacy, ATV-COVID-19: Attitudes towards the COVID-19 Vaccine, CI: Confidence interval

Considering the significance tests of the regression coefficients, being 45 years old and over and having had the COVID-19 vaccine significantly increased the mean scores of the ATV-COVID-19 scale. Being literate, not getting vaccinated, and having been vaccinated with Sinovac and not BioNTech significantly decreased the mean ATV-COVID-19 scale scores (Table 3).

There was a statistically significant positive correlation between mean COVID-19 VL scale scores and mean ATV-COVID-19 scale scores (r: 0.209; p<0.01). As vaccine literacy increased, the positive attitude toward the vaccine also increased (Table 4).

Table 3. Linear Regression Analysis with ATV-COVID-19 VL Scale of Independent Variables Identified in Participants (n=1112)

Independent variables	ß	ATV-COVID-19 Scale		
		B	%95 CI	p
Age (Ref: 18-26)				
27-35	0.014	0.028	-0.095-0.159	0.661
36-44	0.003	0.009	-0.155- 0.187	0.916
45-54	0.071	0.204	0.042-0.415	**0.030**
54<	0.113	0.281	0.177-0.534	**0.001**
Marital status (Ref: Married)				
Single	0.021	0.013	(-0.98-0.141)	0.729
Education (Ref: University or higher graduate)				
Literate	-0.085	-0.301	-0.496-(-0.106)	**0.003**
Elementary school	-0.011	-0.064	-0.381-0.253	0.693
High school	-0.058	-0.155	-0.187-(-0.002)	0.055
COVID-19 transmission status (Ref: No)				
Yes	-0.019	-0.037	-0.150-0.071	0.485
COVID-19 vaccination status (Ref: No)				
Yes	0.392	0.301	0.838-1.109	**0.001**
COVID-19 vaccine type (Ref: Biontech)				
Sinovac	-0.050	-0.126	-0.255-0.011	0.063
Sinovac+Biontech	0.032	0.085	-0.077-0.254	0.313
Diğer	-0.060	-0.274	-0.506-0.028	**0.025**
Unvaccinated	-0.279	-0.699	-0.030-0.167	**0.044**
R^2: 0.406				

Table 4. Relationship Between COVID-19 VL and ATV-COVID-19 Scale Main Scores

COVID-19 VL Scale X±SS: 2.91±0.43	ATV-COVID-19 Scale X̄±SS: 3.68±0.76	
	r	p
	0,209	**0,001**

Spearman correlation test, COVID-19 VL: COVID-19 vaccine literacy, ATV-COVID-19: Attitudes towards the COVID-19 Vaccine

DISCUSSION

The majority of research participants, which was conducted to examine the association between COVID-19 vaccine literacy and attitudes about the COVID-19 vaccination, had a relatively high degree of COVID-19 vaccine literacy. A limited number of studies on COVID-19 vaccine literacy were found in the literature. This reveals the importance of research. According to research, the literacy level regarding the vaccines developed against the COVID-19 disease, an unexpected occurrence affecting the whole world, is relatively high. This may be related to the fact that most of the participants we sampled had a university or higher education level and therefore had higher vaccine literacy.

The research participants had a high level of positive attitude toward the vaccine. Lazarus et al. (2021) reported that 88.62 % of Chinese and 85.36 % of Brazilian participants had a very positive attitude toward the vaccination, like results[15]. In the research by Peretti-Watel et al. (2020), 86% of respondents from England and 92% of respondents from Italy had a positive attitude towards COVID-19 vaccines[16]. Contrary to the results, El-Elimat et al. (2021) reported that almost half of the participants (49.6%) had a negative attitude toward vaccinations because of their adverse effects and refused to vaccinated[17]. Research results can be associated with the fact that more than half of the participants having a university or higher education level, and their vaccine literacy is high; therefore, they have a more positive attitude towards vaccines.

In this research, the total scores of the participants aged 54 and over from the ATV-COVID-19 scale were higher than the other age groups. Similar to findings, previous studies were found in the literature[18-21]. Unlike research findings, several studies report that younger participants have a more positive attitude toward COVID-19 vaccines[9,17]. It is known that as people get older, chronic diseases increase, resistance to infectious diseases is lower, and they are considered to be more risky[22,23]. For this reason, from the first moments of the COVID-19 pandemic, priority has been given according to age groups with regard to vaccination. In the report published by The Republic of Turkey's Ministry of Health, individuals aged 65 and over were included in the vaccine group in the first stage and individuals aged 50 and over in the second stage[24]. It is thought that these practices cause individuals to have a more positive attitude towards the vaccine and to differ from others in vaccine literacy as a result of their understanding of how important it is to protect individuals from the disease and care about

vaccination. According to the research result, the positive attitude of elderly individuals towards COVID-19 vaccines can be associated with the health policies implemented in this country and the high education level of more than half of the participants.

The COVID-19 VL scale total scores and the ATV-COVID-19 scale total scores of the participants with a university or higher education level were higher than those of the participants with other education levels, and there was a positive correlation between them. In the research conducted by Biasio et al. in 2021, a significant relationship was found between education level and vaccine literacy, similar to research[9]. There are also other studies in the literature that support research findings[15,25]. However, contrary to research findings, Enticott et al. (2022) found no significant relationship between education level and COVID-19 vaccine attitude[26]. In research, the high vaccination literacy of the participants and their positive attitudes towards COVID-19 vaccines can be explained by the fact that as their education level increases, they are more open to new information and know better where to obtain the correct information.

The total scores for the ATV-COVID-19 scale of the participants without COVID-19 were higher than the total scores of the participants with COVID-19 from the scales. Similar results were obtained in Lazarus et al.'s (2021) research[15]. In another research conducted in 2021, there was no relationship between having COVID-19 and the decision to have the COVID-19 vaccine[27.] According to research findings, participants who have not had COVID-19 are expected to exhibit positive attitudes toward the vaccine. This suggests that individuals who do not have COVID-19 are protected from the disease as a result of paying more attention to the issue and displaying an attitude supporting the prevention of the disease.

The total scores on the COVID-19 VL scale and the total scores on the ATV-COVID-19 scale had a statistically significant positive relationship. In order to maintain epidemics under control, health literacy is important[28], and it has been reported that there is a relationship between individuals' health literacy and their negative attitudes towards the COVID-19 vaccine[29]. Van Duong et al. (2021) reported that high health literacy reduces COVID-19 vaccine hesitancy[30]. Contrary to research, few studies indicated that health literacy did not affect the attitude toward the COVID-19 vaccine[9,31]. In Ilgaz's (2021) study, the health literacy levels of the participants were insufficient[32], and in a study conducted by Ertuğrul et al. (2021), the health literacy level of the parents was not related to their attitudes and behaviors towards childhood vaccinations[33]. The positive relationship between vaccine literacy and vaccine attitude in this research findings can be explained by the health policies implemented in Turkey and the access of participants to information about their health from the right sources.

CONCLUSION

In this research, participants' vaccination literacy was relatively high, and their attitudes toward the COVID-19 vaccine were positive. As vaccine literacy increased, positive attitudes toward vaccines also increased. It is recommended that necessary information studies be carried out for healthcare professionals to increase literacy regarding the COVID-19 vaccine. In addition, it is crucial for public health that nurses take an active role in disseminating this information.

Ethics Committee Approval: Approval was obtained from the Ethics Committee of Non-Invasive Clinical Researches of Toros University (Date: 09.07.2021. No: 77). An online voluntary informed consent form was used to seek consent from the study's participants.

Conflict of Interest: None.

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Exhibitor Consent: Informed consent was obtained from all participants participating in the study.

Author contributions

Study design: BS, ABD, YS, FO

Data collection: BS, ABD, YS, FO

Literature search: ABD, YS

Drafting manuscript: BS, ABD, YS, FO

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Yazar katkıları

Araştırma dizaynı: BS, ABD, YS, FO

Veri toplama: BS, ABD, YS, FO

Literatür araştırması: ABD, YS

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