Original Article

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

COVID-19 ve Aşı Tereddüdü: Sağlık Okuryazarlığı Çözüm Olabilir mi?

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ABSTRACT

Objective: Practices such as the use of masks, cleaning measures, and social distancing have come to the fore to prevent the Coronavirus disease-2019 (COVID-19) pandemic. In addition to this, the most important way to fight the pandemic seems to be vaccination. However, "vaccine hesitancy" is seen as an important obstacle to attempts to control the pandemic. With this study, we aimed to evaluate the effects of having inadequate or incorrect information, one of the possible determinants of attitudes towards the COVID-19 vaccine.

Methods: The data of this descriptive study were collected via an online questionnaire from patients (N=496) involving Sociodemographic Data Form, Turkey Health Literacy Scale-32 and Anti-Vaccine Scale.

Results: The data revealed that 7.5% of the participants would not be vaccinated and 14.3% were indecisive. We found a negative correlation between vaccine refusal and health literacy, thus confirming the main hypothesis of our study. Also, an increase in education years was a negative predictor of vaccine hesitation.

Conclusion: 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.

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

ÖZ

Amaç: Koronavirüs hastalığı-2019 (COVID-19) pandemisini önlemek için maske kullanımı, temizlik önlemleri ve sosyal mesafe gibi uygulamalar ön plana çıkmıştır. Bunun yanı sıra, salgınla mücadelenin en önemli yolunun aşı olduğu görülmektedir. Ancak "aşı tereddütü" pandemiyi kontrol altına alma girişimlerinin önünde önemli bir engeldir. Bu çalışmanın amacı COVID-19 aşısına yönelik tutumların olası belirleyicilerinden biri olan yetersiz veya yanlış bilgiye sahip olmanın etkilerinin değerlendirilmesidir.

Yöntemler: Tanımlayıcı tipteki bu çalışmanın verileri hastalardan (N=496), Sosyodemografik Veri Formu, Türkiye Sağlık Okuryazarlığı Ölçeği-32 ve Aşı Karşıtlığı Ölçeğini içeren çevrimiçi anket yoluyla toplanmıştır.

Bulgular: Veriler, katılımcıların %7,5'inin aşı olmayacağını ve %14,3'ünün kararsız olduğunu ortaya koymuştur. Aşı tereddüdü ile sağlık okuryazarlığı arasında negatif bir ilişki bulunmuş ve çalışmanın ana hipotezi doğrulanmıştır. Ayrıca eğitim yılındaki artışın aşı tereddüdünün olumsuz bir yordayıcısı olduğu saptanmıştır.

Sonuç: Şu anda pandemi ile mücadelede en önemli yaklaşım toplumun aşılanmasıdır. Doğru bilgiye sahip olmak, aşı reddi tutumlarıyla mücadele etmek için son derece önemlidir. Aşı tereddütü ile mücadele, hükümetlerin ve sosyal medya dahil medya kaynaklarının ortak çabalarını gerektirir.

Anahtar Sözcükler: COVID-19, COVID-19 aşısı, sağlık okuryazarlığı, aşı tereddütü

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Introduction

The Coronavirus disease-19 (COVID-19) pandemic not only affected the health of individuals but also brought many social and economic problems. Works to control the pandemic and reduce all these negative effects are continuing worldwide (1). Since the beginning of the pandemic, false information and fake news about COVID-19 started to spread rapidly, confusing people. Beliefs in the prevention and treatment of COVID-19 were 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 (2). Previous studies have reported that fake news may be at the center of vaccine hesitancy (3,4). 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 (5).

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 (6). HL is generally known to help distinguish fake news (7). The World Health Organization (WHO) defines HL as "personal characteristics and social resources that enable individuals and societies to access, understand, evaluate, and use the information to make health-related decisions" (8). The HL status of individuals plays a very important role in the context of seeking health information (9). In today's world, where access to information has become easier with the effect of technology, individuals with sufficient HL can more easily reach the correct health information they need among unverified health information from different sources (10). It is known that poor HL in chronic diseases is associated with increased healthcare expenditures and mortality (11). Due to the complex nature of chronic diseases, prevention and successful management can be achieved by increasing the level of HL of individuals and taking an active role in their health (12). According to a meta-analysis evaluating the relationship between HL and infectious diseases, a low level of HL also negatively affects protective behaviors such as vaccination and hand hygiene (13). With the emergence of the COVID-19 pandemic, it has emerged that HL is also important in communicable diseases. Low HL scores are associated with "vaccine hesitancy" (6,14).

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 pandemic 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 (15). Discussions about vaccination applications have come up all over the world recently (16). 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 (17). Regarding previous vaccination practices, studies examining anti-vaccine websites have found that the information on these sites underestimates the risk and severity of diseases (18,19). It is seen that these vaccine refusal campaigns are increasingly continuing in the COVID-19 pandemic (20). 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.

Although it is known that a high level of HL is a basic requirement for the protection and development of an individual's health, very little information has been found about how it affects vaccine acceptance, which is the most important weapon in the fight against COVID-19. Therefore, to fill this gap in the literature, with this study, we 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 "HL" 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

A snowball sampling method was used to determine the participants and the data collection tools were sent to 750 people via instant messaging apps by the researchers' personal contacts. All participants were informed about the study and gave informed consent via an online questionnaire. A total of 512 people participated in the study. The results of 12 people due to random marking and four people due to short survey completion times (less than 15 minutes) were not taken into consideration, and analyzes were conducted with 496 people in total.

Data Collection Tools

Sociodemographic Data Form: It was specially prepared for this study by the research team. It was a form in which the demographic data of the participants such as age, gender, occupation, and the preliminary opinions the people had about the vaccination application were asked.

Turkey Health Literacy Scale-32 (THLS-32): The scale was developed by the Republic of Turkey Ministry of Health in 2016 in line with the "European HL Survey-HLS-EU" (21). It consists of 32 questions in total and consists of two dimensions, "prevention from diseases/health promotion and treatment/service", and four processes "accessing health information, understanding health information, evaluating health information and applying/using health information". High scores indicate high HL.

Anti-Vaccine Scale: It was created to evaluate the factors related to vaccine refusal (22). The scale includes 21 items and four 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 was obtained from the Non-Interventional Research Ethics Committee of the faculty of health sciences of a university (date: 05.04.2021, number: 13). Besides, permission was obtained from the authors who developed the scales by e-mail. On the first page of the data collection form, participants were 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 were enabled to answer the survey questions.

Statistical Analysis

All data were analyzed using the Statistical Package for Social Science Windows version 22.00 (SPSS) web software. Quantitative data were evaluated as percentage, mean and standard deviation. Participants were grouped according to their attitudes towards the vaccine, and the normal distribution condition was evaluated using the Kolmogorov-Smirnov test. Categorical variables were evaluated with the Pearson chi-square test and mean scores of independent variables between groups were evaluated with the Independent Sample t-test. The Pearson Correlation test was used to evaluate the correlations between scale scores. Multiple linear regression analyzes were applied while evaluating the precursor factors of vaccine refusal. For all analyzes $p<0.05$ was taken as a basis for significance.

Results

A total of 135 male and 361 female participants was included in the study. The socio-demographic characteristics of the participants are shown in Table 1. Interestingly, while it was their turn to vaccine in 63.7% of all participants, only 5.2% stated that they were not vaccinated even though it was their time of vaccination, and 7.5% stated that they would not be vaccinated when their time of vaccination would come. Nearly half of the participants (42.1%) stated that they trusted the effects of the vaccine and that they would be vaccinated.

The ages of the patients ($p<0.001$) and their years of education ($p=0.002$) were found to be significantly higher in those who were accepted to be vaccinated. Furthermore, it was found that the intention of vaccination was lower in women than in men ($p=0.013$). Lastly, it was determined that the group with the low intention for the vaccine had higher scores on vaccine refusal scales ($p<0.001$) and lower HL scores ($p=0.008$) (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 HL are shown in Table 3.

In the linear regression analysis, it was determined that education year and age negatively predicted vaccine refusal scores. The model explains the 18% variance with the effect of only 2 of the 4 variables including demographic data and HL (Table 4).

Table 1. Distribution of sociodemographic and medical characteristics of participants (n=496)

	Mean ± SD	
Age (years)	39.30±12.59	
Number of children	1.12±0.97	
Education year	16.95±3.94	
	n	**%**
Sex		
Male	135	27.2
Female	361	72.8
Marital status		
Single	155	31.2
Married	341	68.8
COVID-19 history		
Yes	60	12.1
No	436	87.9
COVID-19 treatment story		
No cure	436	87.9
Outpatient treatment	53	10.7
Hospital treatment	5	1.0
Intensive care treatment	2	0.4
COVID-19 in a first-degree relative		
Yes	174	35.1
No	322	64.9
Death from COVID-19 in a first degree relative		
Yes	76	15.3
No	420	84.7
Did you schedule for the COVID-19 vaccine?		
Yes	180	36.3
No	316	63.7
Were you vaccinated?		
Yes	159	32.1
I choose not to get the vaccine	26	5.2
I was not scheduled	311	62.7
Are you going to get the vaccine when it's your turn to vaccinate?		
Yes	388	78.2
No	37	7.5
Unstable	71	14.3
What is your attitude towards the vaccine?		
I trust the effects of the vaccine and I will be	209	42.1
I am indecisive for the effects of the vaccine and I will be	198	39.9
I am completely indecisive	51	10.3
I am indecisive for the effects of the vaccine and I will not be	16	3.2
I think the vaccine is negative/ineffective and I will not be	22	4.4
Childhood vaccinations		
I've had all of childhood vaccinations	455	91.7
I haven't had all of the childhood vaccinations	6	1.2
I do not remember	35	7.1

SD: Standard deviation, COVID-19: Coronavirus disease-2019

Table 2. Groups by vaccine intention

		Accept to be vaccinated (n=388)		Group with low intention to vaccinate (n=108)		p
		Mean ± SD		Mean ± SD		
Age (years)		40.66±12.18		34.41±12.90		<0.001
Education year		17.16±3.99		16.18±3.66		0.022
Vaccine refusal		38.13±9.76		55.06±12.29		<0.001
HL total score		35.34±8.22		32.93±8.56		0.008
		n	**%**	**n**	**%**	
Sex	Male	115	29.6	20	18.5	0.013
	Female	273	70.4	88	81.5	

HL: Health literacy, SD: Standard deviation

Table 3. Correlations between scales

		HL accessing information	HL understanding information	HL evaluating information	HL using knowledge	HL total score
Vaccine benefit and protective value	r	-0.192**	-0.167**	-0.149**	-0.158**	-0.179**
	p	<0.001	<0.001	<0.001	<0.001	<0.001
Vaccine refusal	r	-0.314**	-0.316**	-0.278**	-0.300**	-0.325**
	p	<0.001	<0.001	<0.001	<0.001	<0.001
Solutions for not getting vaccinated	r	-0.261**	-0.242**	-0.208**	-0.225**	-0.252**
	p	<0.001	<0.001	<0.001	<0.001	<0.001
Legitimation of vaccine hesitation	r	-0.294**	-0.255**	-0.184**	-0.212**	-0.253**
	p	<0.001	<0.001	<0.001	<0.001	<0.001
Vaccine refusal total	r	-0.311**	-0.291**	-0.247**	-0.269**	-0.301**
	p	<0.001	<0.001	<0.001	<0.001	<0.001

HL: Health literacy

Table 4. Regression for vaccine refusal

	Adjusted R^2	B	SE	β	95% CI (LL/UL) for β	p
Vaccine refusal	0.181					
Age		-0.045	0.042	-0.045	-0.128/0.038	0.286
Sex		2.002	1.166	0.071	-0.290/4.293	0.087
Education year		-0.901	0.132	-0.284	-1.159/-0.642	<0.001*
HL total score		-0.435	0.061	-0.291	-0.555/-.0315	<0.001*

HL: Health literacy, CI: Confidence interval, LL: Lower level, UL: Upper level
*: p<0.001

Discussion

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

In a study examining the articles between 2007 and 2017, it was found that HL and vaccine hesitancy were associated with age, country, and vaccine type (13). In this review, it was reported that most of the studies originated from the USA and high-income European countries, data on low-income countries were scarce, hence geographical representation might be weak. Therefore, it is important to conduct such studies in 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 the rate of vaccine hesitancy-vaccine refusal among parents was 16% (23). Studies evaluating the relationship between the frequency of pneumococcal and influenza vaccinations and HL indicated that as the level of HL increased, the vaccination rates increased (24,25). The significant relationship between low HL and vaccine hesitancy has also been demonstrated by COVID-19

studies (6). 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 7 European countries, 18.9% of the participants stated that they were not sure about being vaccinated and 7.2% of them did not want to be vaccinated (26). Despite the intervening period of nearly one year, according to the results of our study, 7.5% of the participants stated that they would not be vaccinated and 14.3% were indecisive. In a previous study, 31% of the participants in Turkey stated that they were ambivalent or negative about vaccination administration (27). In the same study, this rate was 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 be vaccinated or were indecisive (16). When the studies in the literature were analysed, it could be considered that the vaccine hesitancy-vaccine refusal attitudes in Turkey were higher than in other European countries. Hence, it is extremely significant to reveal the reasons for this attitude. In a study in which COVID-19 vaccine hesitancy was examined comparatively in Turkey and England, it was evaluated that vaccine hesitancy was higher in Turkey and this result was associated with the belief that the virus did not have a natural origin (27). In particular, individuals who were exposed to false news about the disease and vaccine on social media increased their anxiety and risk perception towards vaccination and its harms (28). In this context, it is important to improve the HL of individuals to gain the ability to distinguish the right information, inform the public about the origin of the virus, to reduce vaccine hesitancy and support vaccination campaigns.

Having the right information is extremely important to fight vaccine refusal attitudes. For instance, previous studies have shown relationships between believing that the coronavirus is an artificial virus produced in the laboratory and vaccine refusal (27). 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 1,153 people in Germany, only 49.9% of the participants were found to have sufficient HL (29). In the study, it was reported that the lowest scores of the participants were related to the capacity to "decide on the reliability of the information in the media". Having the right information is a very important factor affecting the vaccination decision of individuals.

Another important finding of our study was 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 (30). This situation can be interpreted as the elderly group prefer 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. In addition, it is evaluated that the fatalistic and submissive attitudes of elderly individuals result in their not being inquisitive about their health and high vaccination acceptance. 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 (31). 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 (32). 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 (33).

The concept of vaccination literacy, which is built on the idea of HL, affects individuals' intention to be vaccinated. Besides, a specific emphasis on the concept of HL is vital to understanding the determinants of attitudes towards vaccination and enabling change of attitude (34). The Erice Declaration, which was prepared in Italy to address issues related to vaccine attitudes before the pandemic, emphasized the promotion of the concept of HL and vaccine literacy and the inclusion of the media in this movement (35). Given the uncertainty created by the pandemic and the confusion of information in the media, the concept of HL can be a fundamental basis for a way out of the pandemic (36).

Study Limitations

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

Conclusion

Currently, the most important approach in fighting the COVID-19 pandemic is seen as the vaccination of society. 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. Based on the conclusion that low HL increases vaccine hesitancy, it may be possible to reduce vaccine hesitancy by improving the HL level of individuals. 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 HL for individuals to distinguish correct information.

Ethics

Ethics Committee Approval: Ankara Medipol University Non-invasive Clinical Research Ethics Committee (date: 05.04.2021/ decision no: 13).

Informed Consent: All participants were informed about the study and gave informed consent via an online questionnaire.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: F.K., F.Y., Design: F.K., F.Y., Data Collection or Processing: F.K., F.Y., N.Ü., Analysis or Interpretation: F.Y., Literature Search: F.K., F.Y., N.Ü., Writing: F.K., F.Y., N.Ü.

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