Are midwifery students ready for the COVID-19 vaccine? The decision to vaccinate and affecting factors

Filiz Aslantekin-Özçoban, Mesude Uluşen, Hacer Yalnız-Dilcen & Elif Çilesiz

Taylor & Francis
Taylor & Francis Group

Check for updates

RESEARCH PAPER

Are midwifery students ready for the COVID-19 vaccine? The decision to vaccinate and affecting factors

Filiz Aslantekin-Özçoban [a], Mesude Uluşen [b], Hacer Yalnız-Dilcen [c], and Elif Çilesiz [b]

aFaculty of Health Sciences, Department of Midwifery, Balikesir University, Balikesir, Turkey; bFaculty of Health Sciences, Department of Midwifery, Amasya University, Amasya, Turkey; cFaculty of Health Sciences, Department of Midwifery, Bartin University, Bartin, Turkey

ABSTRACT

Aim: This study aims to determine the decision of midwifery students, who are the midwives of the future, on getting the COVID-19 vaccine and affecting factors.

Method: The sample of this online cross-sectional study consisted of 1879 midwifery students in Turkey. The data *collection tools of the study included a sociodemographic data form, the Health Literacy Index, Perception of Causes of COVID-19 and Attitudes Toward the COVID-19 Vaccine Scale. Descriptive statistics, correlation and linear regression analyses were used in the analysis of the data.*

Findings: Among the participants, 65.7% (1235) did not want to get the COVID-19 vaccine. In this study, those who found childhood vaccines beneficial among the students, those reporting positive attitudes toward vaccinations and those who listened to the recommendations of health-care workers had higher rates of not wanting to get the COVID-19 vaccine. It was found that the students' decisions to get the vaccine were not affected by their health literacy levels. However, their attitudes toward vaccination were negatively effective, and their perceptions of COVID-19 causes were positively effective.

Conclusion: In our study, the midwifery students who perceived the cause of COVID-19 as a conspiracy did not want to be vaccinated. Midwifery students should move away from the perception of conspiracy, and they should be informed about COVID-19 with scientific facts.

1. Introduction

Since the detection of the first COVID-19 virus infections in Wuhan, China, at the end of December 2019, the disease has been affecting virtually every country across the world, and a global disaster is being experienced.[1] While behaviors like mask-wearing, social distancing and hygiene are effective in preventing the spread of the virus in the COVID-19 pandemic period,[2] the long-term control of the pandemic is dependent on developing a vaccine and administering it.[3] However, there are challenges such as mass production, global distribution and cost that may endanger the implementation of a COVID-19 vaccine.[4] In the fight against COVID-19, the acceptance of the vaccine is as important as its production and supply. This is because having developed and produced a vaccine does not guarantee that it will inevitably gain acceptance.[5] The increasing number of people who perceive vaccination as unsafe and unnecessary in the last few decades[6] and vaccine hesitancy/refusal[7] have been included in the world's agenda also for the newly developed COVID-19 vaccines (in terms of timing of production, effectiveness and reliability). According to studies on this topic conducted before the COVID-19 vaccine administration process started, intentions toward vaccination vary from country to country. In the literature, the highest rate of COVID-19 vaccine acceptance in the general population was reported in Ecuador (97.0%), and the lowest rate of acceptance was reported from Kuwait (23.6%). The vaccine acceptance rates among health-care workers (e.g., doctors, nurses) vary between 27.7% in the Democratic Republic of the Congo and 78.1% in Israel.[8] Among studies conducted on university students, 86.1% (735) in Italy stated that they wanted to get the vaccine, while in the United States, 53% of medical students (168) reported they wanted to participate in vaccine trials.[9,10]

The situation of refusing to get the COVID-19 vaccine may originate from those who are hesitant about the vaccine as reported by WHO, not trusting vaccines, the misconception that vaccines cause a significant risk and failure to understand the gravity of the disease.[11] Additionally, about the COVID-19 pandemic, reasons like belief in biological warfare, efforts to sell vaccines, unhealthy nutrition, global warming, pollution of natural resources and fatalism may affect perceptions. Perceptions on a disease are formed in line with perceptions on the cause of the disease, and this affects the management of the process of taking the disease under control.[12] For example, it was reported that conspiracy theory perceptions regarding COVID-19 would affect the acceptance of tests and treatments negatively.[13] In this context, it is important for individuals to have access to accurate information and the capacity to understand and assess this information. In this sense, health literacy may be empowering for people in terms of making a distinction between reliable information and false information about COVID-19, utilizing health-care resources and making and implementing responsible health-related decisions. In the literature, it was stated that those who have limited or inadequate health literacy levels are less likely to adopt protective behaviors like immunization.[14]

In the fight against the COVID-19 pandemic, which has spread all around the world, vaccination is an important protective factor. Vaccinating the vast majority of society (at least 60% to 70% of the population) will be effective in the control of the pandemic.[3] If hesitancy regarding vaccination is higher than what is aimed, it will not be possible to reach the desired immunity level in society. In this sense, determining the existing situation regarding vaccine refusal and finding and implementing policies for acceptance is as important as discovering a safe and effective vaccine.[5]

At the time of writing this article, vaccination had started and was going on in priority risk groups in some countries (the USA, China, the United Kingdom, Russia, Israel, Bahrain and Canada).[15] In Turkey, too, vaccination also started for healthcare workers and individuals over the age of 90 who were defined as priority risk groups. Healthcare workers are accepted as the most reliable source of information regarding vaccines and critical determinants.[16,17] Healthcare workers who are hesitant in terms of vaccination may have a strong negative effect on vaccine acceptance.[16] Especially midwives who are involved in immunization services are vitally important in terms of the vaccination decisions of the women under their care, and therefore, in terms of public health outcomes for the broader society. In this sense, it is stated that midwifery education is an important field for training the vaccine advocates of the future. This is because professional university education allows the adoption of occupational values and norms, and the views of university students on vaccines may indicate their vaccination attitudes in the future.[17] It is necessary to determine the preferences of midwives, who are promising individuals in terms of providing vaccination services and the most valuable healthcare services like mother-infant health and reproductive health services, regarding the COVID-19 vaccine, as well as factors influencing these preferences. This study aimed to determine the relationships among the attitudes of midwifery students toward the COVID-19 vaccine, their perceptions on COVID-19 causes and health literacy levels regarding the acceptance of vaccination, in addition to influential factors.

2. Materials and methods

2.1. Type of research

This is a an online cross-sectional study.

2.2. Population and sample

This study, which aimed to determine the decisions of midwifery students on getting the COVID-19 vaccine and affecting factors, was conducted between 7 and 12 January 2021 in Turkey. The population of the study consisted of midwifery students in Turkey (approximately N = 10 000).[18] In this study, it was aimed for the sample size to reach 1840 participants with an unknown prevalence of 50%, an absolute deviation of 3%, a design effect of 1% and within a 99% confidence interval. The sample size required based on these parameters was calculated by using Open Epi Version 3.01, which is an open-source calculator. The study reached 1891 midwifery students. Due to missing data, 12 participants were excluded. Accordingly,

the sample finally consisted of 1879 midwifery students. The inclusion criteria were being a midwifery student living in Turkey and voluntarily agreeing to participate in the study. Due to the restrictions brought about by the pandemic, the data were collected via the Google Forms platform. The data collection form was prepared by using the online service of Google Drive (https://docs.google.com/forms/d/1pobzL-JB 8CO8hZRQjsklDGUPzqLUcfC-Bgssz_3vBWY/edit). The link to the survey form was distributed by using the Facebook, WhatsApp, Instagram and Twitter accounts of the Student Committee of the Anatolian Midwives Association and via e-mail. The consent form was on the first page of the survey. The participants were assured that all information to be provided would be kept confidential. The participants had to read the consent form at the first stage. They were able to fill out the questionnaire after declaring their consent to participate voluntarily. Personal and institutional identifying information was not requested in our study.

2.3. Collection of data

The data form consisted of four parts as a demographic data form, the Health Literacy Index, the Perception of Causes of COVID-19 Scale and the COVID-19 Vaccine Attitudes Scale.

2.3.1. Demographic data form

The form that was developed by the researchers based on the literature included questions on the demographic characteristics of the midwifery students (age, class year, place of residence, region of residence), changes they experienced in the COVID-19 pandemic period (financial problems, COVID-19 positivity status, losing a close person due to COVID-19), thoughts about the COVID-19 vaccine (status of wanting to get the COVID-19 vaccine, reason for being undecided about or not wanting to get the COVID-19 vaccine, the effect statuses of vaccination recommendations of healthcare professionals, vaccination recommendations of political authorities and price of the vaccine, trusting the COVID-19 vaccine will be protective and trusting the country where the COVID-19 vaccine is obtained from on their decisions) and their thoughts about vaccination in general (status of finding childhood vaccinations beneficial and believing in rumors about the negative effects of vaccines).[19,20] The opinions of two persons who are experts in the fields of public health and midwifery were collected regarding the comprehensibility of the form. The form was filled out by 10 midwifery students who were randomly selected for pilot implementation, and its comprehensibility was assessed.

2.3.2. Health literacy index

The Health Literacy Index was developed by Sorensen with 47 items, and later, it was simplified by Toçi, Bruzarive and Sorensen and turned into the 25-item Health Literacy Index.[21,22] The Turkish validity and reliability study of the scale was conducted by Bayık-Temel and Aras.[23] Its reliability coefficient was calculated as 0.92. The 5-point Likert-type scale consists of four dimensions as Access, Understanding, Appraisal and Application. All items are positively scored.

Higher scores indicate higher levels of health literacy.[22] The Cronbach's alpha coefficient of the scale was found as 0.95 in our study.

2.3.3. Perception of causes of COVID-19 scale

The scale was developed by Geniş et al. (2020).[12] The 5-point Likert-type scale consists of 14 items and three dimensions. The first dimension of "Conspiracy" covers conspiracy beliefs (e.g., biological warfare, efforts to sell vaccines) portrayed in the media regarding the causes of the disease. The second dimension of "Environment" is related to the social and physical environment among the possible causes of the COVID-19 pandemic (e.g., unhealthy nutrition, global warming, pollution of natural resources). The final dimension of "Belief" is related to perceptions regarding the religious and spiritual explanations of the causes of COVID-19. There are no inversely scored items in the scale. By dividing the total score obtained by adding the scores of all items together by the number of the items in the respective dimension, a dimension score in the range of 1–5 is obtained. Higher scores indicate higher levels of perception regarding the corresponding dimension. The Cronbach's alpha value of the scale was reported as 0.88.[12] In our study, this value was found as 0.84.

2.3.4. Attitudes toward the COVID-19 vaccine

The scale consists of 9 items and two dimensions (Positive Attitudes and Negative Attitudes). It is a 5-point Likert-type scale. By dividing the total score obtained by adding the scores of all items together by the number of items in the relevant dimension, a dimension score in the range of 1–5 is obtained. High scores obtained in the positive attitudes dimension indicate more positive attitudes toward the vaccine. The items in the negative attitudes dimension are inversely scored, and high scores indicate less negative attitudes toward the vaccine. The Cronbach's alpha value of the scale was reported as 0.80.[12] In our study, this value was found as 0.78.

2.3.4.1. Research variables.

The dependent variable of the study was the decision to vaccinate. The independent variables of the study were COVID-19 vaccine attitudes, perceptions of the causes of COVID-19, health literacy status, sociodemographic variables, changes experienced in the COVID-19 pandemic, thoughts about the COVID-19 vaccine and overall thoughts about vaccination.

2.4. Data analysis

The data obtained in the study were analyzed by using the SPSS (Statistical Package for the Social Sciences) for Windows 25.0 program. While analyzing the data, descriptive statistical methods (frequency, percentage, mean, standard deviation, minimum and maximum) were used. The conformity of the scores of the participants with normal distribution was tested both by analyses involving kurtosis and skewness values and visually from plots. Chi-squared analysis was conducted on the participants' views on the COVID-19 vaccine and their vaccination decisions. It was observed that the data were not normally distributed. As the data were non-normally distributed, the relationship between the scales was examined by Spearman's correlation analysis, while using data that were normally distributed after logarithmic transform, linear regression analysis was carried out. The level of statistical significance was accepted as $p < .05$.

2.5. Ethical approval

To conduct the study, ethical approval was obtained with the decision of the Amasya University Ethics Committee (Date: 07.01.2021 no: 1/16). Additionally, permission to conduct COVID-19-related research was obtained by registering the study to the database of the Ministry of Health. The authors declare that all procedures contributing to this work have complied with the ethical standards of the relevant national and institutional committees on studies on human participants and the Declaration of Helsinki.

2.6. Limitations

The limitations of this study included the fact that the data were collected online by questionnaires based on self-reporting, as well as the limited opportunity of discussion due to the fact that two scales that were developed in Turkey were used in the study. Nevertheless, despite its limitations, the strength of this study was that it is the first study to reveal the complexity of the issue of vaccine acceptance among midwifery students and the effects of some perceptions and attitudes on vaccine acceptance. In this study, the data were collected before the COVID-19 vaccination process started.

3. Results

The mean age of the participants was 20.44 ± 2.04 (Min = 17; Max = 45), 34.9% of them were 1st-year students, 30.7% were 2nd-year students, 33.9% were 3rd-year students, 18.9% were 4th-year students, 55.7% lived in the city center in the pandemic process, and 17.9% lived in the Istanbul region. In our study, 65.7% (1235) of the participants stated that they did not want to get the COVID-19 vaccine. The mean score of the students in the Perception of COVID-19 Causes Scale was 3.03 ± 0.64, their mean score in the **Attitudes toward the COVID-19 Vaccine** was 39.94 ± 12.15, and their mean score in the Health Literacy Index was 115.14 ± 12.15.

According to the results of the analyses on some sociodemographic characteristics of the participants and information on their vaccination-related decisions, while there was no significant difference in the vaccination-related decisions of the participants based on their place of residence or current year of study, it was found that region of residence significantly affected their vaccination decisions. The participants living in the Southeastern Anatolia, Central-Eastern Anatolia, Northeastern Anatolia and Mediterranean Regions had vaccine refusal rates of higher than 70% (Table 1).

Considering some situations experienced by the participants in the COVID-19 pandemic and their views on the COVID-19 vaccine and general vaccination as presented in Table 2, it was observed that the status of losing someone close in the COVID-19 pandemic, recommendations of healthcare personnel and political authorities about the vaccine, price of the vaccine,

Table 1. Demographic characteristics and vaccination decisions of the participants.

Variables		Accepts vaccine (n/%)	Refuses vaccine (n/%)	χ^2	p
		Vaccination decision			
Age	17–20 years old	389 (34.1)	751(65.9)	1.116	0.572
	21–24 years old	243(35.0)	452(65.0)		
	25 years and older	12(27.3)	32(72.7)		
Marital status	Single	632(34.2)	1214(65.8)	0,65	0.485
	Married	12 (36.4)	21(63.6)		
Class	1st year	178 (34.9)	332 (65.1)		
	2nd year	204 (35.4)	373 (64.6)	1.211	0.750
	3rd year	148 (33.9)	288 (66.1)		
	4th year	114 (32.0)	242 (68.0)		
Where did you spend the pandemic process?	City	358 (34.2)	688 (65.8)	5.390	0.068
	District	182 (31.8)	391 (68.2)		
	Village	104 (40.0)	156 (60.0)		
Region	Aegean	93 (38.1)	151 (61.9)	20.870	0.035
	Western Marmara	43 (37.4)	72 (62.6)		
	Eastern Marmara	65 (33.9)	127 (66.1)		
	Western Anatolia	87 (35.8)	156 (64.2)		
	Mediterranean	66 (25.8)	190 (74.2)		
	Istanbul	115 (34.2)	221 (65.8)		
	Central Anatolia	30 (41.7)	42 (58.3)		
	Northeastern Anatolia	8 (28.6)	20 (71.4)		
	Eastern Black Sea	27 (38.0)	44 (62.0)		
	Western Black Sea	62 (42.2)	85 (57.8)		
	Central-Eastern Anatolia	12 (27.3)	32 (72.7)		
	Southeastern Anatolia	36 (27.5)	95 (72.5)		

Table 2. Comparison of the effects of the COVID-19 pandemic, views on the COVID-19 vaccine and vaccination in general and decisions to get the vaccine.

		Yes (n/%)	No (n/%)	χ^2	p
		Wants to get the vaccine COVID 19			
Experienced economic problems due to COVID-19	Yes	365 (33.0)	741 (67.0)	1.930	0.090
	No	279 (36.1)	494 (63.9)		
Experienced COVID-19 infection	Yes	88 (35.1)	163(64.9)	0.079	0.415
	No	556(34.2)	1072(65.8)		
Lost a close person due to COVID-19	Yes	107 (29.5)	256(70.5)	4.596	0.018
	No	537(35.4)	979(64.6)		
What can be the reason for not wanting to get the COVID-19 vaccine	Not safe	50 (8.2)	563(91.8)	143.305	0.000
	May have side effects	217(28.0)	559(72.0)		
	I am not afraid of getting ill	69(48.6)	73(51.4)		
Recommendations of healthcare personnel on vaccination are effective on decision	Yes	558 (43.9)	713 (56.1)		0.000
	No	24 (10.8)	199 (89.2)		
	Undecided	62(16.1)	323(83.9)		
Recommendations of political authorities on vaccination are effective on decision	Yes	169 (57.1)	127 (42.9)	93.963	0.000
	No	343 (27.8)	893 (72.2)		
	Undecided	132 (38.0)	215 (62.0)		
Vaccine price is effective on decision	Yes	301 (38.5)	481(61.5)	12.121	0.002
	No	245 (30.2)	566 (69.8)		
	Undecided	98(34.3)	188(65.7)		
Trusting that the COVID-19 vaccine will be protective	Yes	262 (63.6)	150(36.4)	258.557	0.000
	No	44(10.9)	361(89.1)		
	Undecided	338(31.8)	724(68.2)		
Origin country of the COVID-19 vaccine is effective on decision	Yes	235(26.6)	647(73.4)	43.357	0.000
	No	232 (41.9)	322 (58.1)		
	Undecided	177 (40.0)	266 (60.0)		
Finding childhood vaccinations beneficial	Yes	593 (35.9)	1057 (64.1)	18.210	0.000
	No	14 (17.1)	68 (82.9)		
	Undecided	37 (25.2)	110 (74.8)		
Believing rumors about the negative effects of vaccines	Yes	122 (22.4)	423 (77.6)	57.902	0.000
	No	318 (42.7)	426 (57.3)		
	Undecided	204 (34.6)	386 (65.4)		

Values with $p < 0.005$ are indicated in bold.

trusting that the vaccine is protective, the origin country of the vaccine, views on childhood vaccines and rumors about the negative effects of vaccines affected the decision to get the vaccine significantly ($p < .05$). It was found that those who did not lose a close person in the COVID-19 pandemic, those who did not trust the vaccine, those who paid attention to the recommendations of healthcare personnel, those who stated that the vaccination recommendations of political authorities did not affect their decisions, those who stated that the price of the vaccine did not affect their decision, those who were

Table 3. Relationship between decision to get vaccinated and attitudes toward the COVID-19 vaccine, health literacy levels and perceptions of COVID-19 causes.

	Getting vaccinated	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}
V_1 = Positive attitudes	0.430**											
V_2 = Negative attitudes	0.282**	0.266**										
V_3 = Attitudes toward the COVID-19 vaccine	0.456**	0.842**	0.744**									
V_4 = Access	0.015	0.048*	0.061**	0.068**								
V_5 = Understanding	0.023	0.057*	0.076**	0.083**	0.674**							
V_6 = Appraisal	0.004	0.044	0.068**	0.068**	0.630**	0.790**						
V_7 = Application	0.021	0.069**	0.090**	0.098**	0.531**	0.647**	0.772**					
V8 = Health Literacy	0.017	0.061**	0.084**	0.090**	0.792**	0.900**	0.935**	0.846**				
V_9 = Conspiracy	−0.148**	−0.135**	−0.267**	−0.244**	−0.055*	−0.070**	−0.053*	−0.017	−0.057*			
V_{10} = Environment	−0.017	0.117**	−0.031	0.064**	−0.053*	−0.011	−0.057*	−0.039	−0.046*	0.155**		
V_{11} = Belief	0.017	0.025	−0.055*	−0.013	−0.081**	−0.088**	−0.100**	−0.088**	−0.103**	0.153**	0.164**	
V_{12} = Perception of Causes of COVID-19	−0.095**	−0.016	−0.202**	−0.124**	−0.089**	−0.080**	−0.097**	−0.061**	−0.094**	0.759**	0.672**	0.519**

** Correlation is significant on the 0.01 level (2-tailed).
* Correlation is significant on the 0.05 level (2-tailed).
V = Variable.

undecided about the protectiveness of the vaccine, those who reported that the origin country of the vaccine affected their decision, those who found childhood vaccinations beneficial, those without a negative vaccination experience and those who did not believe rumors about the negative effects of vaccines were more likely to not want to get the vaccine (Table 2).

Table 3 presents the relationship statuses between the decisions of the participants on getting the COVID-19 vaccine and their attitudes toward this vaccine, health literacy levels and perceptions on the causes of COVID-19. There was a positive relationship between the vaccination decisions of the participants and their scores in the COVID-19 Vaccine Attitudes Scale and its subscales. No significant relationship was found between their vaccination-related decisions and health literacy levels. There was a negative relationship between the participants' vaccination decisions and their scores in the Perception of COVID-19 Causes Scale and its conspiracy dimension. There were high-level correlations in the relationships between the participants scores in the COVID-19 Vaccine Attitudes, Health Literacy Index and Perception of COVID-19 Causes Scale.

The predictive level of the participants' attitudes toward the COVID-19 vaccine, their health literacy levels and perceptions of COVID-19 causes on their decisions to get vaccinated was examined by linear regression analysis. The regression analysis showed that the model was statistically significant (F = 166.221; $p < .05$). However, when the significance of the variables used in the model was examined, it was found that only health literacy was statistically insignificant ($p < .05$). The highest effect (45%) on the vaccination decisions of the participants came from their attitudes toward the vaccine. The model did not have a problem of multicollinearity (VIF<10). Additionally, when the DW statistic as a measure of the relationship among errors was examined, it was found that there was no autocorrelation (DW = 0.261). The adjusted R2 value, which is the power of the independent variables to explain the dependent variable, was calculated as 0.260 (Table 4).

4. Discussion

It was seen in our study that the vast majority of the participants did not want to get the COVID-19 vaccine. There was no significant relationship between demographic variables such as

age, class year, place of residence (urban/rural) and the vaccination decisions of the participants. It was determined that the participants who lived in the Southeastern Anatolia, Central-Eastern Anatolia, Northeastern Anatolia and Mediterranean Regions of Turkey had vaccine refusal rates over 70%.

Thirty-one percent of the participants of a study conducted in Turkey on the general population (May 2020) and 14% of those in the United Kingdom were found to be undecided about getting the vaccine for themselves and their children.[24] In the study by Köse et al.[19] conducted on healthcare workers, 68.6% of the participants stated that they wanted to get vaccinated. A study on students at schools of medicine and health sciences found that 18.9% did not want to get vaccinated, 23.8% were undecided, and 57.3% wanted to get vaccinated.[25] A study conducted in South Carolina discovered that 60.6% of university students reported that they would definitely or probably get the COVID-19 vaccine when possible.[26] A study on medical students revealed that almost all participants had positive attitudes toward vaccines, and they agreed that they would probably be exposed to COVID-19; however, only 53% stated that they would participate in a COVID-19 vaccine trial, and 23% would not want to get the COVID-19 vaccine even after FDA approval.[10] The vaccine acceptance rates among university students were reported as 44.2% in Malta and 86.1% in Italy, while there was no significant difference between students of health-related fields and students of other fields.[9] Considering that such students would have higher health literacy levels, the finding that vaccination intentions were not higher in students receiving education with health-related curricula sheds light on the potential risks to be brought about by vaccine hesitancy.[9] It is a significant finding that midwifery students have high levels of vaccine hesitancy.

It was found in our study that the participants who paid attention to the recommendations of healthcare personnel were more likely to not want to get vaccinated. However, Wang et al. (2020) reported that believing in the effectiveness of the COVID-19 vaccine or valuing doctor recommendations increased the likelihood of wanting to get the COVID-19 vaccine as soon as possible. The different result in our study in comparison to the literature may have been caused by different social structures and perceptions.[27]

Table 4. Linear Regression analysis on the COVID-19 vaccine decision of the participants.

Independent variables	Beta	t	p-Value	VIF	Adj.R^2	F	p	DW
Constant	2.985	12.672	0.000		0.260	166.221	0.000	0.261
Attitudes toward vaccine COVID-19	−0.453	−21.838	0.000	1.022				
Health literacy Index	.027	1.318	0.188	1.015				
Perception of causes of COVID-19	.042	2.010	0.045	1.023				

In our study, there was no significant relationship between the vaccination decisions of the participants and their statuses of having experienced COVID-19 infection and having someone close who had died due to COVID-19. Qiao et al. (2020) discovered that, while students who stated that they were exposed to a low-level risk of COVID-19 showed high levels of vaccine acceptance, those who stated that they were exposed to a high-level risk showed low levels of acceptance. The fact that the rate of COVID-19-related deaths is low in young adults may lead to perceptions of low risk or low vulnerability levels in university students, therefore resulting in low levels of vaccine acceptance.[26]

Those who did not trust the vaccine, those who were undecided about the protectiveness of the vaccine, those who found childhood vaccines beneficial, those who did not have a negative vaccination experience, those who did not believe rumors about the negative effects of vaccines, those who stated that the origin country of the vaccine was effective on their vaccination decision and those who stated that the recommendations of political authorities were not effective on their vaccination decisions were more likely to not want to get the COVID-19 vaccine. It is known that attitudes about issues such as the unwanted effects and potential long-term harms of vaccines affect vaccine hesitancy.[26] Concerns about the safety of vaccines increase when people are facing a new virus.[19] This study was similar to those in the literature in terms of finding that not trusting the vaccine affected vaccine refusal. It was seen that the refusal rate regarding vaccination against COVID-19 was higher than the refusal rates related to ordinary vaccines.[26,28] Pogue et al. (2020) reported that participants who routinely got vaccinated had a higher probability of getting vaccinated for COVID-19, there was no relationship between their vaccination status and their political ideologies, and those with vaccine hesitancy had concerns about the side effects and effectiveness of the vaccine.[29] The reason for concerns regarding the COVID-19 vaccine is that there is no sufficient information on the potential side effects of the vaccine in the long term.[25] It is considered that the reason for the participants in our study who found childhood vaccines beneficial and those who did not believe negative rumors about vaccines to not want to get the COVID-19 vaccine may have been their lack of confidence in the vaccine due to the fact that it is a newly developed vaccine.

In the regression model of the vaccination decisions of the participants in our study, it was determined that health literacy did not have a significant effect, while attitudes toward the vaccine and perceptions of COVID-19 causes had significant effects. In their study conducted in Australia, Dodd et al. (2020) found inadequate health literacy levels to be associated with unwillingness to get vaccinated against COVID-19.[30] In our studies, the participants who perceived the cause of COVID-19 to be a conspiracy did not want to get vaccinated. In a comparative study on the United Kingdom and Turkey, while more participants from the United Kingdom believed that the virus emerged naturally (54% in Turkey and 63% in the United Kingdom, n = 5024, χ^2 = 24.6, p < .001), 18% of those in Turkey and 12% of those in the United Kingdom thought that the virus is man-made. It was seen that believing that the virus emerged naturally increased the vaccine acceptance rates in both countries (26% in Turkey and 63% in the United Kingdom).[25] Regarding this issue, it is needed for midwifery students to get away from perceptions of a conspiracy and get informed about the COVID-19 pandemic and the COVID-19 vaccine based on scientific facts. For future research, it will be useful to conduct longitudinal studies on the topic.

The limitation of this study was that the data were collected through online surveys, in addition to the inability to reach students with limited internet use due to reasons such as insufficient internet infrastructure or internet packages in the places where the students were living. Moreover, the possibility that students with online access might not be willing to participate in surveys may be a limitation. Two scales developed in Turkey were used in this study. This situation limited the possibility of discussing the results of this study with a broad literature.

4.1. Conclusion and Recommendations

The vast majority of the midwifery students who were included in this study did not want to get vaccinated against COVID-19. This study provided different results than other studies in terms of finding that those who found childhood vaccines beneficial, those who reported positive attitudes toward vaccination and those who paid attention to the recommendations of healthcare personnel were more likely to not want to get vaccinated against COVID-19, and the health literacy levels of the participants were unrelated to their decisions on getting the vaccine.

It is needed to show great effort and implement effective strategies to overcome negative attitudes toward the vaccine and the perception that the COVID-19 pandemic is a conspiracy. The knowledge levels of all healthcare workers on the vaccine should be increased, and their suspicions and concerns should be eliminated. This situation affects not only their own vaccinations but also midwifery students and society who pay importance to their recommendations. For especially midwifery students, who will be the healthcare professionals of the future and take on important duties for obstetric, gynecological, pediatric and public health, to be more aware about this issue, strategic interventions are needed. Attention should be paid to transmit messages and information provided about the vaccine and the disease within evidence-based scientific content and in a way that is comprehensible, as well as focusing on eliminating the concerns of students and considering their

decision-making dynamics. In order to implement the
COVID-19 vaccine with complacency of mind and to eliminate
the lack of confidence, it is important to qualitatively reveal the
factors leading to vaccine hesitancy in future studies.

ORCID

Filiz Aslantekin-Özçoban http://orcid.org/0000-0002-0402-6959
Mesude Uluşen http://orcid.org/0000-0003-1582-4240
Hacer Yalnız-Dilcen http://orcid.org/0000-0001-5911-7201
Elif Çilesiz http://orcid.org/0000-0002-7270-1194

Availability of data and materials

The data collected in the study are stored and may be provided by the
corresponding author upon reasonable request.

Authors' contributions

FAÖ. Planning, implementation, statistical analysis, writing and review-
ing; MU. Implementation, ethical permits and reviewing; HYD. Statistical
analysis, writing and reviewing.; EÇ. Conducting surveys, writing and
reviewing.

References

1. Sim MR. The COVID-19 pandemic: major risks to healthcare and other workers on the front line. Occup Environ Med. 2020;77(5):281–82. doi:10.1136/oemed-2020-106567.
2. WHO. Coronavirus disease (COVID-19) media resources -herd immunity. 2020. [accessed 2021 Nov 27]. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/media-resources/science-in-5/episode-1
3. Chou WS, Budenz A. Considering emotion in COVID-19 vaccine communication: addressing vaccine hesitancy and fostering vaccine confidence. Health Commun. 2020;35(14):1718–22. doi:10.1080/10410236.2020.1838096.
4. Mellet J, Pepper MS. A COVID-19 vaccine: big strides come with big challenges. Vaccines. 2021;9(1):39. doi:10.3390/vaccines9010039.
5. Neumann-Böhme S, Varghese NE, Sabat I, Barros PP, Brouwer W, van Exel J, Schreyögg J, Stargardt T. Once we have it, will we use it? A European survey on willingness to be vaccinated against COVID-19. Eur J Health Econ. 2020;21(7):977–82. doi:10.1007/s10198-020-01208-6.
6. Rey D, Fressard L, Caortaredona S, Bocquier A, Gautier A, Peretti-Watel P, Verger P. Vaccine hesitancy in the French population in 2016, and its association with vaccine uptake and perceived vaccine risk-benefit balance. Euro Surveill. 2020;23(17). doi:10.2807/1560-7917.ES.23.17.17-00816.
7. Mac Donald NE. Vaccine hesitancy: definition, scope and determinants. Vaccine. 2015;33(34):4161–64. doi:10.1016/j.vaccine.2015.04.036.
8. Sallam M. COVID-19 vaccine hesitancy worldwide: a systematic review of vaccine acceptance rates. MedRxiv. 2021. doi:10.1101/2020.12.28.20248950.
9. Barello S, Nania T, Dellafiore F, Graffigna G, Caruso R. 'Vaccine hesitancy' among university students in Italy during the COVID-19 pandemic. Eur J Epidemiol. 2020;35(8):781–83. doi:10.1007/s10654-020-00670-z.
10. Lucia VC, Kelekar A, Afonso NM. COVID-19 vaccine hesitancy among medical students. J Public Health (Bangkok). 2020:1–5. DOI:10.1093/pubmed/fdaa230.
11. Arslan R, Filiz M. Evaluation of healthcare education students' perceptions about Covıd-19 outbreak. J Econ Administrative Sci. 2020;21(2):1–18. doi:10.37880/cumuiibf.745861.
12. Geniş B, Gürhan N, Koç M, Geniş Ç, Şirin B, Çırakoğlu OC, Coşar B. Development of perception and attitude scales related with Covid-19 pandemia. Pearson J Social Sci Humanities. 2020;7(5):306–28. doi:10.46872/pj.127.
13. Freeman D, Waite F, Rosebrock L, Petit A, Causier C, East A, Lambe S. Coronavirus conspiracy beliefs, mistrust, and compliance with government guidelines in England. Psychol Med. 2020;50(16):1–30. doi:10.1017/S0033291720001890.
14. Castro-Sánchez E, Chang PWS, Vila-Candel R, Escobedo AA, Holmes AH. Health literacy and infectious diseases: why does it matter? Int J Infect Dis. 2016;43:103–10. doi:10.1016/j.ijid.2015.12.019.
15. Coronavirus (COVID-19) Vaccinations. Our world in data. Statistics and Research, https://ourworldindata.org/covid-vaccinations. accessed 2021 Feb 02
16. Karafillakis E, Dinca I, Apfel F, Cecconi S, Wűrz A, Takacs J, Larson HJ. Vaccine hesitancy among healthcare workers in Europe: a qualitative study. Vaccine. 2016;34(41):5013–20. doi:10.1016/j.vaccine.2016.08.029.
17. Kaufman J, Attwell K, Hauck Y, Omer SB, Danchin M. Vaccine discussions in pregnancy: interviews with midwives to inform design of an intervention to promote uptake of maternal and childhood vaccines. Hum Vaccine Immunother. 2019;15(11):2534–43. doi:10.1080/21645515.2019.1607131.
18. Sögüt S, Dolu İ, Cangöl E. The relationship between COVID-19 knowledge levels and anxiety states of midwifery students during the outbreak: a cross-sectional web-based survey. Perspect Psychiatr Car. 2020. doi:10.1111/ppc.12555.
19. Kose S, Mandiracioglu A, Sahin S, Kaynar T, Karbus O, Ozbel Y. Vaccine hesitancy of the COVID-19 by health care personnel. Int J Clin Pract. 2020:e13917. doi:10.1111/ijcp.13917.
20. Harrison EA, Wu JW. Vaccine confidence in the time of COVID-19. Eur J Epidemiol. 2020;35(4):325–30. doi:10.1007/s10654-020-00634-3.
21. Sørensen K, Van Den Broucke S, Pelikan JM, Fullam J, Doyle G, Slonska Z, Brand H. Measuring health literacy in populations: illuminating the design and development process of the European Health Literacy Survey Questionnaire (HLS-EU-Q). BMC Public Health. 2013;13(1):48. doi:10.1186/1471-2458-13-948.
22. Toçi E, Burazeri G, Sorensen K, Jerliu N, Ramadani N, Roshi E, Brand H. Health literacy and socioeconomic characteristics among older people in transitional Kosovo. Br J Med Med Res. 2013;3(4):1646–58. doi:10.9734/BJMMR/2013/3972.

23. Bayık-Temel A, Aras Z. Evaluation of validity and reliability of the Turkish version of health literacy. Florence Nightingale J Nurs. 2017;25(2):85–94. doi:10.17672/fnhd.94626.

24. Salali GD, Uysal MS. COVID-19 vaccine hesitancy is associated with beliefs on the origin of the novel coronavirus in the UK and Turkey. Psychol Med. 2020:1–3. doi:10.1017/S0033291720004067.

25. Grech V, Gauci C. Vaccine hesitancy in the University of Malta Faculties of Health Sciences, Dentistry and Medicine vis-a-vis influenza and novel COVID-19 vaccination. Early Hum Dev. 2020. doi:10.1016/j.earlhumdev.2020.105258.

26. Qiao S, Tam CC, Li X. Factors associated with decision making on COVID-19 vaccine acceptance among college students in South Carolina. MedRxiv. 2021. doi:10.1101/2020.12.03.20243543.

27. Wang J, Jing R, Lai X, Zhang H, Lyu Y, Knoll MD, Fang H. Acceptance of COVID-19 vaccination during the COVID-19 pandemic in China. Vaccines. 2020;8(3):482. doi:10.3390/vaccines8030482.

28. Feleszko W, Lewulis P, Czarnecki A, Waszkiewicz P. Flattening the curve of COVID-19 vaccine rejection A global overview. SSRN Electron J. 2020. doi:10.2139/ssrn.3631972.

29. Pogue K, Jensen JL, Stancil CK, Ferguson DG, Hughes SJ, Mello EJ, Poole BD. Influences on attitudes regarding potential COVID-19 vaccination in the United States. Vaccines. 2020;8(4):582. doi:10.3390/vaccines8040582.

30. Dodd RH, Cvejic E, Bonner C, Pickles K, McCaffery KJ. Willingness to vaccinate against COVID-19 in Australia. Lancet Infect Dis. 2020. doi:10.1016/s1473-3099(20)30559-4.