

Covid-19 vaccine literacy status of individuals without completed covid-19 vaccine period and implementation of covid-19 vaccine in Turkey: descriptive study

ABSTRACT

Background and Objectives: In the Covid 19 pandemic, determining the vaccine literacy of individuals whose vaccination process has not been completed and ensuring that they are vaccinated shows the importance of this study. This study was carried out between 1 January and 31 March 2022.

This study was conducted to determine the vaccine literacy level of individuals whose Covid-19 vaccines were not completed during the Covid-19 pandemic process and to apply Covid-19 vaccines.

Materials and Methods: This study is descriptive and cross-sectional study. The population of the study consisted of individuals over the age of 18 who did not complete their Covid-19 vaccines and lived in a town in the west of Turkey. After the power analysis was conducted, the sample consisted of 923 people who agreed to participate in the research. The information form and the Covid-19 Vaccine Literacy Scale were used as data collection tools. The Independent Sample t-test was used to compare the Covid-19 vaccine literacy and sub-dimension scores with personal information; one-way analysis of variance (ANOVA) was used to compare educational status and income levels; the Tukey HSD test was used as post-hoc test; and the Pearson Correlation analysis was used to correlate the continuous variables with each other.

Results: The mean score of the Covid-19 Vaccine Literacy Scale was found to be above average, and the mean score of the subdimensions communicative/critical and functional skills was found to be moderate. It was found that the participants' Covid 19 vaccine literacy was associated with marital status, education levels, income level, having the Covid-19 disease, and having previously been vaccinated against Covid-19.

Conclusion: As a result of the research conducted between January 1, 2022 and March 31, 2022, 923 volunteer participants were vaccinated against Covid-19. The first dose of Covid-19 vaccine was administered to 82 people out of 923 who had never been vaccinated. A second dose of Covid-19 vaccine was administered to 178 people, a third dose of Covid-19 vaccine to 311 people, a fourth dose of Covid-19 vaccine to 271 people, and a fifth dose of Covid-19 vaccine to 81 people. An important vaccination program was carried out, and this result is the most important success of our study. It was found that there was a relationship between the Covid-19 vaccine literacy levels and the Covid-19 vaccination, marital status, education level, income status and Covid-19 disease status of the individuals participating in the study. The Covid-19 vaccine literacy score of the participants was above the medium level, and the sub-dimension scores of the participants were moderate. In total, 923 volunteer participants were vaccinated against Covid-19, and 82 people who had never been vaccinated were given the first dose of Covid-19 vaccine.

Paper Type: Research Article

Keywords: Health engagement; health promotion; health literacy; young adults; South Africa; Participatory research

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Introduction

Covid-19 disease, also known as coronavirus disease, was first seen in 2019 in Wuhan, Hubei province of the People's Republic of China. Due to the high rate of transmission of the disease, it spread rapidly to many countries in a short time. On March 11, 2020, Covid-19 disease was declared as a "pandemic" worldwide by the World Health Organization (WHO). The rate of transmission and the effect of the disease seriously threaten human life and cause death. For this reason, many countries have taken some measures as of the date of the disease, but the desired level of protection has not been achieved. As an important step in the fight against the disease, scientists started vaccine studies and obtained vaccines with different protection percentages and side effects. After the reliability of the obtained vaccines has been proven, vaccination studies have started in many countries, including our country. The rate of transmission and impact of the Covid-19 disease seriously has threatened human life and caused the death of many people (1). Between January 1, 2022 and March 31, 2022, when this study was conducted, the total number of Covid -19 cases in Turkey was 5404176, while the daily number of patients was 60721. These figures were the highest number of Covid-19 patients in Turkey, and this was the peak phase of the cases. For this reason, many countries have taken some measures as of the date of the disease, but the desired level of protection has not been achieved. As an important step in the fight against Covid-19, scientists have started vaccine studies and produced vaccines with different protection percentages and side effects. After the

reliability of the produced vaccines has been proven, vaccination studies have started in many countries, including Turkey (2). Vaccines are an application that enables healthy individuals to gain immunity against the disease that will occur. It is one of the most important factors at the stage of gaining resistance against the disease. As a result of Covid-19 vaccine studies, the following vaccines have been produced: inactivated virus vaccines (the Sinovac vaccine), messenger RNA (mRNA) and nucleic acid-based vaccines under the name of Deoxyribo Nucleic Acid (DNA), vector vaccines, virus-like particle vaccines, live-attenuated virus vaccines, and protein-based vaccines (3). The BioNTech and Moderna vaccines are the examples of mRNA vaccines. However, the disadvantage of vaccines in this group is the difficulty of storage conditions. The Moderna vaccine is stored at -20 C0, and the BioNTech/Pfizer vaccine is stored at -70 C0. The Covid-19 vaccines applied in Turkey are Sinovac, BioNTech, and Tukovac. The Turkovac vaccine produced in Turkey is an example of inactivated vaccines (3). However, at the time of our study, only the Sinovac and BioNTech vaccine s were administered in Turkey. Individuals over the age of 18 who can optionally receive five doses of Covid-19 vaccines are assigned in the e-pulse personal health system by the Ministry of Health.

Since the 1800s, vaccination studies have been one of the important practices in the field of public health, but since those years, opposition to vaccination has been observed in individuals from different societies. It has been concluded that people do not want to be vaccinated for many diseases, that parents find vaccines to be harmful for children, that

vaccines are religiously objectionable and contain harmful substances, and that people do not have enough information about vaccines (4). During the Covid-19 pandemic, there have been individuals in the society who are against the Covid-19 vaccine. The rapid emergence of the Covid-19 vaccine, its side effects, the belief that it will harm the human body, and the rumors that a chip will be implanted in the body, which have been disseminated through the mass media, have led to the emergence of anti-vaccination (5,6). Infodemia also causes vaccine indecision in individuals (7, 8, 9).

The word literacy refers to individuals' ability to read and write, to understand what they read, to use information correctly, and to put it into practice. The word literacy has led to the emergence of new concepts by taking different words with it over time. Health literacy is defined as "personal, cognitive and social skills that determine one's ability to access, understand and use information to improve and maintain personal health" (10). The basic assumption of this definition is that people with a satisfactory level of health literacy manage their health more efficiently. Vaccine literacy is very complex. Studies on vaccine literacy are not sufficient due to its equivalent, health literacy. However, these two terms are directly related, as vaccine literacy is based on health literacy (11). Vaccine literacy is also a concept related to health literacy. The concept of vaccine literacy is defined as the level of individuals having the ability to obtain, understand and process basic health services and information so that they can make right healthy decisions about vaccines. Vaccine literacy requires global, national,

local and community participation and investment in communication to make vaccination a social norm around the world. The challenge is to engage multiple sectors across society to collectively help everyone decide to accept the vaccine. Vaccine literacy is a fundamental building block, ensuring that everyone understands what they need to know and do to get vaccinated. Evidence to date indicates that without comprehensive communication, participation and innovative approaches that advance a "new" public health, the vaccination levels required to achieve community protection or "herd immunity" cannot be achieved (12,13). The first Covid-19 vaccine application in Turkey started in January 2021, with healthcare professionals; then, it was applied to individuals over 65 years of age, those working in the service sector, those aged 50-64, those with chronic diseases, and those aged 17-49, respectively. According to the Coronavirus vaccine calendar in Turkey, each individual can get 5 doses of coronavirus vaccine (14). Determining the Covid-19 vaccine literacy level and reaching the desired level of Covid-19 vaccine literacy are an important step in vaccination so that the society can both obtain and use the correct information about the Covid-19 vaccine (15).

Materials and Methods

Study Design

This descriptive and cross-sectional study was conducted between January 1, 2022 and March 31, 2022.

Setting and Sample

The population of the study consisted of all individuals aged 18 and over who did not complete the Covid-19 vaccine application

and lived in a town located in the west of Turkey. According to the data of the Turkish Statistical Institute's address-based population registration system for 2021, there are a total of 452956 people, 226682 men (50.05%) and 226274 (49.95%) women, aged 18 and over. The sample size in the study was calculated with the following formula using $N=452956$, $t=1.96$, $p=0.5$, $q=0.5$, and $d=0.05$ values. Sample size in the study; $N=452956$, $t=1.96$, $p=0.5$, $q=0.5$, $d=0.05$ were calculated using the following formula.

$$n = (N * t^2 * p * q) / ([d]^2 * (N - 1) + (t^2 * p * q))$$

n: Sample size

N: Universe size

t: Table z-value corresponding to the confidence level

p: Observation rate of x in the universe

q (1-p): Unobserved rate of x in the universe

d: Acceptable deviation tolerance

As a result of the calculation, it was found that the sample size should be at least 384 in order for the individuals who volunteered to participate in the research to represent the whole population. At the time of the study, the number of people infected with Covid 19 disease in the world and in Turkey had peaked. We thought that the larger the sample, the more people we would vaccinate. The sample of the research consisted of 923 people who agreed to participate in the research. The research was completed with 923 people.

Inclusion Criteria

Being able to read and write in Turkish, being 18 years or older, and not having completed Covid-19 vaccines (5 doses).

Exclusion Criteria

Not speaking Turkish and being in a vulnerable group (e.g. the elderly, drug users, physically disabled, homeless, etc).

Instruments

Socio-Demographic Characteristics Information Form

The socio-demographic characteristics information form was composed of 14 questions by scanning the literature by the researcher (15, 16, 17). The questions included the following information about the participants: age, gender, marital status, number of children, occupation, income status, whether they have any chronic diseases, whether they have a daily medication, whether they have ever had a Covid-19 disease, whether the individuals they live with have had Covid-19, how many doses of Covid-19 vaccine they have had, which Covid-19 vaccine they have had, and if they have not been vaccinated so far, why not?

Covid-19 Vaccine Literacy Scale

The Covid-19 Vaccine Literacy Scale consists of 12 items and two sub-dimensions. It was developed by Ishikawa et al. to determine the level of health literacy in individuals with chronic diseases. The Covid-19 vaccine literacy scale was updated by Biasio et al. (16, 17). The Turkish reliability and validity study of the scale was performed by Durmuş et al. (2021), and the reliability of the study was similar to the original (15). The scale consists of two sub-dimensions, functional vaccine literacy and communicative/critical vaccine literacy, and is graded as a 4-point Likert scale. The functional vaccine literacy sub-dimension consists of 4 questions, and is reverse coded, and the scoring is (4) never, (3)

rarely, (2) sometimes, (1) often. It is about individuals' reading and writing skills in daily life, and being able to read concepts such as health education and vaccination. The communicative/Critical vaccine literacy sub-dimension refers to the ability to solve problems and make decisions, and is related to the individual's ability to benefit from health activities and make sense of them. There are eight questions in the Communicative/Critical Skill sub-dimension, and the scoring is as follows: (1) never, (2) rarely, (3) sometimes, (4) often. The fact that the average score obtained from the scale is close to 4 indicates that the Covid-19 vaccine literacy level is high (15). The functional skill sub-dimension of the original scale is $\alpha=0.850$, and the communicative/critical skills dimension is $\alpha=0.767$ (17). In the Turkish validity and reliability study conducted by Durmuş et al. The functional skill sub-dimension is $\alpha=0.915$, the communicative/critical skill sub-dimension is $\alpha=0.867$, and the Covid-19 vaccine literacy scale is $\alpha=0.868$ in total (15).

Some of the items on the "Covid 19 Vaccine Literacy Scale" are as follows;

Did you find any information useful for deciding whether to get vaccinated?

When searching for information on COVID-19 vaccines or available vaccines, have you reviewed multiple sources of information?

When searching for information about COVID-19 vaccines or available vaccines, did you find the information you were looking for?

Did you need someone to help you understand the information/texts about the vaccine?

Did you find any information useful for deciding whether to get vaccinated?

Variables

Dependent variable Covid-19 vaccine literacy scale, independent variables are some socio-demographic characteristics of individuals.

Data Collection and Analysis

The data collection tools were converted to "Google Surveys"

(<https://mail.google.com/mail/u/0/?tab=rm&ogbl#search/ibrahimc237%40gmail.com/FMfcgzGqQJfrgPFXtRjBVmDVhpRpsdWS?projector=1&messagePartId=0.1>). Those

individuals whose Covid-19 vaccine application had not been completed were reached by the researcher at the places where mass vaccinations were conducted (factory and market place). After giving information about the research, their phone numbers were obtained, and a survey form was sent via WhatsApp, and then the vaccine was administered. The IBM SPSS Statistics 24.00 program was used in the analysis of the data. Since the skewness and kurtosis values were between ± 2 reference values, it was concluded that the scores of the subdimension functional skill and communicative/critical skill and the Covid-19 vaccine literacy scale showed normal distribution (18). The significance level was accepted as $p<0.05$. The independent sample t-test was used to compare the Covid-19 vaccine literacy and sub-dimension scores with gender, marital status, status of having Covid-19 disease, and being vaccinated against Covid-19. ANOVA analysis was used to compare the Covid-19 vaccine literacy and sub-dimension scores with educational status and income levels, and the Tukey HSD test was used as Post-Hoc test. The Pearson

Correlation analysis was used to correlate continuous variables with each other.

Results

Socio-Demographic Variables

As a result of the research conducted between January 1, 2022 and March 31, 2022, 923 volunteer participants were vaccinated against Covid-19. The first dose of Covid-19 vaccine was administered to 82 people out of 923 who had never been vaccinated. A second dose of Covid-19 vaccine was administered to 178 people, a third dose of Covid-19 vaccine to 311 people, a fourth dose of Covid-19 vaccine to 271 people, and a fifth dose of Covid-19 vaccine to 81 people. An important vaccination program was carried out, and this result is the most important success of our study. It was found that there was a relationship between the Covid-19 vaccine literacy levels and the Covid-19 vaccination, marital status, education level, income status and Covid-19 disease status of the individuals participating in the study. There were 923 individuals participating in the study, with an average age of 39.61 and an average of 1.56 children. It was determined that 55.6% of the participants were male, that 69.0% were married, that 8.8% were primary school graduates, that 17.9% were secondary school graduates, that 53.8% were high school graduates, and that 19.5% were university graduates. 70.8% of the participants were working in a job, and 60.0% had a medium income level. 98.0% of the participants did not have a chronic disease, 98.0% did not use medication every day, 53.0% were infected with Covid-19, 52.5% had family members infected with Covid-19, and 91.1% had the

Covid-19 vaccine. The answers given to the participants, who had not been vaccinated for Covid-19, to the question “why have you not been vaccinated against Covid-19” are as follows: 40 people stated that they were not vaccinated due to fear, 19 due to side effects, 18 due to insecurity and insufficient information, and the others did not answer.

Information on the number of Covid-19 vaccine doses of the participants is given in Table 1.

Among the individuals participating in the study, the first dose of Covid-19 vaccine was administered to 82 people who had never been vaccinated, the second dose to 178 people, the third dose to 311 people, the fourth dose to 271 people, and the fifth dose to 81 people. Table 1 shows that the participants mostly preferred the BioNTech vaccine.

Covid-19 Vaccine Literacy

The descriptive statistics of the participants' Covid-19 vaccine literacy scale and sub-dimension scores are given in Table 2.

The functional skill sub-dimension score average of the participants was 2.30 ± 0.66 . The mean score of the communicative/critical skill sub-dimension was 3.07 ± 0.58 . The mean Covid-19 vaccine literacy score was 2.81 ± 0.30 . The functional skill sub-dimension was $\alpha=0.855$, the communicative/Critical sub-dimension was $\alpha=0.915$, and the Covid-19 Vaccine Literacy was $\alpha=0.924$.

The correlation between the participants' Covid-19 Vaccine Literacy Scale and its sub-dimension scores

According to Table 3, there was a positive and weak correlation between the age of the participants and the functional skill sub-dimension score, while a weak and inverse

relationship was found between the age of the participants and the communicative/critical skill sub-dimension score. There was no statistically significant

relationship between the age of the participants and the Covid-19 vaccine literacy score.

Table 1. The number of Covid-19 vaccine doses of the participants (N=923)

Parameter		Number of Covid-19 Vaccine Doses											
		Unvaccinated		1 Dose		2 Dose		3 Dose		4 Dose		\bar{X}	
		n	%	n	%	n	%	n	%	n	%	SD	SD
BioNTech	Unvaccinated	82	100.0	38	21.3	30	9.6	0	0.0	0	0.0	1.72 ±1.01	0-3
	1 Dose	0	0.0	140	78.7	0	0.0	46	17.0	0	0.0		
	2 Dose	0	0.0	0	0.0	281	90.4	0	0.0	81	100.0		
	3 Dose	0	0.0	0	0.0	0	0.0	225	83.0	0	0.0		
Sinovac	Unvaccinated	82	100.0	140	78.7	281	90.4	225	83.0	0	0.0	0.38 ±0.76	0-2
	1 Dose	0	0.0	38	21.3	0	0.0	0	0.0	0	0.0		
	2 Dose	0	0.0	0	0.0	30	9.6	46	17.0	81	100.0		
	3 Dose	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		
Total		82	8.9	178	19.3	311	33.7	271	29.4	81	8.8	2.10 ±1.09	0-4

* One-way analysis of variance (ANOVA) test was performed.

Table 2. Covid-19 vaccine literacy scores of participants (N=923)

Parameter	(α)	\bar{X}	S.D	Min	Max	Skewness	Kurtosis
Functional Skill	0,855	2.30	0.66	1.00	4.00	0.169	-0.549
Communicative/Critical Skill	0,915	3.07	0.58	1.00	4.00	-0.555	-0.012
Covid-19 Vaccine Literacy	0,924	2.81	0.30	1.33	3.67	-0.347	1.763

While there was a weak and positive correlation between the number of children and the functional skill sub-dimension score, a weak and inverse relationship was found between the number of children and the communicative/critical skill sub-dimension score. There was no statistically significant

relationship between the number of children and the Covid-19 vaccine literacy score.

There was no statistically significant difference between the Covid-19 vaccine literacy scale and sub-dimension scores according to the gender of the participants ($p>0.05$).

Table 3. Correlation between participants' age, child, vaccine dose and Covid-19 vaccine literacy scores (N=923)

Parameter		Age	Number of children	Number of Vaccine Doses
Functional Skill	r	0.17	0.22	-0.09
	p	0.00*	0.00*	0.01*
Communicative/Critical Skill	r	-0.07	-0.13	0.29
	p	0.04**	0.00*	0.00*
Covid-19 Vaccine Literacy	r	0.04	0.00	0.32
	p	0.21	0.89	0.00*

r: Pearson Correlation, * $p\leq 0.01$, ** $p\leq 0.05$: Significant Relationship

Comparison of Covid-19 Vaccine Literacy Scale and Sub-Dimension Scores according to the descriptive characteristics of the participants

According to Table 4, there was no significant difference between the Covid-19 vaccination of the participants and their functional skill sub-dimension scores ($p>0.05$).

There was a statistically significant difference between the communicative/critical skill scores and the Covid-19 vaccine literacy scores ($p\leq 0.05$).

The participants with the Covid-19 vaccine were found to have higher communicative/critical skills and Covid-19 vaccine literacy. There was no statistically significant difference between the participants having Covid-19 disease and their communicative/critical skill sub-dimension scores ($p>0.05$). A statistically significant difference was found between the functional skill sub-dimension scores and the Covid-19 vaccine literacy scores ($p\leq 0.05$). It was found that the functional skill sub-dimension and Covid-19 vaccine literacy scores of the individuals who had Covid-19 disease were lower. There was no significant difference between the income status of the participants and their communicative/critical skill sub-dimension scores ($p>0.05$). A significant difference was found between the functional skill sub-dimension scores and the Covid-19 vaccine literacy scores ($p\leq 0.05$). According to the results of the Tukey HSD test conducted to determine between which income levels the differences are, the functional skills of those with low income levels were found to be higher than those with medium income levels ($a>b$). The

functional skills of those with a high income level were found to be higher than those with a low and medium income level ($c>a,b$). The Covid-19 vaccine literacy scores were found to be higher in those with low income compared to those with a medium income level ($a>b$). The participants with high income levels were found to have higher Covid-19 vaccine literacy skills compared to those with low and medium income levels ($c>a,b$). A significant difference was found between the educational status of the participants and their functional skills, communicative/critical skills, and Covid-19 vaccine literacy scores ($p\leq 0.05$). As a result of the Tukey HSD test performed to determine the difference, the primary school graduates were found to have higher functional skills than the high school and university graduates. The functional skills of those who graduated from secondary school were found to be higher than those who graduated from high school and university. The high school graduates were found to have higher functional skills than the university graduates. The communicative/critical skills of the primary school graduates were found to be lower than the secondary school, high school and university graduates. The communicative/critical skills of the secondary school graduates were found to be lower than the university graduates. The Covid-19 vaccine literacy skills were found to be lower among the primary school graduates than the secondary school, high school and university graduates. There was no significant difference between the participants' marital status and their Covid-19 vaccine literacy scores ($p>0.05$). A significant difference was found between the functional skill and

communicative/critical skill sub-dimension scores ($p \leq 0.05$). It was found that the married participants had higher functional skills and

lower communicative/critical skills compared to the single participants (Table 4).

Table 4. Comparison of Covid-19 Vaccine Literacy Scale and Sub-Dimension Scores according to the descriptive characteristics of the participants (N=923)

Descriptive Characteristics	Status of Getting a Covid-19 Vaccine	n	\bar{X}	SD	t	p	
Functional Skill	Yes	841	2.29	0.64	-0.737	0.46	
	No	82	2.35	0.82			
Communicative/Critical Skill	Yes	841	3.10	0.55	6.094	0.00*	
	No	82	2.70	0.69			
Covid-19 Vaccine Literacy	Yes	841	2.83	0.28	7.472	0.00*	
	No	82	2.58	0.35			
Covid-19 positive status		n	\bar{X}	SD	t	p	
Functional Skill	Yes	489	2.26	0.66	-2.009	0.04*	
	No	434	2.35	0.65			
Communicative/Critical Skill	Yes	489	3.05	0.59	-0.712	0.48	
	No	434	3.08	0.56			
Covid-19 Vaccine Literacy	Yes	489	2.79	0.30	-2.424	0.02*	
	No	434	2.84	0.28			
Income status		n	\bar{X}	SD	f	p	Difference
Functional Skill	low (a)	251	2.34	0.47	16.940	0.00*	a>b c>a, b
	medium (b)	554	2.22	0.71			
	high (c)	118	2.60	0.66			
Communicative/Critical Skill	low (a)	251	3.08	0.47	2.826	0.06	-
	medium (b)	554	3.04	0.64			
	high (c)	118	3.17	0.47			
Covid-19 Vaccine Literacy	low (a)	251	2.83	0.28	28.568	0.00*	a>b c>a, b
	medium (b)	554	2.76	0.28			
	high (c)	118	2.98	0.32			
Educational Status		n	\bar{X}	S.D	F	p	Difference
Functional Skill	Primary school (a)	81	2.70	0.62	32.720	0.00*	a>c, d b>c, d c>d
	Secondary School (b)	165	2.56	0.63			
	High school (c)	497	2.25	0.58			
	University (d)	180	2.03	0.73			
Communicative/Critical Skill	Primary school (a)	81	2.63	0.60	20.738	0.00*	a<b, c, d b<d
	Secondary School (b)	165	3.01	0.53			
	High school (c)	497	3.11	0.52			
	University (d)	180	3.19	0.66			
Covid-19 Vaccine Literacy	Primary school (a)	81	2.65	0.33	9.548	0.00*	a<b, c, d
	Secondary School (b)	165	2.86	0.34			
	High school (c)	497	2.82	0.26			
	University (d)	180	2.81	0.30			
Marital status		n	\bar{X}	SD	t	p	
Functional Skill	Married	637	2.37	0.64	5.012	0.00*	
	Single	286	2.14	0.67			
Communicative/Critical Skill	Married	637	3.03	0.56	-2.759	0.01*	
	Single	286	3.14	0.61			
Covid-19 Vaccine Literacy	Married	637	2.81	0.30	0.080	0.94	
	Single	286	2.81	0.29			

t: Independent Sample t-test; * $p \leq 0.05$: Significant Relationship

Discussion

This study was conducted to determine the Covid-19 vaccine literacy level of individuals who did not receive the Covid-19 vaccine (5 doses) during the Covid-19 pandemic and to administer the Covid-19 vaccine. Between January 1, 2022 and March 31, 2022, when this study was conducted, the total number of Covid-19 cases in Turkey was 5404176, while the daily number of patients was 60721. These figures were the highest number of Covid-19 patients in Turkey, and this was the peak phase of the cases. The strongest aspect of this study was that although the Covid-19 cases peaked, the research was conducted with 923 people and all of these people were given the Covid-19 vaccine. In total, 923 volunteer participants were vaccinated against Covid-19, and 82 people who had never been vaccinated were given the first dose of Covid-19 vaccine.

Evaluation of Socio-demographic Characteristics

The data of the 923 volunteers, 410 female and 513 male, between the ages of 18-76, were included in the study. It was determined that the majority of the participants were married (69%), that their economic status was moderate (60%), that they were high school graduates (53.8%), and that 53% had Covid-19 disease to date. It was determined that 52% had family members whom they lived together and who caught Covid-19, and that 91.1% of them had at least one dose of Covid-19 vaccine.

Results of the Covid-19 Vaccine Literacy Scale

The total mean score of the participants' Covid-19 vaccine literacy was 2.81 ± 0.30 , and it was moderate. The functional skill sub-

dimension score average of the participants was 2.30 ± 0.66 , and it was moderate. The participants' communicative/critical skill sub-dimension score average was 3.07 ± 0.58 and was at a high level. In their study, Durmuş et al. (2021) concluded that the Functional Skill sub-dimension average score was 2.40, that the Communicative/Critical Skill sub-dimension average score was 2.60, that the Covid-19 vaccine literacy scale was 2.54, and that their participants' vaccine literacy levels were moderate (15). In the study conducted by Biasio et al (2021) with 885 people in Italy, the Functional Skill sub-dimension mean score was 2.92 ± 0.70 and the Communicative/Critical sub-dimension mean score was 3.27 ± 0.54 (17). In the study conducted by Gusar et al (2021), in which the Covid-19 vaccine literacy level was determined, the vaccine literacy level was 2.37 ± 0.54 , and the result was moderate (19). The results of these studies support the results of our study. In the vaccine literacy study conducted by Takahashi et al. (2022) in Japan with pregnant women and women with small children, the functional skill score was 2.62 ± 0.75 for pregnant women and 2.62 ± 0.77 for mothers with small children, whereas the communicative/critical skills scores were found to be 2.76 ± 0.61 for pregnant women and 2.69 ± 0.62 for mothers (20). The Covid-19 vaccine literacy score was 2.37 ± 0.54 , the functional skill score was 2.86 ± 0.71 , and the communicative-critical skill score was 2.12 ± 0.75 (19). In the Covid-19 vaccine literacy study in Italy by Lorini et al (2022), the Covid-19 vaccine literacy score was 3.19 ± 0.49 , the functional skill score was 3.17 ± 0.69 , and the communicative/critical subdimension score was 3.21 ± 0.59 (21). The results of these

studies show us that the Covid-19 vaccine literacy as generally found to be moderate. In our study, the fact that the functional skill sub-dimension was slightly lower than in other studies may be due to the socio-cultural environment, educational status, and reading comprehension level of the individuals participating in the research.

Evaluation of Covid-19 Vaccine Literacy by Demographic Variables

There was no significant relationship between the age of the individuals participating in the study and the Covid-19 vaccine literacy. In the study of Biasio et al. (2021), no significant difference was found between age and vaccine literacy, but the mean communicative-critical score was found to be high between the ages of 31 and 65 (17). In the study of Durmuş et al. (2021), no significant difference was found between age and vaccine literacy (15). In the study of Lorini et al. (2022), no relationship was found between age and Covid-19 vaccine literacy (21). The fact that age is not related to Covid-19 vaccine literacy may be due to the fact that people of all age groups can catch this disease and that everyone over the age of 18 is vaccinated. However, Gusar et al. (2021) found in their study that the level of vaccine literacy decreased with increasing age (19). In the health literacy determination study conducted by the Ministry of Health in Turkey, it was found that the level of health literacy was low in individuals over the age of 65 (10). It can be stated that as health literacy decreases, chronic diseases increase and vaccine literacy decreases.

A significant relationship was found between the number of Covid-19 vaccine doses of the individuals participating in the

study and their Covid-19 vaccine literacy. It can be thought that individuals, who have one dose or more of the Covid 19 vaccine, understand that the vaccine does not have any side effects and has protection; therefore, they approach the vaccine more moderately and the level of vaccine literacy increases by accepting the idea of being vaccinated. It can be said that by experiencing the vaccine, knowledge and acceptance on this subject increase. In addition, before administering the Covid-19 vaccine, nurses inform individuals about the vaccine, and obtain their consent. It can be thought that informing nurses about vaccination increases vaccine literacy. There was no difference between the Covid-19 vaccine literacy and gender of the participants. Durmuş et al. (2021) found that there was no correlation between gender and Covid-19 vaccine literacy (15). Gusar et al. (2021) concluded that gender did not affect the level of vaccine literacy (19). However, in the study of Biasio et al. (2021), women's functional skill sub-dimension score was found to be lower than men's functional skill sub-dimension score (17). In the "Turkey Health Literacy" study conducted in Turkey in 2020, men's health literacy levels were found to be higher than women's health literacy levels (10). In our study, the Covid-19 vaccine literacy scores of the women and men were close to each other, which can be related to the fact that all individuals were informed by the nurses before the Covid-19 vaccine was administered. However, it can be thought that the low health literacy of the women is due to low access to education, marriage at an early age before completing their

education, and geographical and cultural reasons.

It was found that the marital status of the participants was not related to the Covid-19 vaccine literacy level; however, the functional sub-dimension score of the married participants was higher and the communicative/critical skill sub-dimension score was lower than the single participants. It can be thought that this result is due to the fact that most of the participants (637 people) were married. It can also be thought that it is due to the exchange of information about Covid-19 within the family, the wider social environment, the traditionalist extended family structure of the Turkish family structure, and constant communication.

A significant difference was found between the educational status of the participants and their functional skill and communicative/critical skill sub-dimension scores. It was observed that the level of Covid-19 vaccine literacy increased with the increase in education level. It was found that the participants who graduated from primary school had a lower Covid-19 vaccine literacy level than those who graduated from secondary school, high school and university. Functional skills are related to reading comprehension, and the primary school graduates had high functional skill sub-dimension scores (the functional skill sub-dimension was reverse coded). In the study of Bioasio et al. (2020), it was found that as the Covid-19 vaccine literacy education level increased, vaccine literacy also increased (16). Similarly, in the study of Durmuş et al. (2021), the functional skill sub-dimension was higher for primary school graduates than for

high school and university graduates (15). Gusar et al (2021), in their study on Covid-19 vaccine literacy, found that there was a significant relationship between education and vaccine literacy, and that vaccine literacy increased with the increase in education level (19). It is well known that the relationship between education and health can be confused with socioeconomic conditions or cognitive abilities in childhood and can be explained by several main factors, namely material conditions, social-psychological resources, and a healthy lifestyle. Difficulties with reading, writing, math, communication, and the use of technology can interfere with understanding health information. It is even more difficult to read and understand the information written in the package insert of the drugs prescribed by the doctor. According to these results, it can be thought that primary school graduates cannot understand what they read on health-related topics, and that the level of education is very important in improving the health literacy of societies.

A significant difference was found between the income status and the Covid-19 vaccine literacy level. The individuals with a high income level were found to have higher Covid-19 vaccine literacy skills than those with a low and medium income level. The individuals with low income level were found to have higher functional skills compared to those with a medium income level. In the study of Takahashi et al (2022), vaccine literacy was found to be low in both pregnant women and mothers with small children and in those with lower education level and lower income (20, 22). In the study of Engelbrecht et al. (2022) on Covid-19 vaccine literacy in Africa, low-income individuals were found to

have lower communicative/critical skills compared to high-income individuals (23). This situation can be associated with the level of education, and it can be stated that individuals with low education level work in lower-paid jobs and have a lower understanding of reading compared to their education level.

It was found that the participants who had the Covid-19 disease had a lower Covid-19 vaccine literacy level than those who did not have Covid-19. The individuals with Covid-19 are not vaccinated for a certain period of time, as they have natural immunity. Therefore, it can be thought that individuals with Covid-19 do not do research on vaccines. In addition, it can be thought that individuals with Covid-19 disease close themselves to all kinds of information about Covid-19 due to the fact that they have had this disease, and that the information pollution in social media may also have an effect.

It was found that the individuals with the Covid-19 vaccine had a higher vaccine literacy level than the individuals who had never been vaccinated against Covid-19. Before the Covid-19 vaccine, nurses provide information about the vaccine, and obtain consent. Therefore, individuals who have been vaccinated have information about vaccines. It can be thought that those who have been vaccinated against Covid-19 understand that the vaccine does not have any side effects and has vaccine protection; for that reason, they approach the vaccine more moderately and the level of vaccine literacy increases by accepting the idea of being vaccinated. By experiencing the vaccine, we can say that knowledge and acceptance on this subject increase. There was no significant difference

between the participants' age, number of children, and Covid-19 vaccine literacy levels. According to the income status of the participants, a significant difference was found between the functional skill sub-dimension scores and the Covid-19 vaccine literacy scores. It was determined that the individuals with low income levels had higher Covid-19 vaccine literacy levels than the participants with medium and high income levels. This may suggest that low-income individuals are vaccinated against Covid-19 in order not to lose their jobs. It may also make us think that workplaces may have made it necessary to vaccinate, as there is a 7-day isolation period for those who are infected with Covid-19.

Between January 1, 2022 and March 31, 2022, when this study was conducted, the total number of Covid -19 cases in Turkey was 5404176, while the daily number of patients was 60721. These figures were the highest number of Covid-19 patients in Turkey, and this was the peak phase of the cases. The strongest aspect of this study was that although the Covid-19 cases peaked, the research was conducted with 923 people and all of these people were given the Covid-19 vaccine. In total, 923 volunteer participants were vaccinated against Covid-19, and 82 people who had never been vaccinated were given the first dose of Covid-19 vaccine.

Study Limitations and Strengths

The strongest aspect of this study is that 923 people were informed about the Covid -19 vaccines during the peak period of the Covid 19 pandemic and these people were vaccinated. The research was limited to 923 people living in a town in western Turkey, whose Covid-19 vaccines had not been

completed. It was limited to the answers of the participants to the questions of the Covid-19 Vaccine Literacy Scale. Due to the Covid-19 pandemic, permissions from institutions to conduct the research came too late.

Conclusions

The mean score of the Covid-19 Vaccine Literacy Scale was found to be above average, and the mean score of the subdimensions communicative/critical and functional skills was found to be moderate. It was found that the participants' Covid 19 vaccine literacy was associated with marital status, education levels, income level, having the Covid-19 disease, and having previously been vaccinated against Covid-19.

It was found that Covid-19 vaccine literacy and being vaccinated against Covid-19 were related to the participants' marital status, education level, income status, and having had the Covid-19 disease.

In total, 923 volunteer participants were vaccinated against Covid-19, and 82 people who had never been vaccinated were given the first dose of Covid-19 vaccine. This is a measure of success for us. Its contribution to public health is enormous.

Recommendations

According to the results obtained from the research, the following recommendations can be made:

- Since the education level of individuals affects the Covid-19 vaccine literacy level, subjects related to vaccination and health literacy should be included in the primary school curriculum. In order to improve the health literacy of the public, lessons related to this subject should be

included in the curricula of all schools from primary school to university.

- Nursing undergraduate students should provide training on health literacy and vaccine literacy in the areas where they practice (family health centers, kindergarten, primary school, high school, etc.).
- Information prepared by the reliable sources of the Ministry of Health through communication channels (such as television, radio, social media) should be presented to the public, thus preventing the infodemic and reducing the anxiety of individuals living in the community about vaccines. For this, the news and statements of the Ministry of Health in Turkey, which is the most reliable source, should be taken into account.
- The importance of vaccination against Covid-19 should be conveyed to individuals in health institutions and on social media platforms with the right tools, and the spread of false information should be prevented.
- It is recommended that future health literacy/vaccine literacy studies be conducted in the Eastern Anatolia Region where vaccination is low.

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Ethical approval and consent to participate:

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