

# Evaluation of the Covid-19 vaccine literacy of the under-vaccinated community in a district in the Covid-19 pandemic: Pursaklar example

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## Abstract

**Objective:** In this study, it was aimed to determine the reasons why individuals with incomplete Covid-19 vaccines in a district did not have their second dose of vaccine, even though they had their first dose of vaccine, and to evaluate their vaccine literacy.

**Methods:** The research is a cross-sectional study conducted between August and October 2021. It was identified and the population of the research was determined. 192 people participated in the study with the sample calculation. In the questionnaire used in the research, there are 29 questions and three sections: demographic characteristics of the participants, their knowledge and attitudes about the Covid-19 vaccine and other vaccines, and the Covid-19 vaccine literacy scale. The scale consists of 12 statements and two dimensions. Mann-Whitney U and Kruskal Wallis tests it was used as statistical methods in the study. Statistical significance value was accepted as  $p < 0.05$ .

**Results:** Among the reasons why the participants did not receive the second dose of vaccines, the most common reason was stated as “I didn't have time/opportunity” with 51%. The Covid-19 vaccine literacy scale mean score of the participants was found to be  $2.48 \pm 0.53$ . A difference was found between education status and Covid-19 vaccine literacy, and it was determined that there was an increase in vaccine literacy level as the education level increased.

**Conclusion:** The mean score of the Covid-19 vaccine literacy scale was determined as  $2.48 \pm 0.54$  for the under-vaccinated participants who had the first dose of Covid-19 vaccine, but did not receive the second dose. The Covid-19 vaccine literacy of the participants in the study is low. Increasing the vaccination literacy of individuals will make a positive contribution to their second dose vaccination.

**Keywords:** Covid-19, Missing Vaccine, Vaccine Literacy

## INTRODUCTION

Vaccination is one of the greatest achievements of public health practice. As a result of immunization through vaccination, many epidemics have been prevented in the past and continue to be prevented today, and vaccination has been one of the most important weapons in building community immunity. Immunization programs are the best and most cost effective method for preventing and eliminating infectious diseases, reducing disease morbidity and mortality, and developing a healthy community (1). Vaccines are important for both individual immunity and social immunity, which occurs because the likelihood of unvaccinated individuals coming into contact with the pathogen decreases as the number of vaccinated individuals in the community increases (2).

Vaccination hesitancy today, as in the past, hinders the provision of community immunity to infectious diseases. The Covid-19 pandemic has brought a long standing debate on vaccine hesitancy back to the agenda. The reasons for vaccination hesitancy are not just a lack of information (3).

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Governments and health professionals play a critical role in shaping people's attitudes toward vaccines (4-6). Although it is extremely important that many entities (media, health organizations, educators, health professionals and educators, business or economic activities, general education institutions, public institutions, all academic fields, etc.) work together to combat vaccine hesitancy, society also has a major responsibility. However, for society to fulfill its responsibility, individuals must achieve a certain level of general education, followed by health literacy and vaccine literacy (7).

According to WHO, health literacy is defined as "the ability of individuals to acquire cognitive and social skills and abilities to use and understand information to maintain and improve health" (8). In addition to general health literacy, vaccine literacy should also be understood by society (9). Vaccine literacy is defined as the ability to have and use general health related information and services by processing and understanding them to make appropriate decisions about vaccines (10). In addition to providing information about vaccines, the role of vaccine literacy is to make vaccines more understandable by explaining them to individuals (3). Low vaccination literacy among people in the community leads to low vaccination rates in that community. There are studies that have investigated that vaccination is related to health literacy and vaccine literacy (11, 12). Therefore, proper communication about vaccination should be organized according to people's level of knowledge and vaccine literacy.

In this study, it was aimed to determine the reasons why individuals who were missing Covid-19 vaccine in a district did not receive the second dose of the vaccine even though they had received the first dose, and it was wanted to assess their vaccine literacy.

## METHOD

In this study was a cross sectional study conducted between August 2021 and October 2021. From the Public Health Management System (PHMS) vaccination module, 6648 individuals it was identified who had received the first dose of Covid-19 vaccine by August 23, 2021, in the Pursaklar district of Ankara province but did not receive the second dose even though it was due. This number constitutes the population of the study. The sampling method used was systematic random sampling. Incomplete vaccination status was defined as a period of at least 4 weeks after the first vaccination, although the second vaccination was due. Pursaklar is a district in the north of Ankara. The population is 159676, of which 49.88% are male and 50.12% are female. 74% of the population has completed primary, middle or high school and 14% has attended university or higher education (13). In a literature study on Covid-19 vaccine literacy, the prevalence of limited vaccine literacy was found to be 11% (12). The study sample size was calculated using the online computer programme

Openepi. The minimum sample size calculated with  $\alpha = 0.05$ ,  $d = 5\%$ , design effect 1 and 11% frequency % at a confidence interval of 95% was reported as 148. Considering that exceeding the calculated sample size increases the power of the study, the questionnaire was administered to 192 individuals who agreed to participate in the study.

The dependent variable of the study was the Covid-19 vaccine literacy scale score and its subdimensions of functional skills score and communicative/critical skills score. The independent variables were educational level, age, sex, employment status, marital status, presence of a chronic disease, history of Covid-19, self-assessment of own health, status of influenza vaccination in the last season, status of intention to get influenza vaccination in this season, questions about planning vaccination against other infectious diseases, and reasons for not receiving the second dose of Covid-19 vaccine.

The questionnaire, "Evaluation of Covid-19 vaccine literacy of the community with missing vaccines in a district during the Covid-19 pandemic," used as the data source in the study, was prepared by the researchers and administered to individuals by telephone. Those who could not be reached by telephone or who did not want to participate in the survey it was not surveyed and the next person on the list was passed on. The questionnaire included 29 questions and three sections: participant demographic characteristics, knowledge and attitudes about the Covid-19 vaccine and other vaccines, and a Covid-19 vaccine literacy scale. The question "Why did you not get the 2nd dose of Covid-19 vaccine?" was a closed-ended question, and options it was presented to participants by reading them.

### Covid-19 Vaccine Literacy Scale

Biasio et al. adapted the scale developed by Ishikawa et al. to measure health literacy of individuals with chronic diseases as the Covid-19 vaccine literacy scale (12). The Turkish validity and reliability study of the Covid-19 vaccine literacy scale was conducted by Durmuş et al. in 2021 (14). In the scale, the functional dimension questions consist of 4 items and the communicative/critical dimension questions consist of 8 items, giving a total of 12 items and two dimensions. The scale is a 4-point Likert scale. The functional dimension items are rated 1=often, 2=sometimes, 3=rarely, 4=never, and the communicative/critical dimension statements are rated 4=often, 3=sometimes, 2=rarely, 1=never. No threshold or min-max value was determined for the scale used in this survey. A mean score close to 4 indicates a high level of vaccine literacy (14).

Functional vaccine literacy means that individuals have literacy skills to understand health information about vaccines and to use this information in their daily lives (15).

Communicative/critical immunization literacy focuses on areas such as the ability to solve problems more accurately and make decisions. Communicative health literacy means that individuals have cognitive and social skills, can adapt to current medical situations by using their health related knowledge, and benefit from various medical activities (15, 16). Critical health literacy refers to a more advanced cognitive level. It enables individuals to analyze acquired information in a critical dimension along with their social skills and use this information to gain control over the events or situations they experience (15, 16).

All subjects reached by telephone for the study were first given explanatory information about the study, and the informed consent form was read. Those who volunteered to participate in the study it was interviewed, and the questionnaire was used. The interview with one person took an average of 10-15 minutes.

The research data it was analysed using SPSS 23 statistical package program. Descriptive statistics it was presented as mean ( $\pm$ ), standard deviation (min; max), median (IQR 25-75), frequency distribution, and percentage. Mann-Whitney U test was used for statistical analysis between two independent groups, and Kruskal-Wallis test was used for statistical analysis between more than two independent groups. Statistical significance value was accepted as  $p < 0.05$ .

The ethics committee approval of the study was obtained from Ankara Yıldırım Beyazıt University Ethics Committee with the date 22.09.2021 and number 2021- 415.

## RESULTS

Of the subjects who participated in the study, 55.2% were female and the mean age was  $41.90 \pm 16.44$  years. According to educational status, the highest number of individuals were primary school graduates with a rate of 38%. 73.9% of those over 40 years old had a primary school diploma or less. 43.2% of individuals were employed in an income generating job and 76% were married (Table 1).

25.5% of participants had a physician diagnosed chronic disease. 27.6% had been previously vaccinated with Covid-19. For the first vaccination dose, 79.7% of participants received the Biontech vaccine and 20.3% received the Sinovac vaccine (Table 2).

Table 3 lists the reasons why individuals who received the first dose of Covid-19 vaccine did not receive the second dose. Accordingly, it was found that 51% of participants did not receive the second dose of vaccine because they did not have time/opportunity and 17.2% did not get an appointment. The mean age of those who reported not having time/opportunity was  $37.47 \pm 15.24$  years, and 51.1% were employed (Table 3).

**Table 1. Some demographic characteristics of the individuals participating in the research (n=192)**

|                           | n                         | (%)* |
|---------------------------|---------------------------|------|
| <b>Age</b>                |                           |      |
| Mean $\pm$ sd (min-max )  | 41.90 $\pm$ 16.44 (18-85) |      |
| Median (25-75 %)          | 40 (28-53)                |      |
| <b>Age group</b>          |                           |      |
| 40 and below              | 100                       | 52.1 |
| 41 and above              | 92                        | 47.9 |
| <b>Sex</b>                |                           |      |
| Female                    | 106                       | 55.2 |
| Male                      | 86                        | 44.8 |
| <b>Education</b>          |                           |      |
| Literate                  | 15                        | 7.8  |
| Primary school graduate   | 73                        | 38.0 |
| Secondary school graduate | 27                        | 14.1 |
| High school graduate      | 44                        | 22.9 |
| University graduate       | 33                        | 17.2 |
| <b>Working status</b>     |                           |      |
| Working                   | 83                        | 43.2 |
| Not working               | 109                       | 56.8 |
| <b>Marital Status</b>     |                           |      |
| Married                   | 146                       | 76.0 |
| Single                    | 46                        | 24.0 |
| * Column Percentage       |                           |      |

**Table 2. Some descriptive characteristics of the participants (n=192)**

|                                       | n   | (%)* |
|---------------------------------------|-----|------|
| <b>Chronic disease</b>                |     |      |
| Yes                                   | 49  | 25.5 |
| No                                    | 143 | 74.5 |
| <b>Previous Covid-19 status</b>       |     |      |
| Yes                                   | 53  | 27.6 |
| No                                    | 139 | 72.4 |
| <b>First dose of Covid-19 vaccine</b> |     |      |
| Biontech                              | 153 | 79.7 |
| Sinovac                               | 39  | 20.3 |
| * Column Percentage                   |     |      |

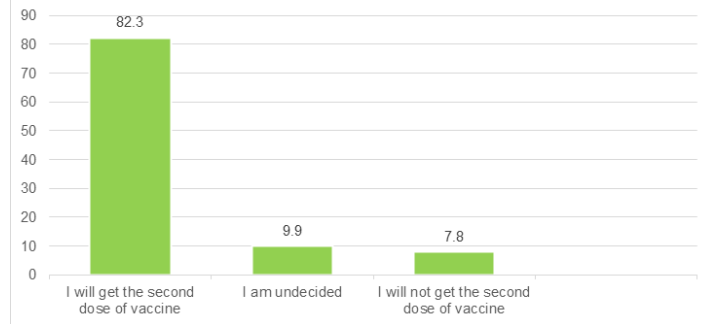
**Table 3. The reasons why the participants who had the first dose of Covid-19 vaccine did not get the second dose of vaccine**

|   | n            | (%)* |
|---|--------------|------|
| <b>Reasons for not getting the 2nd dose of vaccine **</b>                                 |              |      |
| I didn't have the time/opportunity  | 88           | 46.0 |
| I couldn't get an appointment   | 33           | 17.2 |
| I experienced Covid-19-like symptoms with the first dose of vaccine. I am scared          | 24           | 12.5 |
| I got Covid-19 before I got my 2nd dose of vaccine  | 10           | 5.2  |
| I am affected by negative news in the media   | 4            | 2.1  |
| I think a single dose of vaccine is enough  | 13           | 6.8  |
| I regretted it after the first dose of vaccine  | 12           | 6.3  |
| Conditions related to pregnancy/breastfeeding   | 4            | 2.1  |
| Other   | 6            | 3.1  |
| <b>Age distribution of those who answered that I did not have time/opportunity (n=88)</b> |              |      |
| Mean± ssd   | 37.47± 15.24 |      |
| Median (min-max)  | 34.5 (18-85) |      |
| <b>Employment status of those who answered that I did not have time/opportunity</b>       |              |      |
| Working   | 45           | 51.1 |
| Not working   | 43           | 48.9 |
| * Column Percentage<br>** More than one reason may be specified                           |              |      |

**Table 4. General health status of the participants and some attitudes and behaviors about vaccines**

|  | n   | (%)* |
|--|-----|------|
| <b>Flu vaccination status at last season (n=192)</b>               |     |      |
| Yes  | 11  | 5.7  |
| No   | 181 | 94.3 |
| <b>Age distribution of those who had the flu vaccine</b>           |     |      |
| 59 and below   | 4   | 5.7  |
| 60 and above   | 7   | 94.3 |
| <b>Considering getting the flu vaccine this season</b>             |     |      |
| Considering getting vaccinated                                     | 97  | 26.6 |
| Not considering  | 268 | 73.4 |
| <b>Planning to be vaccinated against other infectious diseases</b> |     |      |
| Considering getting vaccinated                                     | 35  | 18.2 |
| Not considering  | 157 | 81.8 |
| <b>Self-evaluation of health</b>                                   |     |      |
| Very good  | 50  | 26.0 |
| Good   | 114 | 59.4 |
| Middle   | 20  | 10.4 |
| Bad  | 7   | 3.6  |
| Too bad  | 1   | 0.5  |
| *Column Percentage   |     |      |

Of those who participated in the study, 5.7% had received an influenza vaccination in the previous season, and 26.6% planned to receive influenza vaccination in this season. Of those who had received influenza vaccination, 63.6% were over 60 years of age, and 59.4% of participants rated their health as generally good (Table 4).

**Attitudes about the second dose of Covid-19 vaccine****Figure 1. Attitudes of the individuals participating in the study about the second dose of Covid-19 vaccine**

When study participants it was asked about their attitudes toward the second dose of Covid-19 vaccine, 82.3% of participants indicated that they would receive the second dose of vaccine, 7.8% indicated that they would not, and 9.9% indicated that they had not yet decided (Figure 1).

**Table 5. Mean, standard deviation, minimum, maximum, median and 1st-3rd quartile (25-75 %) values for the Scale**

|   | Mean±sd<br>(min-max) | Median (25-75 %) |
|---|----------------------|------------------|
| <b>Functional Skills</b>                  | 2.71±0.91 (1-4)      | 2.5 (2-3.75)     |
| <b>Communicative/<br/>Critical Skills</b> | 2.36±0.79 (1-4)      | 2.63 (1.78-2.88) |
| <b>Covid-19 Vaccine<br/>Literacy</b>      | 2.48±0.54 (1-3.67)   | 2.5 (2.08-2.83)  |

Participants' total and subscale scores on the Covid-19 Vaccine Literacy Scale were as follows: The mean score of the functional skills subscale was 2.71±0.91, the mean score of the communication/critical skills subscale was 2.36±0.79, and the mean score of the Covid-19 vaccine literacy scale was 2.48±0.54 (Table 5).

Table 6 shows the comparison of Covid-19 vaccine literacy scale and subdimensions scores according to some characteristics of the study participants. No difference was found in Covid-19 vaccine literacy scale score and its subdimensions by sex. While no difference was found between participants' educational levels for functional skills ( $p=0.186$ ), Covid-19 scale scores for vaccination literacy and communication/critical thinking skills were higher in university graduates than in the other groups ( $p<0.001$ ;  $p<0.001$ ). While no significant difference was found between participants' communicative/critical skills scores by age group ( $p=0.263$ ), functional skills and Covid-19 vaccine literacy scale scores were significantly higher among persons 40 years of age and younger than among persons 40 years of age and

older ( $p=0.006$ ;  $p=0.010$ , respectively) (Table 6). Among those aged 40 and older, 73.9% had an primary school degree or less and 26.1% had a secondary school, high school, or university degree. Individuals over 40 years of age with at least secondary school, high school, or university education had a higher functional skills score ( $2.64\pm 0.91$ ), but this was not statistically significantly different from individuals with primary school education or less ( $p=0.528$ ), while the communicative/critical skills score ( $2.69\pm 0.64$ ) and Covid-19 vaccine literacy scale score ( $2.67\pm 0.43$ ) were statistically significantly higher ( $p=0.010$ ;  $p=0.002$ ).

**Table 6. Distribution of Covid-19 vaccine literacy scale and sub-dimension scores according to some demographic characteristics of the participants**

| N=192   | Functional Skills |                    | Communicative/Critical Skills |                     | Covid-19 Vaccine Literacy |                     |
|---|-------------------|--------------------|-------------------------------|---------------------|---------------------------|---------------------|
|   | Mean $\pm$ sd     | p                  | Mean $\pm$ sd                 | p                   | Mean $\pm$ sd             | p                   |
| <b>Education</b>                                      |                   |                    |                               |                     |                           |                     |
| Primary school graduate and below                     | 2.58 $\pm$ 0.96   | 0.186 <sup>1</sup> | 2.07 $\pm$ 0.79               | <0.001 <sup>1</sup> | 2.24 $\pm$ 0.51           | <0.001 <sup>1</sup> |
| Secondary school, high school graduate                | 2.75 $\pm$ 0.90   |                    | 2.46 $\pm$ 0.70               |                     | 2.58 $\pm$ 0.48           |                     |
| University graduate                                   | 2.79 $\pm$ 0.75   |                    | 2.85 $\pm$ 0.57               |                     | 2.89 $\pm$ 0.38           |                     |
| <b>Age group</b>                                      |                   |                    |                               |                     |                           |                     |
| 40 and below  | 2.87 $\pm$ 0.86   | 0.006 <sup>2</sup> | 2.43 $\pm$ 0.77               | 0.263 <sup>2</sup>  | 2.58 $\pm$ 0.51           | 0.010 <sup>2</sup>  |
| 41 and above  | 2.53 $\pm$ 0.93   |                    | 2.29 $\pm$ 0.80               |                     | 2.37 $\pm$ 0.54           |                     |
| <b>Educational status of those over the age of 40</b> |                   |                    |                               |                     |                           |                     |
| Literate-Primary school graduate                      | 2.50 $\pm$ 0.94   | 0.528 <sup>2</sup> | 2.15 $\pm$ 0.81               | 0.010 <sup>2</sup>  | 2.27 $\pm$ 0.55           | 0.002 <sup>2</sup>  |
| Secondary school, high school, university graduate    | 2.64 $\pm$ 0.91   |                    | 2.69 $\pm$ 0.64               |                     | 2.67 $\pm$ 0.43           |                     |
| <b>Sex</b>  |                   |                    |                               |                     |                           |                     |
| Female  | 2.75 $\pm$ 0.89   | 0.445 <sup>2</sup> | 2.29 $\pm$ 0.84               | 0.291 <sup>2</sup>  | 2.44 $\pm$ 0.56           | 0.369 <sup>2</sup>  |
| Male  | 2.65 $\pm$ 0.93   |                    | 2.46 $\pm$ 0.70               |                     | 2.52 $\pm$ 0.50           |                     |
| <b>Working status</b>                                 |                   |                    |                               |                     |                           |                     |
| Working   | 2.85 $\pm$ 0.86   | 0.058 <sup>2</sup> | 2.49 $\pm$ 0.74               | 0.092 <sup>2</sup>  | 2.61 $\pm$ 0.46           | 0.005 <sup>2</sup>  |
| Not working   | 2.60 $\pm$ 0.93   |                    | 2.27 $\pm$ 0.80               |                     | 2.38 $\pm$ 0.56           |                     |
| <b>Marital Status</b>                                 |                   |                    |                               |                     |                           |                     |
| Married   | 2.69 $\pm$ 0.91   | 0.607 <sup>2</sup> | 2.25 $\pm$ 0.80               | 0.002 <sup>2</sup>  | 2.40 $\pm$ 0.53           | <0.001 <sup>2</sup> |
| Single  | 2.77 $\pm$ 0.89   |                    | 2.70 $\pm$ 0.64               |                     | 2.72 $\pm$ 0.46           |                     |

<sup>1</sup>Kruskal Wallis test  
<sup>2</sup>Mann Withney U test

Table 7 shows the comparison of the results of the Covid-19 vaccine literacy scale and its subdimensions according to some characteristics of the study participants. There was no statistically significant difference in scores on the Covid-19 vaccine literacy and its subdimension communicative/

critical skills depending on the presence of chronic disease and whether participants had previously had Covid-19, but there was a difference in functional skills ( $p<0.001$ ;  $p=0.006$ ). Accordingly, those who did not have chronic diseases and those who had not had Covid-19 before had higher functional skills scores. There was no difference in Covid-19 vaccine literacy and its subdimension communicative/critical skills score according to the 'status of participants considering influenza vaccination this season and planning to get vaccinated against other infectious diseases, while those who did not plan to get vaccinated against influenza and other infectious diseases this season had higher functional skills scores. This difference was statistically significant ( $p=0.029$ ;  $p=0.034$ ). In addition, although no statistically significant difference was found when comparing functional skills according to participants' self-assessed health status ( $p=0.078$ ), those who rated their health status as very good-good had higher Covid-19 vaccine literacy and communicative/critical skills

**Table 7. Comparison of Covid-19 vaccine literacy scale and subdimension scores according to some characteristics of the participants**

|  | Functional Skills |                     | Communicative/Critical Skills |                    | Covid-19 Vaccine Literacy |                     |
|--|-------------------|---------------------|-------------------------------|--------------------|---------------------------|---------------------|
|  | Mean $\pm$ sd     | p                   | Mean $\pm$ sd                 | p                  | Mean $\pm$ sd             | p                   |
| <b>Chronic disease</b>   |                   |                     |                               |                    |                           |                     |
| Yes  | 2.30 $\pm$ 0.90   | <0.001 <sup>1</sup> | 2.40 $\pm$ 0.80               | 0.457 <sup>1</sup> | 2.37 $\pm$ 0.55           | 0.211 <sup>1</sup>  |
| No   | 2.85 $\pm$ 0.87   |                     | 2.35 $\pm$ 0.782              |                    | 2.52 $\pm$ 0.53           |                     |
| <b>Previous Covid-19 status</b>                                    |                   |                     |                               |                    |                           |                     |
| Yes  | 2.42 $\pm$ 0.86   | 0.006 <sup>1</sup>  | 2.44 $\pm$ 0.79               | 0.447 <sup>1</sup> | 2.43 $\pm$ 0.61           | 0.712 <sup>1</sup>  |
| No   | 2.81 $\pm$ 0.91   |                     | 2.34 $\pm$ 0.78               |                    | 2.49 $\pm$ 0.51           |                     |
| <b>Self-evaluation of health</b>                                   |                   |                     |                               |                    |                           |                     |
| Very good-good   | 2.76 $\pm$ 0.88   | 0.078 <sup>2</sup>  | 2.43 $\pm$ 0.76               | 0.007 <sup>2</sup> | 2.54 $\pm$ 0.51           | <0.001 <sup>2</sup> |
| Middle   | 2.43 $\pm$ 1.05   |                     | 2.05 $\pm$ 0.82               |                    | 2.18 $\pm$ 0.52           |                     |
| Bad-too bad  | 2.18 $\pm$ 0.89   |                     | 1.65 $\pm$ 0.70               |                    | 1.83 $\pm$ 0.41           |                     |
| <b>Flu vaccination status at last season</b>                       |                   |                     |                               |                    |                           |                     |
| Yes  | 2.97 $\pm$ 0.85   | 0.357 <sup>1</sup>  | 2.09 $\pm$ 0.82               | 0.278 <sup>1</sup> | 2.38 $\pm$ 0.46           | 0.506 <sup>1</sup>  |
| No   | 2.69 $\pm$ 0.91   |                     | 2.38 $\pm$ 0.78               |                    | 2.48 $\pm$ 0.54           |                     |
| <b>Considering getting the flu vaccine this season</b>             |                   |                     |                               |                    |                           |                     |
| Considering  | 2.31 $\pm$ 0.88   | 0.029 <sup>1</sup>  | 2.48 $\pm$ 0.69               | 0.275 <sup>1</sup> | 2.43 $\pm$ 0.43           | 0.791 <sup>1</sup>  |
| Not considering  | 2.76 $\pm$ 0.90   |                     | 2.34 $\pm$ 0.80               |                    | 2.48 $\pm$ 0.56           |                     |
| <b>Planning to be vaccinated against other infectious diseases</b> |                   |                     |                               |                    |                           |                     |
| Planning   | 2.40 $\pm$ 0.81   | 0.034 <sup>1</sup>  | 2.48 $\pm$ 0.70               | 0.368 <sup>1</sup> | 2.45 $\pm$ 0.53           | 0.910 <sup>1</sup>  |
| Not planning   | 2.77 $\pm$ 0.92   |                     | 2.34 $\pm$ 0.80               |                    | 2.48 $\pm$ 0.54           |                     |

<sup>1</sup>Mann Withney U testi, <sup>2</sup>Kruskal Wallis testi

scale scores than those who rated their health status as moderate and very poor-bad. This difference was statistically significant ( $p<0.001$ ;  $p=0.007$ ) (Table 7).

## DISCUSSION

This study was conducted in Pursaklar district to determine the reasons why individuals who were missing Covid-19 vaccine did not receive their second vaccination dose even though they had received their first vaccination dose and to assess evaluate their vaccine literacy.

When asked why they did not receive their second vaccine dose, the most common reason given was “I did not have time/opportunity” at 51%. Considering that 51% of respondents were employed and 61% were between 18 and 40 years old, this result is to be expected. According to the results of the survey conducted in October 2021 by Ipsos (Global Specialist in Marketing and Public Opinion Research), a global market research firm, the rate of nonvaccination in the 18- to 35-year-old age group was higher than the vaccination rate in this age group (17). An appointment system that can be adjusted to individual work schedules can change this result. On-site vaccination practices and appointment-free vaccination practices can improve the “I did not have time/opportunity” response. Vaccination points can be located in places that are easily accessible to people in public living spaces.

The majority of participants stated that they did not intend to get influenza vaccines or existing infectious disease vaccines other than Covid-19 vaccines. This indicates that these individuals with missing Covid-19 vaccines do not have the necessary care and dedication not only for the Covid-19 vaccine, but also for other vaccines. Only 5% of participants reported having been vaccinated against influenza in the last season. About 65% of those who received influenza vaccines were 60 years and older. Although the number of participants over 65 years old in the study was not very high (17 people), 29.4% of participants over 65 years old had received the flu vaccine in the last season. In another study conducted in Istanbul, the rate of influenza vaccination among those over 65 years of age was 26.5% (18). Experts strongly recommend seasonal influenza vaccination to reduce the burden of the two epidemics expected next winter (19, 20). Explaining the concepts of health literacy and vaccine literacy to people may positively influence their health-related decisions and lead to an increase in vaccination rates. According to this study, the mean score of participants in the functional skills dimension of the scale was  $2.71 \pm 0.91$ , the mean score in the communicative/critical skills dimension was  $2.36 \pm 0.79$ , and the mean score of the whole scale was  $2.48 \pm 0.54$ . Similar to the study on vaccine literacy in Italy, the mean score of participants in the functional skills was higher than the mean score in the communicative/critical skills in this study (21). In the Turkish Validity and Reliability of the Covid-19 vaccine literacy scale, participants' mean score on functional skills ( $2.40 \pm 0.75$ ) was lower than in this study, whereas mean scores on communicative/critical skills ( $2.60 \pm 0.69$ ) and total scale ( $2.54 \pm 0.56$ ) were higher than in this study (14). These differences could be due to the fact that the places where the studies were conducted had different socioeconomic levels.

According to the results of the October 2021 survey by Ipsos (Global Specialist in Marketing and Public Opinion Research), a worldwide research firm, 85% of society has received at least

one vaccination dose by the first week of October 2021, while the percentage of people who have never been vaccinated is 15%. According to the same study, the rate of those who have received a single dose of vaccination is 13% (17). In this study, 82% of the participants who had received the first dose of vaccine stated that they would also receive the second vaccine dose; whereas the others it was undecided or stated that they would not receive the second dose. The hesitations and reasons of those who it was undecided and those who stated that they would not get vaccinated can be listened to and their knowledge can be corrected with accurate information by healthcare professionals.

In both this study and the Turkish validity and reliability study of the Covid-19 vaccine literacy scale, no statistically significant difference was found in Covid-19 vaccine literacy, functional skills, and communicative/critical skills according to the gender of the participants (14). Covid-19 vaccine literacy scale and functional skills scores of individuals aged 40 years and younger were higher than those of individuals aged 40 years and older. Of note in the study, 73.9% of those over 40 years of age had primary school education or less. The higher Covid-19 vaccine literacy scale and functional skills score of individuals over age 40 may be due to this. A study of Covid-19 vaccine literacy in Japan found that Covid-19 vaccine literacy decreased as participants aged (22). Covid-19 risk increases with age, suggesting that vaccination literacy should be higher in older participants; however, this was not the case in either study. The study found a statistically significant difference between Covid-19 vaccine literacy and the communicative/critical skills subdimension according to the education level of the individuals. Accordingly, vaccine literacy was found to increase as the level of education increased. This was an expected result. In the Turkish validity and reliability study of the Covid-19 vaccine literacy scale, no significant difference was found in the Covid-19 vaccine literacy and communicative/critical skills dimension according to the educational level of the participants; however, a significant difference was found in the functional skills dimension. In the study on vaccine literacy in Italy, a strong association was found between vaccination, education level and vaccine literacy of participants (12). These three studies have shown us that the vaccine literacy scale score or the score of its subdimensions, in other words, the vaccine literacy level of individuals, has a positive relationship with educational status. This confirms the importance of improving health literacy and vaccine literacy skills through targeted interventions.

Appropriate and timely vaccination for the whole society is very important to survive the Covid-19 pandemic that the whole world has been struggling with for some time. In this context, it is important to increase the awareness of

the concept of vaccine literacy in the society, evaluate and improve the vaccine literacy of the society so that vaccines are accepted and used by the people in the society. There are very few studies on vaccination literacy in the literature. It is important to increase the number of studies in this area to prevent this and future infectious disease outbreaks.

### Limitations of the Study

Since the survey of participants was conducted by telephone, some people over 65 years of age did not want to participate in the survey. Therefore, the number of participants over 65 years old is small. In addition, the survey was conducted in only one center, that is, only in Pursaklar district. The results can only be generalized for Pursaklar. This study can serve as a guide for other multicenter studies on vaccine literacy.

### CONCLUSION

In this period from August to October 2021, when health experts emphasize the need for three doses of vaccination in the Covid-19 pandemic, there are still people in the Pursaklar district with a single dose of vaccination for various reasons. Low Covid-19 vaccine literacy is one of the most important reasons for incomplete vaccination. Identifying the vaccine literacy skills of the population and implementing the necessary measures to correct the inadequate vaccination competency can positively contribute to the reduction of incomplete vaccination rates.

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#### Conflict of Interest

The authors declare that they have no conflict of interests regarding content of this article..

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#### Ethical Declaration

Ethical permission was obtained from Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee for this study with the letter dated 22.09.2021 and numbered 415, and the Helsinki Declaration criteria were taken into consideration.

#### Authorship Contributions

Concept: HD, MEG, Design: HD, FA, Supervising: MEG, HD, Data collection and entry: HD, FA, Analysis and interpretation: MEG, HD, Literature search: FA, HD, Writing: HD, FA Critical review: MEG.

### REFERENCES

1. Haverkate M, D'Ancona F, Giambi C, Johansen K, Lopalco PL, Cozza V, et al. Mandatory and recommended vaccination in the EU, Iceland and Norway: results of the VENICE 2010 survey on the ways of implementing national vaccination programmes. *Eurosurveillance*. 2012;17(22):20183. <https://doi.org/10.2807/ese.17.22.20183-en>
2. Fine P, Eames K, Heymann DL. "Herd immunity": a rough guide. *Clinical infectious diseases*. 2011;52(7):911-6. <https://doi.org/10.1093/cid/cir007>
3. Biasio LR. Vaccine literacy is undervalued. *Human vaccines & immunotherapeutics*. 2019;15(11):2552-3. <https://doi.org/10.1080/21645515.2019.1609850>
4. Anand S, Bärnighausen T. Health workers and vaccination coverage in developing countries: an econometric analysis. *The Lancet*. 2007;369(9569):1277-85. [https://doi.org/10.1016/S0140-6736\(07\)60599-6](https://doi.org/10.1016/S0140-6736(07)60599-6)
5. Leask J, Kinnersley P, Jackson C, Cheater F, Bedford H, Rowles G. Communicating with parents about vaccination: a framework for health professionals. *BMC pediatrics*. 2012;12(1):1-11. <https://doi.org/10.1186/1471-2431-12-154>
6. Wang X, Zhou X, Leesa L, Mantwill S. The effect of vaccine literacy on parental trust and intention to vaccinate after a major vaccine scandal. *Journal of health communication*. 2018;23(5):413-21. <https://doi.org/10.1080/10810730.2018.1455771>
7. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: a systematic review and integration of definitions and models. *BMC public health*. 2012;12(1):1-13. <https://doi.org/10.1186/1471-2458-12-80>
8. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Viera A, Crotty K, et al. Health literacy interventions and outcomes: an updated systematic review. *Evidence report/technology assessment*. 2011(199):1-941. <https://doi.org/10.7326/0003-4819-155-2-201107190-00005>
9. Biasio LR. Vaccine hesitancy and health literacy. *Human vaccines & immunotherapeutics*. 2017;13(3):701-2. <https://doi.org/10.1080/21645515.2016.1243633>
10. Ratzan SC. *Vaccine literacy: a new shot for advancing health*. Taylor & Francis; 2011. <https://doi.org/10.1080/10810730.2011.561726>
11. Rowlands G. Health literacy: ways to maximise the impact and effectiveness of vaccination information. *Human vaccines & immunotherapeutics*. 2014;10(7):2130-5. <https://doi.org/10.4161/hv.29603>
12. Biasio LR, Bonaccorsi G, Lorini C, Pecorelli S. Assessing COVID-19 vaccine literacy: a preliminary online survey. *Human vaccines & immunotherapeutics*. 2021;17(5):1304-12. <https://doi.org/10.1080/21645515.2020.1829315>

13. TÜİK, <https://data.tuik.gov.tr/Kategori/GetKategori?p=nufus-ve-demografi-109&dil=1>, Erişim Tarihi:22.04.2022. .
14. Durmuş A, Akbolat M, Amarat M. COVID-19 Aşı Okuryazarlığı Ölçeği'nin Türkçe geçerlilik ve güvenilirliği. *Cukurova Medical Journal*. 2021;46(2):732-41. <https://doi.org/10.17826/cumj.870432>
15. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health promotion international*. 2000;15(3):259-67. <https://doi.org/10.1093/heapro/15.3.259>
16. Inoue M, Takahashi M, Kai I. Impact of communicative and critical health literacy on understanding of diabetes care and self-efficacy in diabetes management: a cross-sectional study of primary care in Japan. *BMC family practice*. 2013;14(1):1-9. <https://doi.org/10.1186/1471-2296-14-40>
17. Ipsos. Aşı Olmayanların Yarıısı 18-35 Yaş Grubundan. [Erişim Tarihi: 6 Aralık 2021]. Erişim: <https://www.ipsos.com/tr-tr/asi-olmayanlarin-yarisi-18-35-yas-grubundan>.
18. Uzuner A, Uç D, Dikmen İ, Akman M, Sarısoy M, Güzel S, et al. Altmış beş yaş üstü erişkinlerde aşılama durumu ve bilgi düzeyleri. *The Journal of Turkish Family Physician*. 2014;5(3):19-23.
19. Arokiaraj MC. Correlation of influenza vaccination and influenza incidence on COVID-19 severity. Available at SSRN 3572814. 2020. <http://dx.doi.org/10.2139/ssrn.3572814>
20. Belongia EA, Osterholm MT. COVID-19 and flu, a perfect storm. *American Association for the Advancement of Science*; 2020. 10.1126/science.abd2220
21. Biasio L, Giambi C, Fadda G, Lorini C, Bonaccorsi G, D'Ancona F. Validation of an Italian tool to assess vaccine literacy in adulthood vaccination: a pilot study. *Ann Ig*. 2020;32(3):205-22. 10.7416/ai.2020.2344
22. Costantini H. COVID-19 Vaccine Literacy of Family Carers for Their Older Parents in Japan. *Healthcare (Basel, Switzerland)*. 2021;9(8). <https://doi.org/10.3390/healthcare9081038>