


ORIGINAL RESEARCH

Nurses' COVID-19-related fear and anxiety and their attitudes to the COVID-19 vaccine: A descriptive and correlational study

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Abstract

Background: The novel coronavirus disease 2019 has caused psychological distress such as anxiety and fear among nurses worldwide. Nurses are a creditable source of vaccine-related information and have a primary role in building confidence regarding vaccines.

Aim: The present study was designed to investigate the fear and anxiety of nurses regarding novel coronavirus disease 2019 (COVID-19) and their attitudes towards the COVID-19 vaccine. The predictors of fear, anxiety and attitudes towards the vaccine were also investigated.

Methods: A descriptive and correlational design was used. The study was conducted in three public hospitals from different parts of the Turkey, and 405 nurses from the three hospitals were recruited by stratified sampling.

Results: Anxiety and negative attitudes towards the vaccine were positively related to fear of COVID-19. Age and fear were also positively associated with anxiety related to COVID-19. Nurses who had received the vaccine and those who were fearful had a positive attitude towards the vaccine.

Conclusion: Psychosocial support programmes should be implemented to improve psychological resilience and coping strategies in nurses and organized education programmes are needed to increase positive attitudes towards vaccination.

KEYWORDS

anxiety, attitude, COVID-19, fear, nurse, vaccine

Summary statement

What is already known about this topic?

- The COVID-19 pandemic significantly affected the psychological health of nurses.
- Nurses have a fundamental function in the general acceptance of vaccines.

What this paper adds?

- Relationships were found between COVID-19-related fear, anxiety and attitudes towards the COVID-19 vaccine.
- Anxiety and a positive attitude towards the vaccine were found to be predictors of fear related to COVID-19.

- Fear related to COVID-19 and being vaccinated against COVID-19 were predictors of attitudes towards vaccination.

The implications of this paper:

- Nursing managers could organize programmes to improve the coping skills of nurses in responding to situations that cause psychological burden.
- Nursing managers could support nurses through education to develop positive attitudes towards vaccines.

1 | INTRODUCTION

The novel coronavirus, the main cause of the COVID-19 disease, has caused more than 300 million people to become ill and more than 5.5 million people to die worldwide (World Health Organization, 2022). Although there are slight differences throughout the world, different waves of the COVID-19 pandemic have occurred in Turkey. According to Worldometer (n.d.) coronavirus statistics, the first wave in the pandemic was seen in the spring of 2020 (from March to May), and the second wave was seen in the winter months (December 2020 and January 2021). The third wave was seen in the spring of 2021 (April and May), and the fourth wave appeared in January and February 2022.

As with most epidemics and pandemics, nurses have been at the forefront of the COVID-19 outbreak, offering numerous vital services to the community in the fight against the disease. Nurses are psychologically affected by such outbreaks due to the serious risks inherent in working on the front lines, as well as the long hours and fast-paced working conditions (Mekonen et al., 2020; Zhang et al., 2023). Mental problems such as burnout, stress, fear and anxiety have been experienced by nurses throughout the pandemic (Melnyk et al., 2022; Mensinger et al., 2022), due to increased workloads, the risk of infection due to constant contact with patients, insufficient protective equipment, intense working conditions, being unable to rest, living apart from family members, shelter and transportation problems, frequent changes in workplaces and witnessing the loss of too many patients (Mekonen et al., 2020; Zhang et al., 2023). Psychological distress, burnout, post-traumatic stress and insomnia are among the potential long-term effects of the pandemic (Sagherian et al., 2022). For this reason, it is vital to assess the emotional reactions of nurses during and after the pandemic.

The most promising remedy for containing the pandemic has been the development of a harmless and effective vaccine against COVID-19 (Gu et al., 2022; Kwok et al., 2021). The World Health Organization and the US Centers for Disease Control and Prevention have recommended COVID-19 vaccination for all appropriate people (Gu et al., 2022; Toth-Manikowski et al., 2022). In December 2020 and February 2021, emergency authorization for the use of different COVID-19 vaccines was granted by the US Food and Drug Administration, and in many countries, healthcare providers were identified as the first groups to receive the vaccination (Gu et al., 2022; Khubchandani et al., 2022; Toth-Manikowski et al., 2022). However,

with the onset of vaccination practices for COVID-19, anti-vaccine opposition has also been observed. Factors such as safety and efficacy concerns about the newly developed COVID-19 vaccine as well as the possibility of side effects that may develop in the short or long term have caused people to approach the vaccine with caution (Gu et al., 2022; Khubchandani et al., 2022). Despite the comprehensible and recognized advantages of COVID-19 vaccines, many people—including healthcare workers—continue to be resistant to the vaccine (Gu et al., 2022).

The World Health Organization (2022) vaccine advisory group emphasized the role of healthcare professionals in building community confidence in vaccines. Nurses, who make up the largest number of healthcare professionals, need to have a clear understanding of the advantages and dangers of a given vaccine so that they can feel confident in advising their colleagues and the community (Rabi et al., 2021). The opinions of nurses, who are role models for patients, about vaccine acceptance or rejection directly affect the public's thoughts on this issue. Because they are seen as a reliable source of information about vaccines, nurses' own attitudes towards vaccines can increase public confidence (Filiz & Kaya, 2019). Evidence-based interventions could thus reduce COVID-19 vaccine rejection and hesitation among nurses, which would enable nurses to have a key role in assisting the general community vaccinate against COVID-19 (Khubchandani et al., 2022).

There have been several studies on nurses' level of fear and anxiety (Hu et al., 2020; Labrague & de Los Santos, 2020, 2021) and their attitudes towards the COVID-19 vaccine (Baniak et al., 2021; Wang et al., 2020). However, the relationship between nurses' fear, anxiety and attitudes towards the COVID-19 vaccine, as well as the predictors of psychological burden in this pandemic, remains unknown. The present study may contribute to the development of strategies to protect the psychological health of nurses and increase their resilience by determining the emotional impact of the pandemic on nurses. Raising awareness about vaccination could also guide the development of appropriate policies to improve the acceptability and spread of COVID-19 vaccine programmes.

The present study was designed to investigate the level of fear and anxiety among nurses regarding COVID-19 and their attitudes towards the COVID-19 vaccine. The research questions were:

- What is the level of COVID-19-related fear among nurses?
- What is the level of anxiety related to COVID-19 among nurses?

- What are the risk factors for COVID-19-related fear, anxiety and attitudes towards the vaccine?
- Are there any relationships between COVID-19-related fear, anxiety and attitudes towards the vaccine?

2 | METHOD

2.1 | The study design and participants

A descriptive and correlational design was used. The target population of the study consisted of nurses working in three different public hospitals ($N = 1274$) in Turkey. To determine the sample size, power analysis was carried out based on a previous study (Labrague & de Los Santos, 2021), and the sample size was calculated as at least 305 with 80% power, a 95% confidence interval and a 5% margin of error. Nurses from three hospitals were selected by stratified sampling. First, nurses were divided into three strata by hospital. Second, the weight of each layer was calculated to make a proportional selection. The minimum number of nurses to be included in each layer was then determined. The researchers planned to recruit 40% more nurses from each layer than required for the minimum sample size. For the study, 110 nurses from the first hospital, 246 nurses from the second hospital and 71 nurses from the third hospital were recruited. The study was completed with 405 nurses.

The inclusion criteria were being 18 years and older and volunteering to participate in the research. Exclusion criteria included being on leave on the dates of the research (e.g. due to pregnancy, childbirth or illness).

2.2 | Setting

The study was conducted in three public hospitals in different parts of Turkey. One of the hospitals is located in the west, one is located in the centre of the country, and the other is located in the middle eastern part of the country. When the number of cases of COVID-19 increased in hospitals during the pandemic, some inpatient services (e.g. internal medicine, neurology) and intensive care units (e.g. internal, anaesthesia, neurology) served as COVID-19 service areas. During the pandemic, nurses' annual or administrative leaves (except for risky situations such as pregnancy, childbirth or chronic diseases) were suspended by the Ministry of Health; all nurses thus worked throughout the pandemic and all of its waves.

2.3 | Instruments

Data were collected using a participant information form, the fear of COVID-19 scale, the coronavirus anxiety scale and the attitudes towards the COVID-19 vaccine scale. The participant information form, based on the literature (De Los Santos & Labrague, 2021; Labrague & de Los Santos, 2021; Wang et al., 2020), consisted of

questions to determine the respondent's age, gender, education level, income level, working time, unit, shift, working status in the COVID-19 service/intensive care unit, having COVID-19 and COVID-19 vaccination status.

The fear of COVID-19 scale was developed by Ahorsu et al. (2020). The scale has one dimension and seven items, which are rated on a 5-point Likert (1 = *strongly disagree*, 5 = *strongly agree*) grading system. The scores from the scale range from 7 to 35. The total score shows the COVID-19 fear level experienced by the individual. In the Turkish validity and reliability study, performed by Bakioğlu et al. (2021), the confirmatory factor analysis indicated that goodness of fit indices were found to be at a good level ($\chi^2 = 22.08$, $SD = 9$, $p < 0.001$, $\chi^2/SD = 2.45$, $RMSEA = 0.03$, $CFI = 0.99$, $IFI = 0.99$, $GFI = 0.99$, $AGFI = 0.99$, $NFI = 0.99$, $TLI = 0.99$, $RFI = 0.99$, $SRMR = 0.014$). The factor load values of the items were determined to vary between 0.73 and 0.82. The corrected item-total correlations of the scale items were found to range from 0.62 to 0.72, the variance rate explained was 58.9%, and Cronbach's alpha internal consistency coefficient was determined as 0.88 (Bakioğlu et al., 2021). In the present study, the Cronbach's alpha value was 0.91. Furthermore, this scale was confirmed as a valuable and brief instrument that may provide useful information for intervention in other studies (Reznik et al., 2021; Satici et al., 2021).

The coronavirus anxiety scale was developed by Lee (2020) as a brief mental health screening to identify possible cases of dysfunctional anxiety related to COVID-19. This five-item scale is one dimension. Each item is rated on a 5-point Likert scale to reveal symptom frequency, ranging from 0 (*not at all*) to 4 (*nearly every day*) over the previous 2 weeks. The total score obtained from the scale reflects the level of anxiety related to COVID-19, and a cut-off score ≥ 9 indicates dysfunctional anxiety. The adaptation of the Turkish form was conducted by Biçer et al. (2020). The goodness of fit of the model obtained in the confirmatory factor analysis was found significant ($\chi^2/SD = 4.975$, $p < 0.001$). Other fit indices ($RMSEA = 0.092$, $GFI = 0.980$, $AGFI = 0.939$, $CFI = 0.976$, $NFI = 0.971$, $TLI = 0.953$ and $IFI = 0.976$) revealed that the single factor model showed good fit. Factor loadings on the items of the scale vary between 0.625 and 0.784, and the variance rate explained was 60.5%. The Cronbach's alpha reliability coefficient was 0.83 (Biçer et al., 2020). In this study, the Cronbach's alpha value was 0.92.

The attitudes towards the COVID-19 vaccine scale was developed by Geniş et al. (2020). The scale has nine items and has two sub-dimensions: positive attitude (items 1–4) and negative attitude (items 5–9). The scale is evaluated on a 5-point Likert, ranging from 1 (*strongly disagree*) to 3 (*undecided*) to 5 (*strongly agree*). High scores in the positive attitude sub-dimension indicate a positive attitude towards the vaccine. Items in the negative attitude sub-dimensions are scored inversely and are calculated after being reversed; high scores indicate a less negative attitude towards the vaccine. After the confirmatory factor analysis, good fit indices were observed ($\chi^2 = 93.805$, $df = 25$, $p < 0.001$, $\chi^2/df = 3.752$, $RMSEA = 0.057$, $SRMR = 0.039$, $GFI = 0.977$, $AGFI = 0.959$, $NFI = 0.986$ and $CFI = 0.989$). Factor loads of the scale were determined between

0.649 and 0.972, and the variance rate explained was 70%. The Cronbach's alpha value is 0.96 for the positive attitude subscale, 0.78 for the for negative attitude subscale and 0.80 for the entire scale (Geniş et al., 2020). In the present study, the Cronbach's alpha value was 0.94 for the positive attitude sub-dimension, 0.81 for negative attitude sub-dimension and 0.91 for the total scale.

2.4 | Procedure

Data were collected online between May and September 2021. Data collection tools were prepared as an online survey with Google Forms. A list of nurses working in each clinic was obtained from the nursing managers. Nurses were interviewed face-to-face both to obtain informed consent after the explanation of the research and to collect data. Nurses who agreed to participate in the study were sent an online survey on their mobile phones during working hours by the researcher and were asked to complete it under the observation of the researchers. The researcher then put a tick on the list of nurses next to the name of the nurse who completed the instruments; this ensured that each nurse answered the questionnaire only once. The implementation of the data collection tools took an average of 10–15 min.

2.5 | Data analysis

To reduce bias in the design of this study, the stratified sampling method was used, and instruments were sent to nurses working at different hospitals. Data were evaluated with the IBM Statistical Package for Social Sciences for Windows version 25.0 (IBM Corp., Armonk, NY). Descriptive statistics are presented with frequency, percentage, mean and standard deviation. The normal distribution was evaluated with kurtosis/skewness values ± 2 . Relationships between COVID-19-related fear, anxiety about COVID-19, attitudes towards vaccines and descriptive characteristics were examined with univariate and multiple linear regression models. Independent variables that were significant in the simple model were included in the multiple linear regression analysis, in which the backward selection method was used in the selection of the independent variables. The significance level was accepted as $p < 0.05$.

2.6 | Ethical consideration

Gazi University Ethics Commission approved the study (2021-405). Before the research, institutional permission was provided from the Ministry of Health Sciences Research Platform and the Provincial Health Directorate for each affiliated hospital. Nurses provided both written and verbal informed consent before the implementation of the survey.

3 | RESULTS

Of the recruited nurses ($N = 427$), 22 nurses (21 from the second hospital and one from the third hospital) declined the invitation to participate.

The mean age of the nurses was 29.81 ± 6.53 , 76.3% were women, 50.4% were married, 75.1% had completed an undergraduate degree, 61% of the nurses stated that their income was equal to their expenses, 55.1% had worked in the profession for 1–5 years, and 33% worked in the emergency department. Out of the entire sample, 52.8% worked in the COVID-19 service, 39% had had COVID-19, and 85.7% had received the COVID-19 vaccine (Table 1).

TABLE 1 Descriptive characteristics of nurses ($n = 405$).

Descriptive characteristics		
Age (mean \pm SD)	29.81 \pm 6.53	
	<i>n</i>	%
Gender		
Female	309	76.3
Male	96	23.7
Marital status		
Single	201	49.6
Married	204	50.4
Education level		
High school	35	8.6
Undergraduate	304	75.1
Graduate	66	16.3
Income level		
Income is less than expense	89	22.0
Income is equal to expense	247	61.0
Income is more than expense	69	17.0
Employment (year)		
1–5 years	223	55.1
5–10 years	75	18.5
10 years and more	107	26.4
Work shift		
From 8 AM to 8 AM (a 24-h shift)	284	70.1
From 8 AM to 4 PM	85	21.0
From 4 PM to 8 AM	36	8.9
Work unit		
Emergency department	135	33.3
Intensive care unit	76	18.8
Inpatient clinics	120	29.6
Operating room	28	6.9
Polyclinics	46	11.4
Working in COVID-19 unit		
Yes	214	52.8
No	191	47.2
Having COVID-19		
Yes	161	39.8
No	244	60.2
Having COVID-19 vaccine		
Yes	347	85.7
No	58	14.3

3.1 | Fear related to COVID-19 and risk factors

The mean score for the COVID-19-related fear scale was 19.02 (*SD* = 6.76). The working unit of the nurse, having received the COVID-19 vaccine, anxiety, positive attitude and a negative attitude towards COVID-19 vaccine were determined to have a significant relationship with COVID-19-related fear in the univariate regression analysis. These variables were included in the multiple linear regression model. The model consisting of negative attitudes towards the vaccine and COVID-19-related anxiety explained approximately 42% of the variance in COVID-19-related fear (adjusted $R^2 = 0.42$, $p < 0.001$). Anxiety ($\beta = 0.579$) and negative attitudes towards the

vaccine ($\beta = 0.229$) were positively associated with fear of COVID-19. Accordingly, COVID-19 fear was higher in nurses who were anxious and those with a negative attitude towards the vaccine (Table 2).

3.2 | Coronavirus anxiety and risk factors

The mean score for the coronavirus anxiety scale was 7.68 (*SD* = 3.93). Using a score ≥ 9.0 as the cut-off, 28.4% of the nurses had dysfunctional anxiety levels. Age, having received the COVID-19 vaccine, fear and a positive attitude towards COVID-19 vaccines were

TABLE 2 Predictors of the fear of COVID-19.

Variables	Simple model			Multiple model		
	B (95% CI for B)	β	<i>p</i>	B (95% CI for B)	β	<i>p</i>
Age (Ref: 18–24 years)	0.60 (–0.61–1.83)	0.048	0.331	–	–	–
Gender (Ref: Male)	1.36 (0.19–2.91)	0.086	0.085	–	–	–
Marital status (Ref: Married)	0.67 (0.64–1.99)	0.050	0.315	–	–	–
Education level (Ref: High school)	0.13 (1.47–1.21)	0.010	0.849	–	–	–
Income (Ref: Less than expense)	0.23 (–0.57–1.03)	0.028	0.573	–	–	–
Employment (Ref: ≥ 5 years)	–0.01 (–0.78–0.75)	0.002	0.967	–	–	–
Having COVID-19 (Ref: No)	0.81 (0.53–2.16)	0.059	0.239	–	–	–
Working in COVID-19 unit (Ref: Yes)	0.92 (0.40–2.224)	0.068	0.172	–	–	–
Work unit (Ref: Emergency)	0.60 (0.10–1.10)	0.118	0.017	–	–	–
Having COVID-19 vaccine (Ref: No)	3.59 (1.73–5.45)	0.186	<0.001	–	–	–
Anxiety	1.03 (0.90–1.17)	0.605	<0.001	0.99 (0.03–0.73)	0.579	<0.001
Positive attitude towards vaccine	1.60 (0.96–2.25)	0.237	<0.001	–	–	–
Negative attitude towards vaccine	2.52 (1.69–3.34)	0.287	<0.001	2.01 (1.35–2.67)	0.229	<0.001

Abbreviations: B, unstandardized coefficient; CI, confidence interval; Ref, reference; β , standardized coefficient.

TABLE 3 Predictors of COVID-19-related anxiety.

Variables	Simple model			Multiple model		
	B (95% CI for B)	β	<i>p</i>	B (95% CI for B)	β	<i>p</i>
Age (Ref: 18–24 years)	0.88 (0.17–1.59)	0.121	0.014	0.63 (0.10–1.24)	0.092	0.020
Gender (Ref: Male)	0.55 (0.34–1.46)	0.060	0.226	–	–	–
Marital status (Ref: Single)	0.43 (0.33–1.20)	0.055	0.267	–	–	–
Education level (Ref: High school)	0.51 (0.26–1.29)	0.065	0.195	–	–	–
Income (Ref: Less than expense)	0.22 (–0.24–0.69)	0.048	0.339	–	–	–
Employment (Ref: ≥ 5 years)	0.14 (–0.30–0.59)	0.031	0.531	–	–	–
Having COVID-19 (Ref: No)	0.27 (–0.51–1.06)	0.034	0.495	–	–	–
Work unit (Ref: Emergency)	0.19 (0.10–0.48)	0.064	0.199	–	–	–
Working in COVID-19 unit (Ref: No)	0.48 (0.28–1.25)	0.062	0.215	–	–	–
Having COVID-19 vaccine (Ref: No)	1.46 (0.37–2.55)	0.130	0.009	–	–	–
COVID-19-related fear	0.35 (0.30–0.39)	0.605	<0.001	0.34 (0.30–0.39)	0.600	<0.001
Positive attitude towards vaccine	0.50 (0.110.88)	0.127	0.011	–	–	–
Negative attitude towards vaccine	0.47 (0.02–0.97)	0.092	0.064	–	–	–

Abbreviations: B, unstandardized coefficient; CI, confidence interval; Ref, reference; β , standardized coefficient.

determined to have a significant relationship with coronavirus anxiety in univariate regression analysis and were included in the multiple linear regression model. The model consisting of age and fear of COVID-19 explained approximately 37% of the variance in coronavirus anxiety (adjusted $R^2 = 0.37$, $p < 0.001$). Age ($\beta = 0.092$) and fear ($\beta = 0.600$) were positively associated with coronavirus anxiety, and coronavirus anxiety was higher in nurses who were older and those who were fearful (Table 3).

3.3 | Attitudes towards COVID-19 vaccine and risk factors

The mean score for the positive attitudes towards the coronavirus vaccine subscale was 15.06 ($SD = 3.99$), and the mean score for the negative attitudes subscale was 12.22 ($SD = 3.84$). Univariate regression analysis revealed that having received the COVID-19 vaccine, anxiety and fear were associated with positive attitudes towards COVID-19 vaccines. Multiple linear regression analysis determined that the model consisting of having received the vaccine and fear of COVID-19 explained approximately 23% of the variance in attitudes towards the vaccine (adjusted $R^2 = 0.23$, $p < 0.001$). Nurses who had received the vaccine ($\beta = 0.429$) and those who were fearful ($\beta = 0.158$) had a positive attitude towards the vaccine.

3.4 | Correlations between COVID-19-related fear, anxiety and attitudes towards the vaccine

There was a moderate positive association between COVID-19-related fear and anxiety ($r = 0.610$, $p < 0.001$), a weak positive relationship between COVID-19-related fear and positive attitudes towards the vaccine ($r = 0.240$, $p < 0.001$) and a weak negative association between COVID-19-related fear and negative attitudes towards the vaccine ($r = -0.290$, $p < 0.001$). A weak positive relationship was found between anxiety and positive attitude towards the vaccine ($r = 0.130$, $p = 0.011$), and a weak positive association was found between the score of the coronavirus anxiety scale and age ($r = 0.110$, $p = 0.029$).

4 | DISCUSSION

The current research was conducted to investigate the level of fear and anxiety among nurses regarding COVID-19 and their attitudes towards the COVID-19 vaccine. This is one of the first studies to investigate fear, anxiety and attitudes towards vaccines among nurses, as well as the relationship between these parameters. These contributions will help to identify important outcomes in the field of nursing. The psychological burden of COVID-19 on nurses, including fear and anxiety, has increased due to the risk of being infected or involuntarily transmitting the disease to others during the COVID-19 pandemic, as

well as due to the irregular and comprehensive work schedules and the lack of personnel protective equipment (Amin, 2020; De Los Santos & Labrague, 2021). The present study determined that nurses experienced moderate fear of COVID-19. Similarly, a study conducted in five European countries (Greece, Albania, Cyprus, Spain and Kosovo) revealed that most of the nurses displayed moderate levels of COVID-19 fear (Patelarou, Galanis, et al., 2022). Despite the changes during the pandemic, nurses' fears of being infected and the risk of infecting others were at medium and high levels.

In addition to fear, 28.4% of the nurses showed dysfunctional anxiety levels. This finding indicates that nearly one out of every three nurses was anxious; this is in line with the findings of prior studies. Labrague and de Los Santos (2020), for example, found that 37.8% of nurses had dysfunctional anxiety levels, and in studies using different measurement tools, the prevalence of anxiety among nurses varied between 18.1% and 37% (Al Maqbali et al., 2021; Santabárbara et al., 2021; Zheng et al., 2021). Although there have been changes and developments related to the handling of COVID-19 since the start of the pandemic, anxiety among nurses remains. The authors thought that the anxiety level of the nurses may have increased due to the inability to control the number of cases, the emergence of virus variants, the increase in nursing workload and the continuing uncertainties in the care process.

Multiple linear regression analysis emphasized that some characteristics of nurses were significant determinants of fear and anxiety related to COVID-19. Nurses who had a negative attitude towards vaccines and those who were anxious about the disease were more likely to be fearful of COVID-19. A study conducted in multiple countries (Brazil, Italy, Spain and Turkey) found that fear of COVID-19 was high in nurses who were worried about themselves or their relatives because of infection (Baysal et al., 2022). Lockett et al. (2021) found that fear of becoming infected with influenza during a pandemic was common among the nurses. Moreover, the current study determined that the level of anxiety increased as the nurses' age and fear level increased. The prognosis for COVID-19 may be more severe in older people, and this situation may have increased the anxiety of older nurses. The current study found that factors such as working shift, unit of work, working status during COVID-19 service and having COVID-19 were not associated with fear and anxiety. Similarly, Ünver and Yeniğün (2021) found that nurses' working shift and diagnosed with COVID-19 were not associated with fear. Conversely, Cho et al. (2021) revealed significant differences in fear and anxiety level according to COVID-19-related work type in nurses, but work experiences and position were not associated with fear and anxiety levels. The results of the current study could be related to the decrease in the number of cases and the increase in vaccination rates among nurses during the study period.

It is important to reduce nurses' fear and anxiety related to COVID-19, because they are at the forefront of the pandemic care process. The vaccine is currently thought to be one of the most effective methods of protection against the disease, but there are various attitudes towards vaccines produced for COVID-19. Concerns about the safety, efficacy and potential adverse effects of vaccines, especially

among healthcare professionals, can drive vaccine acceptance (Baniak et al., 2021; Halbrook et al., 2022; Wang et al., 2020) or hesitation (Baniak et al., 2021; Biswas et al., 2021; Halbrook et al., 2022; Shekhar et al., 2021). A study conducted by Boragno et al. (2023) revealed that healthcare providers more frequently used words with 'trust' and 'safety' themes about the vaccine compared to non-healthcare providers. The current study found that nurses' scores on the positive attitude towards the COVID-19 vaccine subscale were higher than their negative attitude scores. It is thought that revealing the changing course of the pandemic and the effects of vaccines on this progress affected the responses given at the time of the study (Meyer et al., 2021; Wang et al., 2020). The present study also found that the attitudes of nurses who had received the COVID-19 vaccine and had a higher level of fear towards the vaccine were more positive. This finding shows that nurses who are afraid of being infected with the virus have more positive attitudes towards the COVID-19 vaccine. A study performed in five European countries (Greece, Albania, Cyprus, Spain and Kosovo) found that nurses who reported higher rates of fear about COVID-19 were more willing to be vaccinated (Patelarou, Saliaj, et al., 2022). It appears that there is little difference in terms of the country where the nurses work and that fear of COVID-19 commonly affects the attitude of nurses towards the vaccine positively. It is thus important to develop strategies to ensure the continuity of interventions to increase nurses' positive attitude towards vaccines.

4.1 | Limitations

This study has several limitations. The results of the research can only be generalized to the nurses working in the three hospitals where the data were collected. Another limitation of the study is that the data obtained from the study were based on the nurses' own statements and reflect the answers given based on the course of the pandemic that was current at the time of the study. Nurses who were on leave when the data collection tools were applied could not be reached. Because the research was performed with a correlational design, causal inferences cannot be made. Another limitation was the lack of suitable studies in the literature to compare the measurement tools used for the group of nurses.

5 | CONCLUSION

Based on the results, nurses experienced moderate levels of COVID-19-related anxiety and fear, and many had a positive attitude towards the COVID-19 vaccine. To alleviate some of this anxiety and fear, nurses could alternate working in COVID-19 clinics and in non-COVID-19 areas. The number of nurses should be increased in high stress COVID-19 areas when necessary, and nurses should be provided with the necessary personal protective equipment support. In addition, professional support should be provided to nurses experiencing fear and anxiety, and social support systems should be strengthened to maintain their communication with their families and

relatives. Education programmes regarding the safety and efficiency of the vaccines, as well as the struggle with fear, should be designed to increase positive attitudes towards vaccination. A comprehensive prevention system including epidemiological monitoring, screening and referral should be constructed to reduce psychological burden. Experimental studies should be planned to improve the psychological health of nurses and their attitudes towards vaccination.

AUTHORSHIP STATEMENT

Study conception and design: SAA, AE, DK, SK, TE. *Data collection:* DK, SK, TE. *Data analysis and interpretation:* SAA, AE. *Drafting of the article:* SAA, AE, DK. *Critical revision of the article:* SAA, AE, DK.

CONFLICT OF INTEREST STATEMENT

The authors report no actual or potential conflict of interest.

DATA AVAILABILITY STATEMENT

The data for this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

This study was approved by the Ethics Commission of Gazi University (2021-405).

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