Original Research Article

Determining the knowledge and anxiety levels of cleaning workers regarding Covid-19 and their attitudes toward the vaccine

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Abstract

Introduction and objective: Cleaning workers, who may contact with contaminated waste, are considered a high-risk group during the COVID-19 pandemic. The high transmission rate of the COVID-19 virus, its elevated mortality rate, the lack of effective antiviral treatment, and the inclusion of these workers in the high-risk group during the pandemic may lead to increased anxiety among workers. This study, conducted with a relational descriptive research model, aims to determine the knowledge, anxiety levels, and attitudes towards the vaccine among cleaning workers regarding COVID-19.

Materials and methods: The study was conducted with 217 cleaning workers. To collect the data, a questionnaire form including the participants' descriptive characteristics, the COVID-19 Anxiety Scale, and the Attitudes toward COVID-19 Vaccine Scale were used.

Results: The knowledge level of cleaning workers regarding COVID-19 did not show a significant difference in attitudes toward the vaccine. Those who received the COVID-19 vaccine showed significantly higher positive and negative attitudes toward the vaccine compared to those who did not get vaccinated. The study did not determine a significant relationship between COVID-19 anxiety and attitudes toward the COVID-19 vaccine. However, it identified a moderate positive relationship between positive and negative attitudes toward the vaccine.

Conclusion: The research results revealed cleaning workers to have low levels of COVID-19 anxiety and moderate levels of both positive and negative attitudes toward vaccine.

Key words

Anxiety, COVID-19, Attitudes toward COVID-19 vaccine, Cleaning workers, Pandemic-related anxiety.

Introduction

Throughout history, humanity has experienced numerous natural disasters. Among the most significant disasters faced by humans since their existence are, undoubtedly, epidemics [1]. Epidemics have severely impacted individuals, communities, and states, causing a large number of deaths, and significantly disrupting the global economy and social life [2]. Some of the major epidemics humanity has encountered include the Black Plague, Cholera, the Spanish Flu, Avian Flu, Swine Flu, Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS) [3], and the Corona virus Disease 2019 (COVID-19 / SARS-CoV-2), described as the pandemic of our era [4].

The COVID-19 pandemic has left humanity helpless worldwide, causing profound changes and challenges across all areas of society, particularly in healthcare [5]. Global efforts to mitigate the effects of the pandemic have undoubtedly relied largely on preventive measures [6]. In this sense, the closure of workplaces, schools, social spaces, and all other places where people gather in large numbers was among the first measures implemented. Despite these precautions, COVID-19 has evolved from affecting institutions or specific countries or societies into a global situation concerning all communities [5]. Therefore, with the recommendations of the WHO and the support of governments, scientific authorities and the pharmaceutical industry have made significant efforts to develop effective and safe vaccines for COVID-19 [6]. Due to the absence of any medication specifically developed for treating people infected during the pandemic, numerous countries and research companies initiated vaccine development efforts. Toward the end of the first year of the pandemic, the Sinovac vaccine, developed in China, was used against COVID-19. Later, the Sputnik V, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, and Johnson & Johnson vaccines were developed and used [7, 8]. In addition, a vaccine called Turkovac was developed in Turkey [9].As the use of vaccines became more widespread, both positive and negative information about COVID-19 vaccines began to emerge. This information spread rapidly, particularly through social media platforms. Many people avoided getting vaccinated and prevented their loved ones from doing so due to numerous unfounded claims and theories, particularly propagated by vaccine opponents [10]. Because it is difficult to predict public perceptions of vaccines in advance, scientific studies have been conducted to assess people's attitudes toward vaccines and vaccination policies have been developed and implemented accordingly. As vaccinations became more widespread, the fatality rate of the disease decreased, leading to decreased COVID-19 measures [5, 11, 12, 10].

Individuals in society face various risks related to COVID-19 due to various factors, including gender, age, ethnicity, education, and profession [13]. The risk associated with specific occupational groups is particularly significant [14]. One of the most at-risk groups during epidemics is cleaning workers [15]. Due to the nature of their work, they are responsible for collecting waste that poses significant health risks. Cleaning workers face various dangers depending on the type of work they perform and the environment they work in. While many occupational groups had the opportunity to work from home as part of the precautions taken at the beginning of the pandemic, cleaning workers continued to perform their duties without interruption from outer world [14].

The high transmission rate of the COVID-19 virus, its elevated mortality rate, the lack of effective antiviral treatment, and the inclusion of

these workers in the high-risk group during the pandemic may lead to increased anxiety among workers. This anxiety can negatively impact thoughts, emotions, and physical health. As it can result in issues like distraction, excessive sweating, and focus problems, it poses an additional risk for cleaning workers who are in the high-risk group [16, 17]. It is normal for individuals to experience heightened anxiety due to the uncertainty during pandemic periods. Studies conducted on the effects of past pandemics on people's psychology have reported that pandemics lead to an increase in stress and anxiety symptoms [18].

A review of the literature shows that during pandemics such as SARS, Swine Flu, Ebola, and COVID-19, healthcare workers and the general public experienced conditions like stress, depression, anxiety, post-traumatic stress disorder, worry, and mental health disorders [19, 16, 20, 21, 22, 23, 24]. In addition, a cross-sectional and quantitative study measuring the anxiety, depression, and stress levels of cleaning and healthcare workers during and after quarantine found that cleaning workers experienced high levels of stress and anxiety during the pandemic [25]. A study conducted in Iran reported that environmental service workers (housekeepers and cleaners) had a significantly higher likelihood of contracting COVID-19 compared to other healthcare workers in the same institutions [26]. Considering all these factors, the absence of studies on cleaning workers, who are in the high-risk group due to their work, and the relevance of the topic highlight the importance of assessing their knowledge about COVID-19, anxiety levels, and attitudes toward vaccines. This assessment is expected to make a significant contribution to the literature and to efforts in combating the pandemic, given the crucial role cleaning workers play in protecting public health through their work.

Materials and methods

This correlational descriptive study was conducted between September 20, 2021 and December 31, 2021, with 217 workers at Istanbul Başakşehir Municipality. The data were collected in the gathering areas of cleaning workers during shift change hours, considering pandemic conditions. To collect data, the study utilized a questionnaire form, the COVID-19 Anxiety Scale developed by Lee (2020) [27] and adapted into Turkish by Evren, et al. (2022) [28], and the Attitudes toward COVID-19 Vaccine Scale developed by Geniş, et al. (2020) [29]. Ethical approval for the research was obtained from the Health Sciences Ethics Committee of MuğlaSıtkıKoçman University on September 15, 2021, with decision number 204.

COVID-19 Anxiety Scale: The scale, comprising five Likert-type questions, is scored as follows: "never = 0," "rarely = 1," "less than one or two days = 2," "a few days = 3," "more than 7 days = 4," and "almost every day in the last two weeks = 5." Since the COVID-19 Anxiety Scale does not have subscales, the reliability was determined using the Cronbach's alpha coefficient calculation method. In its original form, the Cronbach's alpha value of the scale was found to be 0.930, while the Cronbach's alpha value of the adapted Turkish version was 0.832 [30, 31]. In the current study, the Cronbach's alpha coefficient was 0.843.

Attitudes Toward COVID-19 Vaccine Scale: This scale consists of two subscales, including positive attitudes and negative attitudes. The five-point items are scored as "I strongly disagree" (1), "I disagree" (2), "I am indecisive" (3), "I agree" (4), and "I strongly agree" (5). Items in the negative attitude subscale (items 5-9) are reverse-scored. High scores obtained from the positive attitude subscale (items 1-4) indicate a positive attitude toward the vaccine. After reversing the items in the negative attitude subscale, the scores are calculated, with higher scores in this subscale indicating a lower negative attitude toward the vaccine [32]. The Cronbach's alpha coefficient for the Attitudes toward COVID-19 Vaccine Scale was 0.80. In

this study, the Cronbach's alpha coefficient was 0.796.

A statistical software was used to analyze the data obtained from the study. The Kolmogorov-Smirnov test was employed to assess the normality of the data distribution. For data analysis, the independent samples t-test, Mann-Whitney U test, and Kruskal-Wallis H test were used. Spearman's correlation analysis was performed to determine the relationship between numerical variables. The results were evaluated at a 95% significance level ($p<0.05$). The dependent variables of the study were socio-demographic characteristics (age, gender, marital status, education level, etc.), while the independent variables comprised the total and subscale mean scores of the COVID-19 Anxiety Scale and the Attitudes toward COVID-19 Vaccine Scale.

Limitations of the Study

This study has some limitations. First, the data were collected from cleaning workers in a specific region, which may limit the generalizability of the findings to other populations. Second, the study relied on self-reported questionnaires, which may be subject to response bias.

Disclosure

This article is based on the master's thesis titled 'Determination of Cleaning Workers' Knowledge and Anxiety Levels Regarding COVID-19 and Their Attitudes Towards the Vaccine,' which was completed in 2023 at MuğlaSıtkıKoçman University, Institute of Health Sciences, under the supervision of Prof. Dr. Media SUBAŞI BAYBUĞA.

Results

Table - 1 shows the distribution of the demographic characteristics of the cleaning workers. Among the individuals, 93.5% are male and 6.5% are female. A total of 46.1% are in the 35-44 age group, while 1.8% are in the 55-65 age group. Of the cleaning workers, 47.0% have a primary school education, while 1.4% have a university/graduate education. Among the participants, 67.3% stated that they have a moderate level of knowledge about COVID-19, 17.5% had heard of COVID-19 but considered their knowledge insufficient, and 13.8% reported having expert-level knowledge of COVID-19. The study also found that 80.6% of the cleaning workers or their close circles had contracted COVID-19. Of those whose relatives contracted COVID-19, 58.7% recovered at home, while 17.7% reported the death of a relative due to COVID-19. Among those who had contracted COVID-19 themselves, 75% were treated at home, 22.5% were treated at the hospital service, and 2.5% were treated in intensive care. Of the cleaning workers, 59.9% believed that the Ministry of Health's measures were necessary, stating that they always followed them, 36.4% believed the measures were unnecessary but sometimes followed them or didn't pay much attention, and 3.7% found the measures unnecessary and either didn't follow them or only did so due to obligation. Among them, 82% followed news related to COVID-19, 28.1% met their friends and relatives every day during the pandemic, 47.9% met them once or several times a week, and 15.2% met them once or several times a month. Of them, 24.4% did not receive the COVID-19 vaccine, while 52.1% received the Biontech vaccine, 17.1% received both Sinovac and Biontech, and 6.5% received only Sinovac.

Table – 1: Descriptive attributes of cleaning workers (n=217).

Attributes	**n**	**%**
Sex		
Female	14	6.5
Male	203	93.5
Age		

18-24	8	3.7
25-35	79	36.4
35-44	100	46.1
45-54	26	12
55-65	4	1.8
Education level		
Literate	21	9.7
Primary school	102	47
Secondary school	71	32.7
High school	20	9.2
University/Graduate	3	1.4
Evaluation of COVID-19 knowledge		
Never heard of COVID-19	3	1.4
Heard of COVID-19 but my knowledge is insufficient	38	17.5
I have moderate knowledge of COVID-19:	146	67.3
I have expert-level knowledge of COVID-19:	30	13.8
Presence of COVID-19 in the individual/close circle		
Yes	175	80.6
No	42	19.4
Method of recovery from COVID-19 in the close circle		
Home treatment	103	58.9
Inpatient treatment	41	23.4
Death	31	17.7
Method of recovery from COVID-19 of the individual		
Home treatment	90	75
Treatment at the service	27	22.5
Intensive care treatment	3	2.5
Thoughts on the measures of the Ministry of Health		
I think they are necessary and I always implement them	130	59.9
I find them necessary, but I sometimes implement them, while sometimes I don't pay attention.	79	36.4
I consider them unnecessary; I do not implement them or I implement them due to obligation	8	3.7
Following COVID-19 related news		
I do	178	82
I do not	39	18
The frequency of meeting with friends and relatives during the pandemic		
Everyday	61	28.1
Once or several times a week	104	47.9
Once or several times a month	33	15.2
Once or several times a year	9	4.1
Not meeting	10	4.6
COVID-19 vaccination status		
Yes	164	75.6
No	53	24.4
Type of COVID-19 vaccine preferred		

Biontech	113	52.1
Sinovac	14	6.5
Biontech – Sinovac	37	17.1

n: number %: percent

Table - 2 presents the mean scores of COVID-19 anxiety levels in relation to certain socio-demographic characteristics of the cleaning workers. The table shows no statistically significant difference between COVID-19 anxiety levels and gender, age, and education level ($p>0.05$). However, considering the COVID-19 anxiety levels in relation to the workers' knowledge about COVID-19, there was a statistically significant difference ($p<0.05$). Cleaning workers who reported having expert-level knowledge of COVID-19 had significantly lower anxiety levels. The analysis of the cleaning workers' knowledge about COVID-19 prevention in relation to their COVID-19 anxiety levels showed that workers who had good knowledge of prevention had lower anxiety levels. However, the difference was not statistically significant ($p>0.05$). The COVID-19 anxiety levels were also examined based on whether the cleaning workers or their close circles had contracted COVID-19, showing no statistically significant difference ($p>0.05$). Furthermore, the way in which the cleaning workers or their relatives recovered from COVID-19 was assessed using the COVID-19 Anxiety Scale, and this too was not significant ($p>0.05$). Additionally, the cleaning workers' views on the Ministry of Health's COVID-19 measures were evaluated using the COVID-19 Anxiety Scale, with no significant difference between the scores ($p>0.05$). The analysis of whether cleaning workers followed COVID-19-related news in relation to their COVID-19 anxiety levels revealed that those who followed the news had higher anxiety levels. However, the difference in scores between the groups was not significant ($p>0.05$). The analysis of cleaning workers' frequency of meeting with friends or relatives during the pandemic was conducted based on the COVID-19 Anxiety Scale, showing that the difference was not significant ($p>0.05$). As to whether cleaning workers had received the COVID-19 vaccine in relation to their anxiety levels, the results showed that vaccinated workers had higher levels of COVID-19 anxiety. However, the difference in scores was not significant ($p>0.05$). The analysis examining the relationship between cleaning workers' COVID-19 anxiety levels and the type of COVID-19 vaccine they received revealed a significant difference in scores ($p<0.001$). Those who received only the Sinovac vaccine had significantly lower levels of COVID-19 anxiety compared to others.

Table – 2: Comparison of COVID-19 anxiety levels by sociodemographic characteristics of cleaning workers.

Variables	**n**	**Mean ± SD**	**P**
Sex			
Female	14	0.41±0.48	
Male	203	0.41±0.56	0.992[a]
Total	217	0.41±0.56	
Age (Years)			
18-24	8	0.37±0.36	
25-35	79	0.29±0.47	
35-44	100	0.49±0.59	
45-54	26	0.46±0.65	
55-65	4	0.65±0.75	0.137[a]

Total	217	0.41±0.56	
Educational status			
Literate	21	0.25±0.41	
Primary school	102	0.48±0.62	
Secondary school	71	0.38±0.51	
High school	20	0.35±0.47	
University/Graduate	3	0.00±0.00	0.197[a]
Total	217	0.41±0.56	
Evaluation of COVID-19 knowledge			
Never heard of it	3	0.80±0.80	
Heard of COVID-19 but my knowledge is insufficient	38	0.44±0.44	
I have moderate knowledge of COVID-19:	146	0.46±0.61	
I have expert-level knowledge of COVID-19:	30	0.09±0.20	0.002*[a,c]
Total	217	0.41±0.56	
Protection against COVID-19			
I do not know	16	0.56±0.46	
I know a little	68	0.47±0.59	
I know at moderate level	90	0.41±0.57	
I know well	43	0.24±0.47	0.015[a]
Total	217	0.41±0.56	
Presence of COVID-19 in the individual/close circle			
Yes	175	0.44±0.57	
No	42	0.27±0.48	0.083[b]
Total	217	0.41±0.56	
Method of recovery from COVID-19 in the close circle			
Home treatment	103	0.43±0.60	
Inpatient treatment	41	0.48±0.51	
Death	31	0.43±0.54	0.566[a]
Total	217	0.41±0.56	
Method of recovery from COVID-19 of the individual			
Home treatment	90	0.45±0.64	
Treatment at the service	27	0.57±0.56	0.322[a]
Intensive care treatment	3	0.46±0.23	
Total	217	0.41±0.56	
Thoughts on the measures of the Ministry of Health			
I think they are necessary and I always implement them	130	0.38±0.55	
I find them necessary, but I sometimes implement them, while sometimes I don't pay attention.	79	0.47±0.55	0.249[a]
I consider them unnecessary; I do not implement them or I implement them due to obligation	8	0.30±0.70	
Total	217	0.41±0.56	
Following COVID-19 related news			
I do	178	0.44±0.57	0.108[b]
I do not	39	0.28±0.46	
Total	217	0.41±0.56	
The frequency of meeting with friends and relatives during the pandemic			

Everyday	61	0.35±0.63	
Once or several times a week	104	0.45±0.53	
Once or several times a month	33	0.33±0.52	0.007[a]
Once or several times a year	9	0.28±0.59	
Not meeting	10	0.64±0.32	
Total	217	0.41±0.56	
COVID-19 vaccination status			
Yes	164	0.43±0.56	0.251b
No	53	0.33±0.55	
Total	217	0.41±0.56	
Type of COVID-19 vaccine preferred			
Biontech	113	0.40±0.56	
Sinovac	14	0.05±0.14	0.000*[a,c]
Biontech – Sinovac	37	0.67±0.56	
Total	217	0.41±0.56	

n: number SD: standard deviation. *p<0.05. a: Kruskal Wallis-H test. b: Sample t-test. c: Mann Whitney U test.

Table – 3: Distribution of cleaning workers' attitudes toward COVID-19 vaccination by total scores and subscales.

Scale total and subscales	n	Mean ± SD	Min-Max
Positive attitude	217	3.74±1.00	1.00-5.00
Negative attitude	217	3.60±8.53	1.20-5.00
Attitudes toward COVID-19 vaccine	217	3.67±0.85	1.20-5.00

n: number SD: standard deviation

Table – 4: The mean total and subscale attitude scores of cleaning workers toward the COVID-19 vaccine based on their demographic characteristics.

Variables	N	Positive attitude	P	Negative attitude	P
		Mean ± SD		Mean ± SD	
Sex					
Female	14	3.48±1.36	0.321[b]	3.52±0.83	0.719[b]
Male	203	3.75±0.97		3.61±0.85	
Total	217	3.74±1.00		3.60±8.53	
Age (Years)					
18-24	8	3.81±0.88		3.82±0.78	
25-35	79	3.63±1.00	0.099[a]	3.60±0.82	0.602[a]
35-44	100	3.70±1.00		3.55±0.87	
45-54	26	4.16±0.97		3.75±0.89	
55 – 65	4	3.93±1.35		3.80±1.07	
Total	217	3.74±1.00		3.60±8.53	
Educational status					
Literate	21	3.30±0.88		3.07±0.82	
Primary school	102	3.82±1.07	0.076[a]	3.73±0.85	0.022[a]
Secondary school	71	3.77±0.84		3.63±0.71	

High school	20	3.78±1.19		3.48±1.12	
University/Graduate	3	2.91±1.18		3.33±0.75	
Total	217	3.74±1.00		3.60±8.53	
Evaluation of COVID-19 knowledge					
Never heard of it	3	3.83±0.28		3.86±0.98	
Heard of COVID-19 but my knowledge is insufficient	38	3.47±1.02		3.41±0.87	
I have moderate knowledge of COVID-19	146	3.85±0.98	0.085[a]	3.65±0.80	0.380[a]
I have expert-level knowledge of COVID-19	30	3.50±1.05		3.58±1.01	
Total	217	3.74±1.00		3.60±8.53	
Protection against COVID-19					
I do not know	16	3.76±0.73		3.77±0.75	
I know a little	68	3.57±1.01		3.37±0.87	
I know at moderate level	90	3.88±0.98	0.227[a]	3.68±0.83	0.043[a]
I know well	43	3.67±1.10		3.74±.84	
Total	217	3.74±1.00		3.60±8.53	
Presence of COVID-19 in the individual/close circle					
Yes	175	3.68±0.97	0.100[b]	3.54±0.86	0.029[b]
No	42	3.97±1.11		3.86±0.76	
Total	217	3.74±1.00		3.60±8.53	
Method of recovery from COVID-19 in the close circle					
Home treatment	103	3.47±0.98		3.37±0.96	
Inpatient treatment	41	4.06±0.73	0.002*[a,c]	3.82±0.65	0.028[a]
Death	31	3.88±1.04		3.72±0.61	
Total	217	3.74±1.00		3.60±8.53	
Method of recovery from COVID-19 of the individual					
Home treatment	90	3.60±0.82		3.51±0.87	
Treatment at the service	27	4.25±0.74	0.001*[a,c]	3.82±0.65	0.182[a]
Intensive care treatment	3	3.66±0.57		3.66±.0.30	
Total	217	3.74±1.00		3.60±8.53	
Thoughts on the measures of the Ministry of Health					
I think they are necessary and I always implement them	130	3.87±0.89		3.74±0.82	
I find them necessary, but I sometimes implement them, while sometimes I don't pay attention.	79	3.62±1.13		3.46±0.84	
I consider them unnecessary; I do not implement them or I implement them due to obligation	8	2.75±0.65	0.005*[a,c]	2.80±0.87	0.004*[a,c]
Total	217	3.74±1.00		3.60±8.53	
Following COVID-19 related news					
I do	178	3.87±0.96	0.000*[b]	3.71±0.78	0.001*[b]
I do not	39	3.12±0.96		3.10±0.98	

Total	217	3.74±1.00		3.60±8.53	
Frequency of meeting with friends and relatives during the pandemic					
Everyday	61	3.47±1.11		3.61±0.86	
Once or several times a week	104	3.73±0.94		3.46±0.82	
Once or several times a month	33	3.98±1.06	0.010[a]	3.64±0.88	0.003*[a,c]
Once or several times a year	9	4.55±0.30		4.33±0.68	
Not meeting	10	3.87±0.53		4.24±0.47	
Total	217	3.74±1.00		3.60±8.53	
COVID-19 Vaccination Status					
Yes	164	3.95±0.89		3.78±0.75	
No	53	3.08±1.04	0.000*[b]	3.06±0.91	0.001*[b]
Total	217	3.74±1.00		3.60±8.53	
Type of COVID-19 vaccine preferred					
Biontech	113	3.83±0.96	0.096[a]	3.78±0.78	0.916[a]
Sinovac	14	4.21±0.65		3.67±1.12	
Biontech – Sinovac	37	4.20±0.70		3.83±0.47	
Total	217	3.74±1.00		3.60±8.53	

n: number SD: standard deviation. *p<0.05, a: Kruskal Wallis-H test. b: Sample t-test. c: Mann Whitney U test.

The positive attitude levels of cleaning workers toward the COVID-19 vaccine were slightly higher than their negative attitude levels (**Table - 3**).

Table - 4 presents the mean score distributions of cleaning workers' demographic characteristics and their attitudes toward the COVID-19 vaccine. Considering the gender of cleaning workers in relation to their attitudes toward the COVID-19 vaccine, both the positive and negative attitude levels of male cleaning workers were higher. However, the scores between the groups did not show significant differences (p>0.05). There were no significant score differences when examining the age of cleaning workers in relation to their attitudes toward the COVID-19 vaccine (p>0.05). Furthermore, analyses conducted to determine whether the educational status of cleaning workers causes differences in their attitudes toward the COVID-19 vaccine revealed that the score differences between groups were not significant (p>0.05).

Analyses aimed at assessing whether the level of knowledge about COVID-19 among cleaning workers resulted in differences in their attitudes toward the vaccine showed no significant differences (p>0.05). As to whether the level of knowledge regarding how to protect against COVID-19 influenced the attitudes toward the vaccine, the results showed no significant differences between the groups (p>0.05).

Analyses conducted to determine whether there were differences in attitudes toward the COVID-19 vaccine based on whether cleaning workers or their relatives had contracted COVID-19 revealed that the score differences were not significant (p>0.05). The attitudes toward the COVID-19 vaccine based on how the relatives of cleaning workers who had contracted COVID-19 recovered, significant differences were observed in both positive and negative attitudes toward the vaccine (p<0.05).

Analyses conducted to determine whether there were differences in attitudes toward the COVID-19 vaccine based on how cleaning workers recovered from COVID-19 revealed a significant difference in positive attitudes toward the vaccine (p<0.05). Cleaning workers who were

hospitalized and received treatment had higher positive attitudes toward the vaccine. Furthermore, when analyzing whether differences in attitudes toward the COVID-19 vaccine existed based on cleaning workers' perceptions of the Health Ministry's COVID-19 measures, significant differences were found in both positive and negative attitudes ($p<0.05$). Those who considered the Health Ministry's measures unnecessary showed significantly lower levels of both positive and negative attitudes toward the vaccine. The analysis of whether cleaning workers followed news related to COVID-19 revealed that those who followed such news had significantly higher positive attitudes toward the vaccine ($p<0.001$). Similarly, they also exhibited significantly higher negative attitudes toward the vaccine ($p<0.05$). The frequency of contact with friends and relatives during the pandemic was examined in relation to attitudes toward the COVID-19 vaccine, revealing a significant difference in negative attitudes toward the vaccine ($p<0.05$). Analyses examining whether there were differences in attitudes toward the COVID-19 vaccine based on whether cleaning workers had received the vaccine showed that those who had received the vaccine had significantly higher positive and negative attitudes compared to those who had not been vaccinated ($p<0.05$). In addition, the analysis examining whether differences in attitudes toward the COVID-19 vaccine were based on the type of vaccine preferred by cleaning workers revealed that the preferred vaccine type did not result in a significant difference in attitudes toward the COVID-19 vaccine ($p>0.05$).

Table – 5: Evaluation of the relationship between the COVID-19 Anxiety Scale and the Attitudes toward COVID-19 Vaccine Scale, as well as their subscales.

		COVID-19 anxiety	**Positive attitude**	**Negative attitude**
	r	1.000		
COVID-19 anxiety	P	.		
	n	217		
	r	0.129	1.000	
Positive attitude	P	0.059	.	
	n	216	216	
	r	0.071	0.655**	1.000
Negative attitude	P	0.297	**0.000**	.
	n	217	216	217

** $p<0.001$

Analyses conducted to determine whether there is a relationship between COVID-19 anxiety and attitudes toward the COVID-19 vaccine did not reveal a significant relationship ($p>0.05$). However, a positive, moderate relationship was found between positive attitudes toward the vaccine and negative attitudes ($r=.655$; $p<0.001$) (**Table - 5**).

Discussion

In the present study, 67.3% of the cleaning workers reported having a moderate level of knowledge about COVID-19 (**Table - 1**). A similar study conducted by Singh et al. (2021) on cleaning workers who provided home cleaning services during the COVID-19 period also reported that individuals possessed a moderate level of knowledge regarding cleaning and disinfection practices [34]. Given that cleaning workers are part of a high-risk group, they are expected to have adequate knowledge about COVID-19 to protect themselves. Furthermore, the perception of their own knowledge as moderate suggests that cleaning workers are open to further training and enlightenment. The role of planned training programs in increasing

individuals' knowledge levels is extremely important.

In the current study, 82% of cleaning workers reported following news related to COVID-19 (**Table - 1**). Keeping up with current developments regarding COVID-19 is crucial for controlling the disease. The media can play a significant role during crises in reducing anxiety and fear in society, enhancing knowledge, and increasing awareness [35]. In this sense, it is vital for individuals working cleaners to regularly follow news related to COVID-19, as it helps them update their knowledge levels effectively. However, it is vital to remember that the information pollution found in the media can lead to increased anxiety levels in individuals and lead them to incorrect practices. Therefore, it is essential for health authorities to monitor the content shared on social media and to raise public awareness about reliable information sources. During this critical period of the pandemic, it is necessary to be cautious about the content shared on social media and traditional media, considering the potential impact on public health. The intensive use of social media for obtaining information highlights the need for careful monitoring of social media platforms regarding the dissemination of misleading and unreliable information. Undoubtedly, social media is extremely important for the rapid dissemination of information to large audiences.

In this sense, planned training sessions and campaigns should be organized to inform the public about reliable information sources. Public service announcements, posters, and brochures should be prepared and distributed. Additionally, community-based work should be carried out to identify the information needs of the population and develop different strategies accordingly.

The research found that 75.6% of cleaning workers had received the COVID-19 vaccine, with 6.5% opting for the Sinovac vaccine, 52.1% choosing the Biontech vaccine, and 17.1% preferring both Sinovac and Biontech vaccines (**Table – 1).**

Countries worldwide, including Turkey, are currently focused on the physical health impacts of the COVID-19 pandemic. During the pandemic, because no medication had been developed for the treatment of those infected with the disease, many countries and research companies initiated vaccine development efforts. In Turkey, the first vaccine to be used was the Sinovac vaccine, an inactivated virus vaccine, followed by the Pfizer/BioNTech vaccine. With the introduction of the Turkovac vaccine developed in Turkey, the vaccination rate increased rapidly in the country. A review of the literature reveals that the most significant factors influencing individuals' hesitations about vaccines are cultural, religious, and nationalistic perspectives. Numerous studies have indicated that individuals who refuse vaccines are more likely to accept a vaccine recommended or produced by someone from their own culture or religion [36, 37]. This suggests that individuals' trust in vaccine manufacturers, the influence of religious leaders, and the type of vaccine recommended and administered by individuals from their own ethnic background play a significant role in their vaccine choices. The high vaccination rate among cleaning workers indicates that they tend to have a positive attitude toward vaccines; however, it highlights the need for further research to explore the influences of institutional mandates, societal pressure, and individual preferences. Particularly, informational efforts aimed at motivating cleaning workers to complete their vaccination programs may significantly contribute to achieving community immunity.

Cleaning workers who expressed having expert-level knowledge about COVID-19 were found to have significantly lower anxiety levels compared to those who reported insufficient or moderate knowledge ($p<0.05$) (Table 2). Consistent with this study, Saravanan et al. (2020) reported that individuals with a high level of knowledge about COVID-19 exhibited lower anxiety levels [38].Itis normal for people to experience increased anxiety levels due to the uncertainties they face [18]. Furthermore, a lack of sufficient

information regarding COVID-19 can lead to heightened anxiety, decreased adherence to treatment, and delays in the recovery process. As individuals do research, read, and learn about protective measures, they tend to feel safer and consequently experience less fear. In this regard, public health nurses can play a crucial role in reducing anxiety levels by providing information, monitoring, and especially conducting home visits within their working areas.

Cleaning workers who reported not seeing friends or relatives during the pandemic had higher levels of COVID-19 anxiety, yet the difference was not significant (**Table - 2**). However, for the same variable, there was a significant difference in terms of negative attitudes toward the COVID-19 vaccine ($p<0.05$).

The analysis revealed a difference in negative attitudes toward vaccination between those who meet their friends and relatives once or a few times a year and those who meet them daily, with the former group having higher negative attitudes toward vaccination. Similarly, those who meet their friends and relatives once or a few times a month had more negative attitudes compared to those who meet them daily. In addition, those who meet their friends and relatives once or a few times a year exhibited higher negative attitudes toward vaccination compared to those who meet them once or a few times a week (**Table - 4**). It is extremely important for individuals to receive social support, especially during quarantine, to help reduce anxiety levels. Social support is characterized by the feeling that a person is valued by their surroundings and has a sense of belonging to that environment [39]. The literature shows that as perceived social support increases, there is improvement in many psychological issues, such as stress and anxiety [40, 41]. Having family, friends, or people who are important to an individual as sources of physical and emotional support during difficult times can serve as a significant protective factor against stress. The social isolation and quarantine policies implemented during the COVID-19 pandemic are believed to have contributed to increased feelings of loneliness and anxiety levels. In the literature review, no study was found on this subject specifically related to cleaning workers. Therefore, the results obtained from the present study are significant as they are unique in the field. Future studies that consider this variable could make important contributions to the literature.

Although cleaning workers who reported not knowing at all or knowing very well how to protect themselves from COVID-19 showed higher negative attitudes toward the vaccine, the difference between them was not significant (**Table - 4**). Contrary to the findings of the current study, Mannan and Farhana (2020) reported that an increase in COVID-19 knowledge led to more positive attitudes toward the COVID-19 vaccine [42]. The difference between studies can be influenced regionally. The analyses showed that individuals' knowledge of preventive measures did not provide sufficient information regarding their attitudes toward the COVID-19 vaccine, which requires more investigation in detail. Various studies focusing on the COVID-19 vaccine can positively contribute to the development of favorable attitudes toward the vaccine among individuals.

Those who had not experienced COVID-19 themselves or their relatives exhibited higher levels of negative attitudes toward the COVID-19 vaccine, yet the difference was not significant ($p>0.05$). Additionally, cleaning workers whose relatives were hospitalized had significantly higher levels of both positive and negative attitudes toward the COVID-19 vaccine compared to those whose relatives and friends received outpatient treatment. The levels were also higher for workers whose relatives passed away compared to those whose relatives and friends received treatment. Furthermore, cleaning workers who contracted COVID-19 and received treatment at the hospital service showed significantly higher positive attitudes towards the

COVID-19 vaccine than those who were treated in the intensive care unit ($p<0.05$) (Table 4). Yıldız et al. (2021) indicated in a quantitative study investigating attitudes toward COVID-19 vaccines that individuals who had contracted COVID-19 trusted the vaccine more and expressed a desire to get vaccinated at the earliest occasion [33].Similarly, Çavmak et al. (2022) found that individuals who had contracted COVID-19 displayed more positive attitudes toward the vaccine [44]. However, Ward et al. (2020) conducted a study in France and found no significant difference in attitudes towards the COVID-19 vaccine between those who had been diagnosed with the disease and those who had not [45]. The COVID-19 pandemic has shown that making a vaccine accessible differs from convincing individuals to get vaccinated. The emergence of COVID-19 as a new disease, along with the presence of groups who do not believe in the disease and consider it a conspiracy, contributed to the development of negative attitudes toward the vaccine.

Individuals who considered the Ministry of Health's measures unnecessary showed significantly lower levels of both positive and negative attitudes toward the vaccine (**Table - 4**). Additionally, those who followed news related to COVID-19 demonstrated significantly higher positive and negative attitudes towards it (Table 4). In a study by Korkut et al. (2022), examining COVID-19 vaccine literacy and its impact on attitudes toward the vaccine, the researchers found that positive attitudes toward the COVID-19 vaccine increased, as vaccine literacy increased [29]. This highlights the importance of using reliable information sources in the media and the significance of intersectoral collaboration.

Those who received the COVID-19 vaccine showed significantly higher positive and negative attitudes toward the vaccine compared to those who did not get vaccinated. The preferred type of vaccine did not cause a significant difference in attitudes towards the COVID-19 vaccine (**Table - 4**). Güngör, Atik, and Akyol (2022), examining nurses' acceptance of the COVID-19 vaccine and their fear of contracting the disease, found that being vaccinated had a positive effect on vaccine attitudes, which is consistent with our study's findings [28]. As individuals access exact information about vaccines and their knowledge of the COVID-19 process increases, their motivation increases too. The misinformation on social media about vaccines can lower people's motivation and lead them to approach vaccination with hesitation. Vaccines play a crucial role in preventing the spread of disease and reducing mortality rates, especially during pandemics. To boost motivation, accurate information about vaccines should be disseminated and institutions should monitor information spread on social media to ensure sustainability.

The study did not determine a significant correlation between COVID-19 anxiety and attitudes toward the COVID-19 vaccine ($p>0.05$) However, it identified a moderate positive correlation between positive and negative attitudes toward the vaccine (**Table - 5**). In a study conducted by Yılmaz and others (2021) to examine the effect of COVID-19 fear on the attitudes of intern nursing students toward vaccination, no significant relationship was found, consistent with our findings [47]. There are studies supporting the findings of the present study. A study by Turan and others (2022), which involved individuals over the age of 18 years, discovered that as people's COVID-19 phobia increased, their positive attitudes towards the vaccine increased [48]. A study conducted by Salali and Uysal (2020) with participants from Turkey and the United Kingdom reported that individuals with concerns about COVID-19 had more positive thoughts about getting vaccinated [27]. In a study conducted by Detoc and others (2020) in France, individuals with high levels of COVID-19 fear showed higher vaccination acceptance rates [49]. We attribute the differences among these studies to variations in their dates and vaccination policies, noting that 75.6% of the participants in our research were vaccinated (**Table – 1).**

We found that cleaning workers who received the COVID-19 vaccine had higher levels of COVID-19 anxiety, the difference between the groups was not significant ($p>0.05$). Examination of the relationship between cleaning workers' COVID-19 anxiety levels and the COVID-19 vaccines they received showed a significant difference in scores ($p<0.001$). Those who received only the Sinovac vaccine had significantly lower COVID-19 anxiety levels compared to others, while those who received the Biontech + Sinovac vaccines had higher anxiety levels (**Table - 5**). A study by Akarsu and others (2021) reported that individuals mostly held negative views about the COVID-19 vaccine, experienced anxiety related to it, and this contributed to increased stress, anxiety, and depression levels related to COVID-19 [19].

A study by Başal and Emir Öksüz (2022) suggested that trust in Sinovac and BioNTech vaccine influenced attitudes toward vaccination [50]. In a study conducted by Kreps and others (2020) in the United States, participants considered the origin of vaccine developers important in their vaccine preferences and found domestic vaccines more reliable than those produced in China [51]. In the present study, the reason for the lower anxiety levels among individuals who received only the Sinovac vaccine could be explained by the fact that Sinovac is an inactivated vaccine produced using well-known methods, leading to fewer side effects, being the first vaccine produced and administered.

Conclusion

The study did not determine a significant correlation between COVID-19 anxiety and attitudes toward the COVID-19 vaccine ($p>0.05$) However, it identified a moderate positive relationship between positive and negative attitudes toward the vaccine. The research results revealed cleaning workers to have low levels of COVID-19 anxiety and moderate levels of both positive and negative attitudes toward vaccine.

It is recommended to conduct informational activities for cleaning workers and, consequently, their families regarding protection against COVID-19, precautions, isolation, and other methods to prepare for the pandemic process and future pandemics. Planned training programs should utilize differing strategies to inform cleaning workers about COVID-19 and its vaccine, while public health nurses should effectively use visual and written media tools to raise awareness in the community to prevent vaccine hesitancy and opposition. In addition, although the study yielded significant results, there is a need for more comprehensive research. Therefore, we can suggest toconduct comprehensive qualitative and quantitative studies with larger samples, taking different parameters into account in future research.

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