Clinical and Experimental Health Sciences

Testing Positive for Covid-19, Signs and Symptoms, Treatment, and Covid-19-Related Anxiety: A Case of Factory Workers

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ABSTRACT

Objective: This paper investigated the incidence of COVID-19 contraction, signs and symptoms, treatment, pandemic-related anxiety, and related factors in factory workers.

Methods: This was a descriptive study conducted in a factory operating in the textile industry. No sampling was performed. The sample consisted of 287 volunteers. Data were collected using a sociodemographic characteristics questionnaire and the Coronavirus Anxiety Scale Short Form.

Results: Less than half the participants tested positive for COVID-19 (41.1%). They were treated at home (68.6%) or in a hospital (19.5%). The most common symptoms were fatigue, joint pain, change in the sense of taste, and headache. The mean duration of home and hospital treatment was 7.00±0.00 and 12.49±6.14, respectively. Participants had a mean anxiety scale score of 7.65±3.71. Less than half the participants (31%) had high COVID-19 anxiety levels. The incidence of COVID-19 infection and anxiety was higher in participants who were on medication for chronic illnesses. Age and BMI were correlated with hospitalization for COVID-19.

Conclusions: The incidence of COVID-19 infection is high among factory workers. Therefore, authorities should consider them a priority group for vaccination and provide them with training on COVID-19 risk factors and preventive measures.

Keywords: COVID-19, anxiety, risk factor, chronic illness

1. INTRODUCTION

Novel coronavirus disease (COVID-19) broke out in Wuhan/China at the end of 2019 and has been classified as a pandemic by the World Health Organization (WHO). Turkey announced its first confirmed case of COVID-19 on March 11, 2020 (1). The COVID-19 virus is transmitted through respiratory droplets and contact routes and survives on surfaces for several hours. Individuals can be infected by touching those surfaces and then touching their face (e.g., eyes, nose, mouth) (2, 3). All countries have taken numerous measures to prevent the spread of the virus (4). The Turkish Ministry of Health has introduced numerous rules and regulations to workplaces. Employers have to train employees about what the COVID-19 is and how it spread, how it is related to dietary habits, individual measures for infection control, and disinfection and sterilization rules. The preventive measures that should be enforced in workplaces are reducing the number of workers in shifts, ensuring the minimum distance between workers, setting different break times, using personal protective equipment (PPE), and informing all workers on hygiene protocols (2).

The COVID-19 pandemic has had an unprecedented impact on virtually every aspect of life (4). The clinical features of COVID-19 vary from an asymptomatic state to mild flu-like illness, severe pneumonia, multiorgan dysfunction, or even death (5, 6). The severity of COVID-19 symptoms depends on numerous risk factors (old age, gender, etc.) and underlying comorbidities (hypertension, diabetes, obesity, chronic lung diseases, heart, liver and kidney diseases, tumors, etc.) (7, 8).

The pandemic takes a greater toll on workers because they are more likely to contract the virus by having close contact with the infected and pass it on to others (9). Moreover, those infected may have no symptoms yet still be able to transmit infection (10). People have been experiencing mental problems since the onset of the pandemic because they fear getting infected or have a hard time complying with preventive measures (11). The pandemic has caused

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high levels of anxiety because it has exacerbated access to food and healthcare services, put a strain on people's mental health, and made them worried about getting infected and becoming severely ill (12).

Nurses should be effective consultants and educators and play an active role in informing all segments of society on infectious diseases, risk factors, and ways of protection (13). We should determine the incidence of COVID-19 infection among factory workers and analyze the situation based on their sociodemographic characteristics, Body Mass Indices (BMI), habits, chronic illnesses, anxiety levels, and factors affecting the course of the infection. This information can help nurses update their knowledge for patient/public education and identify the general situation of workers and related factors more easily. Therefore, this paper investigated the incidence of COVID-19 infection, signs and symptoms, treatment, pandemic-related anxiety, and related factors in factory workers.

2. METHODS

This was a descriptive and correlational study.

2.1. Research Questions

- Is the incidence of COVID-19 infection in factory workers the same as that in the general population?
- What are the signs and symptoms of COVID-19 among factory workers?
- What levels of anxiety do factory workers have?
- What factors affect the incidence of COVID-19 infection among factory workers?
- What factors affect the treatment for COVID-19 in factory workers?
- What factors affect the levels of anxiety in factory workers?

2.2. Research Setting

The study was conducted in a textile factory in Seydişehir/Beyşehir/Konya. The factory was the research site of choice because it has been up and running since the onset of the pandemic.

2.3. Population

The study population consisted of 441 workers with at least six months of work experience since the onset of the pandemic. Workplace physician and workplace nurse are available at the factory. Doctors and nurses carry out routine follow-up of employees within the scope of occupational health and safety.

2.4. Sample

Louvardi et al. reported higher levels of stress in patients with chronic illnesses than in those without chronic illnesses since the onset of the pandemic ($p<.05$). We used Louvardi et al.'s results to calculate the ideal sample size. We performed a power analysis (GPower) to determine the appropriate sample size. The result showed that a sample size of 246 would be large enough to detect significant differences. We increased the number by 15% to avoid missing data (14). The power analysis yielded that a sample size of 283 would be large enough to detect significant differences (power of 80%, $\alpha= 0.05$, effect size = 0.80). Therefore, the sample consisted of 283 factory workers who agreed to participate in the study.

2.5. Data Collection Tools

Data were collected using a sociodemographic characteristics questionnaire and the Coronavirus Anxiety Scale (CAS) Short Form.

2.5.1. Sociodemographic Characteristics Questionnaire.

The sociodemographic characteristics questionnaire was based on a literature review conducted by the researchers (7, 8, 15-18). The questionnaire consisted of 17 items on sociodemographic characteristics, tobacco and alcohol use, chronic illness, exposure to COVID-19, and signs/symptoms and treatment (for those who tested positive for COVID-19). The items on signs/symptoms also assessed their severity. The items are rated "mild," "moderate," and "severe." Body weight and body height were classified according to the adult BMI classification by the World Health Organization (WHO).

2.5.2. Coronavirus Anxiety Scale (CAS) Short Form.

The Coronavirus Anxiety Scale (CAS)-Short Form was developed by Lee and adapted to Turkish by Biçer et al.. The instrument consists of five items scored on a five-point Likert-type scale ("0 = Not at all," "1 = Rare, less than a day or two," "2 = Several days," "3 = More than seven days," "4 = Nearly every day over the last two weeks"). The original scale has a Cronbach's alpha of 0.93, while the Turkish version has a Cronbach's alpha of 0.83. The total scale score ranges from 0 to 20. A score higher than nine indicates high anxiety (19). The scale had a Cronbach's alpha of 0.87 in this study.

2.6. Variables

The dependent variables were "testing positive for COVID-19," "signs/symptoms," "treatment type," and "COVID-19 anxiety level." The independent variables were "age," "gender," "BMI," "work experience," "alcohol and tobacco use," "chronic illness," and "being on medication."

Data Collection

The data were collected face-to-face in the factory between April 15 and May 15, 2021. Necessary measures were taken before the interviews.

2.8. Ethical Considerations

The study was approved by the ethics committee of Necmettin Erbakan University Health Sciences Scientific Research Ethics Committee (No: 07.04.2021-9/12) and the Turkish Ministry of Health (Serap Batı-2021-03-02T00_44_01). Verbal consent was obtained from the factory management. Informed consent was obtained from participants before data collection. Permission was obtained from the developer of the Coronavirus Anxiety Scale. The research was conducted according to the ethical principles outlined by the Declaration of Helsinki. The research was applied and reported according to STROBE guidelines (Strengthening the Reporting of Observational Studies in Epidemiology) (20).

2.9. Limitations

The study had two limitations. First, the results were sample-specific. Second, the research was conducted during the pandemic. The third limitation is that the data are collected with the self-notifications of the employees.

2.10. Analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS, v. 22.0) at a confidence interval of 95% and a significance level of.05. Percentage, mean, and standard deviation were used for the descriptive data. The Kolmogorov-Smirnov test was used for normality testing. The categorical data (sociodemographic data, habits, testing positive for COVID-19, and treatment types) were analyzed using the Chi-Square test. The Mann-Whitney U test was used for pairwise group comparisons. The Kruskal Wallis test was used to compare more than two groups. A Tamhane test (posthoc) was used to determine the source of significant differences.

3. RESULTS

Table 1 shows the participants' sociodemographic and individual characteristics. The majority of the participants were men (61.7%) and younger than 40 (67.2%). Participants had a mean age of 35.65±9.08 and a mean BMI of 26.53±8.03. The majority of the participants had less than five years of work experience (62.3%) and worked 45 hours a week (61.7%).

Less than half the participants used tobacco (44.3%) and alcohol (13.9%). A quarter of the participants had a chronic illness (23%); hypertension (34.8%), allergic asthma (19.7%), diabetes mellitus (DM) (9.1%), and chronic obstructive pulmonary disease (COPD) (7.6%). Less than half the participants tested positive for COVID-19 (41.1%). Participants infected with COVID-19 were treated at home (68.6%) (HomT group) or in a hospital (19.5%) (HosT group) or did not receive any treatment (NoT group) (11.9%). The HomT and HosT groups had a mean 7.00±0.00 and 12.49±6.14 days of treatment, respectively. Three HosT participants (13%) were admitted to intensive care units (Table 2).

Table 1. *Sociodemographic Characteristics*

	n	%
Gender		
Woman	110	38.3
Man	177	61.7
Total	287	100.0
Work experience (year)		
<1	48	16.7
1-5	131	45.6
6-10	67	23.3
11-15	26	9.2
≥16	15	5.2
Total	287	100.0
Working hours per week		
45	177	61.7
>45	110	38.3
Total	287	100.0
Age (year)	35.65±9.08	
BMI (kg/m^2)	26.53±8.03	

Participants had a mean CAS score of 7.65±3.71. Three out of ten participants had high anxiety (Table 2).

Table 3 shows the most common signs/symptoms in participants diagnosed with COVID-19. The most common symptoms were fatigue, joint pain, change in the sense of taste, and headache. Eighty-two participants had fatigue: severe (57.32%), moderate (40.24%), or mild (2.44%). Eighty-two participants had joint pain: severe (62.20%), moderate (29.27%), or mild (8.54%). Eighty-two participants experienced a change in their sense of taste: severe (54.88%), moderate (32.93%), or mild (12.20%). Eighty-one participants had a headache: severe (35.80%), moderate (50.62%), or mild (13.58%). The least common symptoms were itching, change in mucous, and dizziness.

Table 4 shows the factors affecting the incidence of COVID-19 diagnosis. There was a correlation between work experience and COVID-19 infection (p=.023). Participants with 1-5 years of work experience were diagnosed with COVID-19 more than others. Participants who were on medication were diagnosed with COVID-19 more than those who were not. Participants with chronic illnesses were diagnosed with COVID-19 more than those with no chronic illness (p<.05) (Table 4).

Being on medication affected the type of treatment (p<.05). Hospitalization was more common in participants who were on medication than in those who were not. Age also affected the type of treatment (p<.05). The mean age of the HosT

group was higher than that of the HomT group (p<.05) (Table 5).

Body Mass Index also affected the type of treatment (p<.05). The HosT group had a higher mean BMI than the HomT and NoT groups (p.001; p<.001) (Table 5).

There was a correlation between work experience and COVID-19 anxiety levels (p<.05). Participants with 1-5 years of work experience had higher levels of anxiety than others. Participants with chronic illnesses had higher levels of anxiety than those with no chronic illness (p<.05). Participants who were on medication had higher anxiety levels than those who were not (p<.05) (Table 6).

Table 2. *Habits and Diseases*

	n	%
Chronic illness		
Yes	66	23.0
No	242	77.0
Total	287	100.0
Chronic illness type[1]		
Hypertension (HT)	23	34.8
Allergic Asthma	13	19.7
Diabetes Mellitus (DM)	6	9.1
Chronic Obstructive Pulmonary Disease (COPD)	5	7.6
Rheumatoid Arthritis (RA)	3	4.5
Depression	3	4.5
Others	13	19.7
total	66	100.0
Medication use		
Yes	70	24.4
No	217	75.6
Total	287	100.0
Testing positive for COVID-19		
Yes	118	41.1
No	169	58.9
Total	287	100.0
Treatment		
None (NoT group)	14	11.9
Home treatment with medication (HomT group)	81	68.6
Hospitalization (HosT group)[2]	23	19.5
Total	118	100.0
Anxiety levels[3]		
Normal (<9 points)	198	69.0
High (≥9 points)	89	31.0
Total	118	100.0
Treatment duration (day)		
HomT	7.00±0.00	
HosT	12.49±6.14	

[1]From highest to lowest incidence. Diseases stated less than three times were grouped under "Others."
[2]Three HosT participants (13%) were admitted to intensive care units
[3]Mean Coronavirus Anxiety Scale (CAS) Score: 7.65±3.71

Table 3. *COVID-19 signs/symptoms*

	Mild n (%)*	Moderate n (%)*	Severe n (%)*	Total n (%)**
Fatigue	2 (2.44)	33 (40.24)	47 (57.32)	82 (100.00)
Joint pain	7 (8.54)	24 (29.27)	51 (62.20)	82 (100.00)
Change in the sense of taste	10 (12.20)	27 (32.93)	45 (54.88)	82 (100.00)
Headache	11 (13.58)	41 (50.62)	29 (35.80)	81 (100.00)
Fever	21 (29.17)	30 (41.67)	21 (29.17)	72 (100.00)
Change/loss in appetite	18 (29.51)	21 (34.43)	22 (36.07)	61 (100.00)
Cough	14 (24.56)	17 (29.82)	26 (45.61)	57 (100.00)
Sore throat	9 (17.31)	21 (40.38)	22 (42.31)	52 (100.00)
Diarrhea	14 (34.15)	17 (41.46)	10 (24.39)	41 (100.00)
Running nose	16 (39.02)	17 (41.46)	8 (19.51)	41 (100.00)
Nausea	15 (39.47)	12 (31.58)	11 (28.95)	38 (100.00)
Stomachache	10 (27.03)	12 (32.43)	15 (40.54)	37 (100.00)
Dizziness	11 (30.56)	14 (38.89)	11 (30.56)	36 (100.00)
Change in Mucous	7 (23.33)	14 (46.67)	9 (30.00)	30 (100.00)
Itching	18(66.67)	6 (22.22)	3 (11.11)	27 (100.00)

** Row percentage*
***From highest to lowest*

Table 4. *Factors affecting COVID-19 diagnosis*

	Testing positive for COVID-19		
	Yes* n(%)	No* n(%)	Total*
Work experience (year)			
<1	16 (5.6)	32 (11.1)	48 (16.7)
1-5	55 (19.2)	76 (26.5)	131 (45.6)
6-10	22 (7.7)	45 (15.7)	67 (23.3)
11-15	14 (4.9)	12 (4.2)	26 (9.1)
≥16	11 (3.8)	4 (1.4)	15 (5.2)
Total	118 (41.1)	169 (58.9)	287 (100.0)
	$\chi2$ =11.31, p**=.023		
Chronic illness			
Var Türkçe yazım düzeltilmeli	35 (12.2)	31 (10.8)	66 (23.0)
Yok	83 (28.9)	138(48.1)	221 (77.0)
Total	118 (41.1)	169 (58.9)	287 (100.0)
	χ^2 = 5.03, p**=.025		
Medication use			
Yes	38 (13.2)	32(11.1)	70 (24.4)
No	80 (27.9)	137 (47.7)	217 (75.6)
Total	118 (41.1)	169 (58.9)	287 (100.0)

**Total percentages ** Chi-square test*

Table 5. *Factors affecting treatment type*

	Treatment Type			
	NoT*	**HomT***	**HosT***	**Total***
Medication use				
Yes	7 (5.9)	20 (16.9)	11 (9.3)	38 (32.2)
No	7 (5.9)	61 (51.7)	12 (10.2)	80 (67.8)
Total	14 (11.9)	81 (68.6)	23 (19.5)	118(100.0)
	χ^2 = 6.70, p**=.035			
Age				
	[1] 62.68 [2] 52.62 [3] 81.78	KW=13.18 p=.001	2-3: p***=.001	
BMI				
	[1] 57.43 [2] 55.41 [3] 75.15	KW=6.02 p=.049	1-3: p***<.001 2-3: p***<.001	
Total percentages ** Chi-square test KW: Kruskal Wallis test * binary comparison p-value (Post-hoc Tamhane's Test)*				

Table 6. *Anxiety levels and related factors*

	Anxiety		
	Normal *	**High ***	**Total***
Work experience (year)			
<1	37 (12.9))	11 (3.8)	48 (16.7)
1-5	80 (27.9)	51 (17.8)	131 (45.6)
6-10	50 (17.4)	17 (5.9)	67 (23.3)
11-15	17 (5.9)	9 (3.1)	26 (9.1)
≥16	14 (4.9)	1 (0.3)	15 (5.2)
Total	198 (69.0)	89 (31.0)	287 (100.0)
	χ2 =10.62, p**=.031		
Chronic illness			
Yes	34 (11.8)	32 (11.1)	66 (23.0)
No	164 (57.1)	57 (19.9)	221 (77.0)
Total	198 (69.0)	89 (31.0)	287 (100.0)
	χ^2 = 5.03, p**=.025		
Medication use			
Yes	38 (13.2)	32(11.1)	70 (24.4)
No	160 (55.7)	57 (19.9)	217 (75.6)
Total	198 (69.0)	89 (31.0)	287 (100.0)
	χ^2 = 9.35, p**=.002		
**Total percentages ** Chi-square test*			

4. DISCUSSION

COVID-19 is a global threat to public health. As of 26.04.2021, the number of confirmed COVID-19 cases is 147.538.302, corresponding to 18.83% of the world's population (21). According to the Turkish Ministry of Health (2021), the number of COVID-19 tests is 46.153.151, and the number of confirmed cases is 4.667.281. In other words, ten percent of the tests come out positive, corresponding to six percent of the national population. Our results showed that 41.1% of the participants had been tested positive for COVID-19, which is twice as much as the global rate (18.82%) and four times as much as the national rate (10.11%). According to the Turkish Ministry of Health (2021) data, our research site was in a "very high-risk" city. Our result shows a trend similar to what is reported in "very high-risk" regions of Turkey. Factory workers are considered a high-risk group that has been adversely affected by the pandemic. They have faced various problems, such as layoffs, unpaid leave, fewer working hours, and lower wages (22). Our result is not surprising because our participants were blue-collar workers who had to keep working during the pandemic to provide for themselves and their families. It is also because they had difficulty affording hygiene products and PPE due to financial problems and had low awareness of the seriousness of the health risks, and therefore, paid little attention to preventive measures.

Although COVID-19 is similar to seasonal influenza, it typically presents with much more severe symptoms. The most common symptom in our participants was joint pain (62.5%). People diagnosed with COVID-19 also experience chest and stomachache (23) and myalgia (56.6%), and general fatigue (56.6%) (24). However, research shows that the most common symptom of COVID-19 is headaches. For example, Lan et al. reported severe headaches in four out of ten COVID-19 patients. Toptan et al. also found that seven out of ten COVID-19 patients suffered from headaches for up to three days since their diagnosis (25). However, they stated that headache was more prevalent in women, which might be related to migraines. Lippi et al. conducted a literature review and concluded that headache was an important symptom in COVID-19 patients because people with a headache were more likely to test positive for COVID-19 (OR: 95%) (26). Pain causes different problems, especially fatigue. Menni et al. focused on the symptoms of COVID-19 and conducted a survey with 2.618.862 people in England and the USA (17). They determined that almost three out of ten people in the England group and more than two out of ten people in the USA group experienced fatigue. What is more, Townsend et al. argue that fatigue is observed in half of the COVID-19 patients even ten weeks after treatment and that it can even turn into permanent fatigue. Another symptom of COVID-19 is the loss/change in the sense of smell and taste (27). Menni et al. reported a loss/change in the sense of smell and taste in almost seven out of ten COVID-19 patients (17). Lan et al. looked into post-COVID symptoms in 592 healthcare professionals and reported the loss/change in the sense of smell and taste in 15.7% of the participants. Menni et al. also found that more than six out of ten COVID-19 patients (n=13.863) experienced a loss in their sense of smell and taste. Anyone with the symptoms of COVID-19 should self-isolate to prevent the spread of the infection (17, 23, 24). The least common symptoms in our participants were joint pain, headache, fatigue, and change in the sense of taste. Some of the symptoms of COVID-19 are similar to those of the common cold. Therefore, anyone showing those symptoms should self-quarantine until their tests come back.

First, the World Health Organization and then the health ministers of all countries have drawn up treatment

guidelines. There are three treatment options: (1) at home with no medication, (2) at home with medication and (3) admission to a hospital. According to WHO (2020), elderly and obese individuals and those on medication for chronic illnesses may experience more problems during recovery and may need inpatient treatment. Demirel Kaya et al. reported that Turkish patients treated on standard protocols had a mean age of 61±16 years and that 65% had at least one chronic illness for which they took medication. High BMI increases the likelihood of lung infections in that population (28). Individuals with obesity are twice as likely to develop pulmonary diseases and almost three times as likely to need hospitalization as non-obese people. They stay in the hospital almost four times longer and have a higher mortality rate than non-obese people (16). The BMI ≥ 28 kg/m^2 and diabetes are independent risk factors for severe illness in patients with COVID-19 (29). Individuals with obesity are 2.7 to 3.3 times more likely to develop type 1 diabetes, hypertension, and high triglycerides (30). Obesity also increases the severity of COVID-19 and the risk of mortality (15). Our HosT group consisted of older adults who were on medication for chronic illnesses. This result shows that age, chronic illnesses, and regular medication use are also risk factors for more severe COVID-19 in young adults who work during the pandemic.

Participants experienced stress because young adults and workers are also at risk of contracting the coronavirus. Moghanibashi-Mansourieh reported severe (9.3%) and very severe (9.8%) anxiety in the Iranian population. He also found that women and people aged 21-40 years experienced higher levels of anxiety (31). Özdin and Bayrak Özdin also determined that anxiety was more common in women than in men, in people aged 18-49 years than in those older than 50, and in people with chronic illnesses than in those without chronic illnesses (32). Shangguan et al. also reported a positive correlation between chronic illnesses and anxiety. People experience anxiety during the pandemic because they think their lives will be adversely affected by COVID-19 (67.7%) (33). They are also afraid of contracting the virus (44.8%) and infecting their loved ones (78.3%) and facing financial problems (47.3%). People with health problems experience great anxiety about the pandemic and constantly think about the virus (p<.001). Elderly individuals also spend a great deal of time thinking about the pandemic (p<.001) (34). It was announced by the World Health Organization that men over the age of 60 and people who take regular medications have a higher risk of COVID-19 infection (4). We also found that participants who were on medication for chronic illnesses had higher levels of anxiety. This is probably because campaigns on COVID-19 raised their awareness of the seriousness of the situation, resulting in increased levels of anxiety. The pandemic has taken its toll on some sectors, and people working in those sectors have faced unemployment and economic difficulties, exacerbating their already-existing problems (22). Our participants were blue-collar workers who had to work to provide for their families during the pandemic. They had high anxiety levels probably because they experienced economic difficulties and had to work during the pandemic and also because they were at risk of contracting the virus and transmitting it to their loved ones.

5. CONCLUSION

At the time when the data were collected, the vaccination of all individuals had not yet been completed, only the vaccination of risky groups was continuing. The rate of COVID-19 infection was significantly higher among our participants than at the global and national levels. The most common symptoms were joint pain, fatigue, change in the sense of taste, and headache. The HosT group consisted mainly of people with chronic illnesses, those who were on medication, and those with high BMI. Participants had high anxiety levels affected by working hours, chronic illnesses, and regular medication use. However, participants' habits did not affect the rate of COVID-19 diagnosis, types of treatment, and anxiety levels.

Authorities should provide workers in the manufacturing industry with training on COVID-19 risk factors and preventive measures and consider them a priority group for vaccination, regardless of age, chronic illnesses, and medication use. The workplace nurse and physician should continue the training and follow-up of employees in this context.

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