

Investigation of Mental Health Condition Among Factory Worker During Covid pandemic–A Cross-Sectional Study



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Abstract The coronavirus disease 2019 (COVID-19) was initially reported in December 2019 in Wuhan, China, after a cluster of unusual pneumonia cases. On March 11, 2020, the World Health Organization (WHO) declared the outbreak a pandemic. Many workplaces are affected by work-related psychosocial risks and stress, as well as the adverse health and economic implications. Workers have been challenged, stretched, and tested in ways they have never been before, as have pharmaceutical manufacturing workers' mental health, as they are responsible for providing optimal medication manufacturing that aids in therapy, treatment, and patient life during COVID-19. This study is to assess the level of depression, anxiety, stress, and associated factors among factory workers during COVID-19. A cross-sectional study was conducted using online surveys to assess workers' mental health and related factors. The study involves 201 manufacturing workers from various departments. The data were collected using a questionnaire distributed via an online platform. The data collection instrument consists of three parts: (1) sociodemographic, (2) related factors associated with mental health conditions, and (3) the DASS-21 survey. This study found that most workers have normal mental health conditions. Depression and anxiety have a significant correlation with sociodemographic characteristics and organizational factors. Meanwhile, stress has a significant correlation with socioeconomic and organizational aspects. All three mental health conditions have a significant correlation with organizational factors such as working experiences (>6 years) and preparation for workflow management during COVID-19, with p-values of 0.028 and 0.023, respectively. The study's findings may assist authorities in establishing ways to diagnose mental distress early, thereby reducing mental or psychological disease among factory workers.

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145

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1 Introduction

Throughout history, there have been several battles against epidemic diseases. Countries have faced complex social and economic challenges during cholera, plague, malaria, and tuberculosis outbreaks. However, following the discoveries of SARS, MERS, H1N1, and EBOLA at the beginning of the twenty-first century, a new type of coronavirus emerged in Wuhan, the capital city of Hubei Province in China [1]. COVID-19, caused by an unknown severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), began in the Chinese city of Wuhan in December 2020 [2]. Since then, the virus has rapidly spread throughout China and the rest of the world. As a result, on March 11, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic.

COVID-19 was first transmitted to the local population in Malaysia by travellers between January and February 2020, resulting in widespread infection in early March when the Tablighi Jamaat cluster of conditions emerged. The government enforced a movement control order (MCO) from March 18, 2020, to June 9, 2020, prohibiting citizens from organizing social activities or gatherings, including cultural, religious, athletic, work-related, and educational activities. Psychological discomfort in the population has been observed as a result of protracted isolation during movement lockdowns during outbreak epidemics; this appears as a variety of symptoms such as poor mood, insomnia, tension, anxiety, despair, frustration, irritability, and emotional tiredness [3]. The pandemic has a profound effect on the world's economies in several ways, including company closures, an increase in unemployment, a decrease in exports, a reduction in oil prices, an increase in hunger, an increase in the global death rate, and population growth [4].

The deadly virus appears to significantly impact people, causing terror, anger, tension, and anxiety. Previous research has shown that crises significantly impact individuals' work and psychological well-being. A crisis is a stressful and upsetting event in a person's life [5]. According to a previous study, the major job stressors include a severe workload with unrealistic deadlines, a work-family imbalance, and job uncertainty [6].

Depression, anxiety, and stress may make people more susceptible and vulnerable to the COVID-19 virus infection [6]. Workplace mental health disorders may be caused by excessively tight deadlines, repetitive work, an insufficient work climate, and dissatisfaction with peers and immediate superiors. Workers struggled with the strains of the COVID-19 pandemic, the emotional challenges of social isolation, and achieving work-life balance while working remotely. The same situation is not evocative or frustrating for everyone, and everyone does not experience the same negative thoughts and emotions when they are depressed or stressed. It must be tackled as a matter of severe occupational health. Therefore, any mental health

disorders such as depression, anxiety, and stress should be handled cautiously by the individual and their organizations, which should provide proper and practical support. Modern life, particularly during the COVID-19 outbreak, is full of mental health problems such as depression, anxiety, and stress. Even though depression is the leading cause of disability worldwide, it frequently goes undiagnosed and untreated. Meanwhile, anxiety is regarded as one of the three most harmful emotional factors, causing numerous incurable problems and disorders in a person's life [7].

Mental health issues are among the most expensive burdens that developing-world organizations and governments face. Psychological distress, identified as psychological and physical symptoms associated with an emotional state of distress, is a growing public health problem in Malaysia, with comparable social and economic effects and consequences [8–10]. In addition, the correlation between mental health and factory workers has been identified by several similar studies. They found that mental health problems were significantly higher with high job demands [11–13]. According to a Malaysian survey, 70% of respondents registered elevated anxiety levels during the early stages of the COVID-19 outbreak. Psychological distress is often associated with poor physical health and increased healthcare use, which harms employees and employers through reduced work participation, increased sick leave, and higher absenteeism and presentism [14]. The lack of effective treatment leaves people alone with these issues, leading to a downward spiral of despair [15]. The COVID-19 pandemic has intensified the global mental health crisis, with nearly one-third of Asia Pacific's remote workers admitting that the pandemic has worsened workplace burnout.

Since 2020, many studies have analysed the psychological impact of the COVID-19 pandemic on various populations, for example, studies among medical workers [16, 17], Chinese residents [18], older adults, children, and adolescents, and college students [19–21], educators such as teachers and lecturers [22]; however, so far there is still inadequate research on pharmaceutical manufacturing workers during the COVID-19 pandemic.

The main objective is to assess depression, anxiety, and stress among factory workers from different departments working during the COVID-19 pandemic. The association between sociodemographic characteristics, socioeconomic, organizational factors, work environmental factors, and special health conditions with depression, anxiety, and stress among factory workers working during the COVID-19 pandemic will also be explored and discussed in this paper.

2 Methodology

A cross-sectional study is conducted through an online survey to determine the worker's depression level, anxiety, and stress. A walkthrough observation is also performed to evaluate the significant factors of mental health disorders. The inclusion criteria were both male and female respondents work in different departments at the factory during the COVID-19 pandemic with provided informed consent to

participate in the study. Meanwhile, respondents who are severely ill and not in a condition to answer the questions were excluded from the study.

2.1 Participants

Pharmaceutical manufacturing is the selected company based in Sungai Petani, Kedah, Malaysia, ultimately controlled by the Malaysian government. The population's sample size is determined using the purposive sampling technique. This study focused on male and female workers in the factory. About 201 workers were involved in this study.

2.2 Instrumentation

The respondents self-administer the structured self-report questionnaire through an online survey that consists of three parts.

Part I—Information related to sociodemographic characteristics of manufacturing workers.

Part II—Questionnaire related to factors associated with depression, anxiety, and stress such as sociodemographic characteristics, socioeconomic status, organizational factors, environmental factors, and particular health conditions.

Part III—Based on the depression, anxiety, and stress scale–21 (DASS-21) [23]. Each of the three DASS-21 scales have seven items broken down into subscales of the same material. Since it is freely available on the DASS-21 official website, the translation has been widely used in Malaysia [24]. In addition, the DASS-21 is a validated tool used in different Malaysian people to identify depression, anxiety, and stress symptoms.

2.3 Data Analysis

Statistical Package for Social Sciences (SPSS) software version 2.0 was used. Descriptive analysis is calculated, including the frequency, percentage mean, and standard deviation. Pearson's chi-square test and multivariate analysis are used in this study. In this study, the Pearson's chi-square test and multivariate analysis will be used. The significance level will be set at 0.05 for the analyses. This test was selected because the analysed data were categorical and involved the associations for two variables. Data normality test was conducted by using the Kolmogorov–Smirnov test with $p > 0.05$ taken as the normal distribution.

3 Result

3.1 Demographic Analysis

Based on Table 1, most respondents are between 31 and 40 years old, which is 103 (51.2%). Respondents aged between 21 and 30, and 41 and 50 years old are 39 (19.4%) and 30 (14.9%), respectively, while the rest, only 29 (14.4%) people, are age 50 years old. Most of the respondents are female, that is 119 (59.2%) people, while the rest, only 82 (40.8%) respondents, are male. Most of the respondents' religion is Islam, which is 180 (89.6%), followed by the Hindu, which is 19 (9.5%), while the rest, only 1 (0.5%), belong to others. 79.1% are married, 15.9% are unmarried, and 5.0% of the respondents are divorced/separated. The type of family, socioeconomic factors, and other essential elements that are required in this study are also provided in the table.

3.2 Depression, Anxiety, and Stress

Figure 1 shows the descriptive finding of depression, anxiety, and stress level among workers. Based on Fig. 1, 10.95% of respondents had mild levels of depression, 6.47% had a moderate level of depression while only 1.00% and 0.50% of the respondents had a severe and extremely severe levels of depression, respectively. For the anxiety levels among respondents where the majority of the respondents, i.e. 78.11%, had a normal level of anxiety, 5.97% had mild level of anxiety, and 10.45% had a moderate level of anxiety whereas 2.99% and 2.49% of the respondents had a severe and extremely severe level of anxiety respectively. On the stress scale findings of DASS-21, the majority of the respondents (92.54%) had a normal level of stress, 4.48% of the respondents had mild level of stress, whereas the moderate and severe levels of stress both had 1.49% and there were no respondents that had an extremely severe level of stress during COVID-19 pandemic.

3.3 Depression, Anxiety, Stress and Demographic Factors

The multivariate analysis for the depression, anxiety, and stress toward demographic factors in Table 2 revealed that females are almost twofold more likely to have anxiety compared to males (AOR (adjusted odd ratio) = 1.944, CI (confidence interval) = 0.795–4.753). Respondents aged between 31 and 40 years old were significantly threefold more likely to have depression (AOR = 3.463, CI = 1.132–10.596) compared to those with the chance of developing anxiety and stress. Surprisingly, married people were found to have a higher chance of developing depression significantly (AOR = 5.942, CI = 2.008–7.588) compared to anxiety and stress.

Table 1 Demographic analysis of the study respondents

Variables	Category	Number	Percentage (%)
Age	20–30 years' old	39	19.4
	31–40 years' old	103	51.2
	41–50 years' old	30	14.9
	> 50 years old	29	14.4
Gender	Female	119	59.2
	Male	82	40.8
Religion	Islam	180	89.6
	Christianity	1	0.5
	Hindu	19	9.5
	Buddhism	1	0.5
Marital status	Unmarried	32	15.9
	Married	159	79.1
	Divorced/separated	10	5.0
Race group	Malay	179	89.1
	Indian	21	10.4
	Chinese	1	0.5
Family type	Nuclear	173	86.1
	Extended	6	3.0
	Joint	10	5.0
	Blended	12	6.0
Socio-economic Status	Bottom 40% (B40)	147	73.1
	Middle 40% (M40)	49	24.4
	Top 20% (T20)	5	2.5
Total family income	<RM3000	147	73.1
	RM4000-RM6999	40	19.9
	RM7000-RM9999	9	4.5
	>RM10000	5	2.5
Training/orientation of COVID-19	Yes	22	10.9
	No	179	89.1
Working hours per day	6–10 h	196	97.5
	11–15 h	5	2.5
	>15 h	0	0
Current work condition	Work from home	15	7.5
	Day shift work (morning-evening)	179	89.1
	Swing shift work (afternoon-midnight)	4	2.0
	Night shift work (midnight-morning)	3	1.5
Working experience (years)	<1 year	3	1.5
	1–3 years	28	13.9
	4–6 years	15	7.5
	>6 years	155	77.1

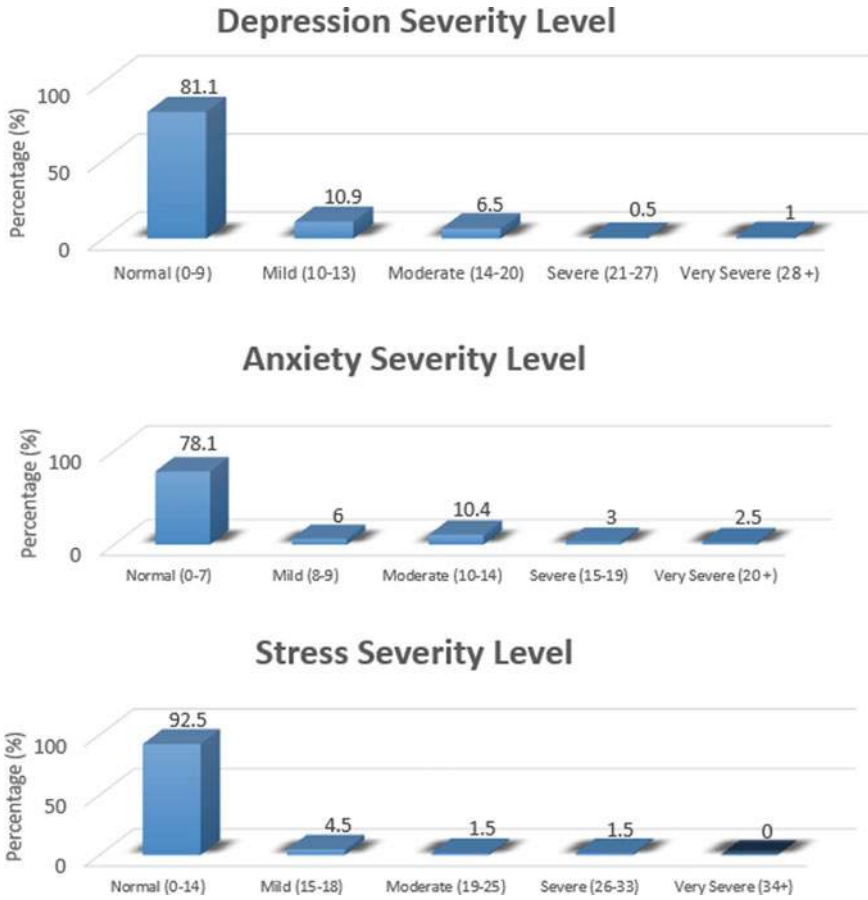


Fig. 1 Depression, anxiety, and stress severity level of the respondents (N = 201)

3.4 Depression, Anxiety, Stress and Socioeconomic Factors

Table 3 shows the factor analysis for socioeconomic status; those who live at Semeling were found to have threefold higher and more likely to have stress symptoms (AOR = 3.366, CI = 1.366–5.904) compared to those who live in Gurun (AOR = 2.899, CI = 0.899–2.899) and Sungai Petani (AOR = 1.859, CI = 0.270–2.307); however, it is not significant. Compared to other levels of education like degree, SPM (Malaysian secondary school certificate), and SKM (Malaysian technical certificate), those with Diploma were found to have a higher chance of developing Stress (AOR = 6.090, CI = 1.926–4.680) significantly. But, for the family income, no significant result was found to relate to the perceived depression, anxiety or stress among workers.

Table 2 Depression, anxiety, stress and demographic

Variables	Depression			Anxiety			Stress		
	p-value	Odd ratio	95% CI	p-value	Odd ratio	95% CI	p-value	Odd ratio	95% CI
Gender									
		Female (ref: male)							
	0.582	0.815	[0.393,1.689]	0.145	1.944	[0.795,4.753]	0.668	1.345	[0.347,5.210]
Age (ref: 20-30 years old)									
	0.029*	3.463	[1.132,10.596]	0.735	0.828	[0.276,2.480]	0.649	0.692	[0.143,3.363]
	0.539	1.559	[0.379,6.420]	0.390	1.999	[0.412,9.691]	0.690	0.636	[0.069,5.888]
	0.126	4.570	[0.653,1.969]	0.204	4.290	[0.454,4.536]	0.158	0.121	[0.006,2.268]
Marital status									
	0.001*	5.942	[2.008,7.588]	0.719	1.231	[0.397,3.813]	0.314	0.458	[0.100,2.091]

Note: Odd Ratio [95% Confidence Intervals]

Significant if $p < 0.05$

Table 3 Depression, anxiety, stress and socioeconomic factors

Variables		Depression		Anxiety		Stress	
		p-value	Odd ratio[95% CI]	Sig	Odd ratio [95% CI]	p-value	Odd ratio[95% CI]
Current residence (ref: others)	Sungai Petani	0.850	1.260 [0.114,3.890]	0.868	0.816 [0.075, 8.920]	0.994	1.859 [0.270, 2.307]
	Gurun	0.694	0.477 [0.012,1.883]	0.694	0.477 [0.012, 1.883]	0.630	2.899 [0.899, 2.899]
	Semeling	0.315	0.177 [0.006,5.176]	0.995	1.191 [0.000, 1.294]	1.000	3.366 [1.366, 5.904]
Level education (ref: others)	SPM	0.938	1.095 [0.111,1.808]	0.611	0.557 [0.058, 5.334]	0.000*	2.351 [1.051, 4.094]
	Diploma	0.912	1.156 [0.088,5.253]	0.809	0.732 [0.058, 9.160]	0.000*	6.090 [1.926, 4.680]
	Degree	0.502	0.450 [0.044,4.617]	0.550	0.491 [0.047, 5.073]	0.336	1.056 [3.973, 6.391]
Family income (ref: > RM10000)	<RM3000	0.567	0.408 [0.019,8.781]	0.295	3.886 [0.306, 4.346]	0.169	2.483 [0.384, 4.179]
	RM4000–RM6999	0.383	0.246 [0.011,5.745]	0.336	3.730 [0.255, 4.508]	0.398	4.166 [0.152, 4.336]
	RM7000–RM9999	0.793	0.602 [0.014,6.648]	0.655	1.991 [0.097, 4.699]	0.242	1.473 [0.777, 4.739]

Note Odd Ratio [95% Confidence Intervals]

Significant if $p < 0.05$

3.5 Depression, Anxiety and Stress Among Workers in Relation to the Organizational Factors

Table 4 shows that workers with work experience of 1–3 years were found to be twofold more likely to have depression symptoms significantly (AOR = 2.187, CI = 0.319–4.451) compared to those who are working almost 6 years. This analysis shows there is a higher chance of developing anxiety symptoms of the workers who work for 6–10 h per day compared to depression and stress symptoms. Compared to swing shift workers, those who work from home (AOR = 1.980, CI = 0.886–6.801) and day shift (AOR = 1.787, CI = 0.587–7.874) are found to be more likely to have stress. Respondents who work at a facility with known or suspected COVID-19

patients were found to have stress symptoms and were less likely to have depression and anxiety. However, the finding is not significantly proven.

Respondents who stated that the company has no plan to care for those infected with COVID-19 were found to have anxiety symptoms. Respondents said the company provides adequate staff to manage COVID-19 patients (AOR = 1.719, CI = 0.654–4.519), and who have been exposed to patient COVID-19 (AOR = 3.731, CI = 0.729–9.102) were more likely to develop chance of getting anxiety symptoms. Unfortunately, with adequate provisions of personal protective equipment supply at the workplace, the respondents were likely to develop depression (AOR = 1.667, CI = 0.850–3.421) and anxiety (AOR = 1.770, CI = 0.590–1.557) compared to stress symptoms. However, the result of the analysis showed that working with 6 to 10 h represent a significance source of anxiety (AOR = 4.405, CI = 1.133, 6.712). Similarly finding studies demonstrated that the excessive working hour shows the associated with anxiety [25–27]. Physical exhausted when workers were involved in extended working hour compared to sharing some time with their family [28]. Other findings regarding the depression, anxiety and stress among workers in relation to the organizational factors may be found in Table 4.

4 Discussion

Based on this research finding, most of the workers who participated in the survey claimed they had not received any COVID-19 training or orientation. However, the company's Safety, Health and Environment (SHE) executive explained that the terms "training" and "orientation" may have various meanings and understandings among employees. Any training or orientation must be a face-to-face event. The company's SHE executive noted that the phrase and the safety awareness that has been provided to the staff might be misunderstood. At their factory, there is no face-to-face training or orientation for COVID-19 due to the standard operating procedure (SOP) that has been implemented since the pandemic. Based on the finding, it can be seen that workers are so worried about Covid-19, and all the control measures for the prevention of Covid-19 infections disturb the workers' emotions. The PPE provision at the workplace during that time also may trigger depression and anxiety among them.

During the COVID-19 epidemic, the company's SHE team has already conducted the COVID-19 orientation program to all departments at the end of December 2019, even before the COVID-19 outbreak in Malaysia. Perhaps some of the staff are ignorant of or misunderstand the previous orientation. Various safety awareness programs and training in various forms of delivery and platform are used to protect the safety and health of their personnel during COVID-19.

This included improvements to the COVID-19 orientation programs, COVID-19 briefing SOP, an online survey, COVID-19 SOP slide management, and regular reminders of all these initiatives via every company's online platform, including group WhatsApp, Telegram, email, and even a video which was always attempting

Table 4 Depression, anxiety, stress and organizational factors

Variables	Depression			Anxiety			Stress		
	p-value	Odd ratio [95% CI]		p-value	Odd ratio [95% CI]		p-value	Odd ratio [95% CI]	
Working experiences (ref: <1 year)	1-3 years	2.187 [0.319, 4.451]		0.530	0.407 [0.025, 6.715]		0.000*	1.316 [3.015, 5.740]	
	4-6 years	1.885 [0.055, 4.982]		0.949	1.118 [0.037, 3.826]		0.974	0.833 [0.419, 4.981]	
	>6 years	0.028* 1.975 [1.376, 8.457]		0.952	0.921 [0.061, 3.877]		0.045*	1.399 [1.783, 5.399]	
Working hours/day	6-10 h (ref: 11-15 h)	1.237 [0.032, 8.297]		0.000*	4.405 [1.133, 6.712]		0.018*	1.366 [1.179, 9.719]	
Current work condition (ref: night shift)	Work from home	0.536 0.207 [0.001, 0.240]		0.000*	1.572 [0.372, 2.699]		0.000*	1.980 [0.886, 6.801]	
	Day shift	0.906 0.748 [0.006, 1.960]		0.000*	1.286 [1.033, 5.867]		0.000*	1.787 [0.578, 7.874]	
	Swing shift	0.996 0.798 [0.524, 4.588]		1.000	0.832 [0.000, 0.184]		0.427	0.890 [0.000, 0.897]	
COVID-19-19 training/ orientation	Yes (ref: no)	0.364 0.562 [0.162, 1.954]		0.264	0.511 [0.157, 1.658]		0.181	1.753 [0.484, 6.704]	
Work at facility with known or suspected with COVID-19 (Ref: DO not know)	Yes	0.412 0.541 [0.125, 2.345]		0.956	0.956 [0.279, 3.341]		0.390	2.261 [0.351, 4.541]	
	No	0.986 0.982 [0.136, 7.113]		0.099	1.084 [0.693, 2.365]		0.871	0.758 [0.027, 1.571]	
Adequate number of staff to manage the COVID-19 patients (ref: do not know)	Yes	0.542 0.722 [0.253, 2.058]		0.272	1.719 [0.654, 4.519]		0.684	1.384 [0.289, 6.619]	
	No	0.979 1.019 [0.242, 4.292]		0.943	1.047 [0.293, 3.740]		0.382	0.450 [0.075, 2.698]	

(continued)

Table 4 (continued)

Variables	Depression		Anxiety		Stress	
	p-value	Odd ratio [95% CI]	p-value	Odd ratio [95% CI]	p-value	Odd ratio [95% CI]
Current work condition exposed to a patient with suspected or confirmed COVID-19 (ref: do not know)	Yes	0.530 0.504 [0.059, 4.277]	0.114	3.731 [0.729, 9.102]	0.974	0.957 [0.065, 3.984]
	No	0.602 0.548 [0.057, 5.242]	0.042*	1.443 [1.071, 8.765]	0.801	0.689 [0.038, 2.368]
Provision of PPE supply at department (ref: no)	Yes, adequate	0.065 1.677 [0.850, 3.421]	0.993	1.770 [0.590, 1.557]	0.447	0.392 [0.035, 4.377]
	Yes, but not adequate	0.135 1.250 [0.456, 2.920]	0.993	1.034 [0.689, 2.526]	0.052	0.930 [0.030, 3.501]
Provision of isolation for COVID-19 patients	Yes	0.824 1.193 [0.252, 5.660]	0.700	1.335 [0.308, 5.798]	0.167	3.674 [0.580, 3.285]
	No	0.283 0.316 [0.039, 2.586]	0.632	1.733 [0.183, 1.643]	0.819	1.334 [0.113, 1.571]
Preparation for workflow management	Yes	0.023* 1.934 [1.242, 9.611]	0.083	0.136 [0.014, 1.294]	0.829	1.373 [0.077, 2.448]
	No	0.361 0.248 [0.012, 1.493]	0.000*	1.661 [0.677, 1.743]	0.230	0.414 [0.145, 1.930]

Note Odd Ratio [95% Confidence Intervals]

Significant if $p < 0.05$

to play at the café. Their fears and anxiety while working during the epidemic resulted from their concerns about COVID-19 management planning. As a result, the corporation should have provided a clear explanation or briefing detailing the effort of safety awareness that they undertook at the company during the COVID-19 pandemic to ensure that all workers were aware of and understood the orientation and safety training surrounding COVID-19.

5 Conclusion

In conclusion, the organizational factors, environmental factors and the relationship between these elements and depression, anxiety and stress levels were examined, presented and discussed, and the study showed that most of the workers had a normal severity of depression, anxiety and stress. This study also found that depression and anxiety have a significant correlation with sociodemographic and organizational factors. Meanwhile, stress has a significant correlation with socioeconomic and organizational factors only. Finally, future research could investigate whether the study's findings can be proceeded into post pandemic or endemic phase.

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