Prevalence and Level of Depression, Anxiety and Stress Among Frontliners Using the Depression, Anxiety and Stress Scale (DASS)-21 in a Tertiary Hospital in Manila, Philippines During the COVID-19 Pandemic: a Cross-Sectional Study

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ABSTRACT

Background COVID-19 was declared as a pandemic by the World Health Organization (WHO) in March 2020. It has affected millions globally and remains as a public health concern until today.

Objectives The study aims to identify the prevalence of depression, anxiety and stress among UST hospital frontliners during the COVID-19 pandemic using the Depression, Anxiety and Stress Scale (DASS)-21 scale.

Methods A cross-sectional study was conducted among 272 frontliners in a tertiary hospital in Manila, Philippines using the DASS-21 scale.

Results Based on data gathered from the responses of participants using the DASS-21 scale, the prevalence of depression, anxiety and stress among the frontliners were 28.68%, 35.66% and 14.71%, respectively. Being single, living alone, higher degree of educational attainment (postgraduate), trainees (residents and fellows) and those having pulmonary comorbidities were associated with increasing level of depression and stress. Respondents who had less work experience (less than 5 years) had significant depression; being single presented with higher anxiety; and those who had a previous COVID-19 infection had higher degree of stress.

Conclusion Several demographic and occupational characteristics, in accordance to the COVID-19 pandemic, yielded significant results regarding the presence of depression, anxiety and stress. The study recommends closer follow-up of participants which recorded high severity scores in the DASS-21 scale as well as regular psychological

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briefing and counseling to assess if there are other contributory factors to such responses. Ultimately, this may enlighten us on how to provide holistic care to our own hospital staff.

Keywords COVID-19, Depression, Anxiety, Stress, DASS-21 scale

INTRODUCTION

The coronavirus disease (COVID-19) is a disease caused by the SARS-CoV-2 virus presenting with flu-like symptoms that originated in Wuhan, China. It was declared a pandemic by the World Health Organization (WHO) last March 11, 2020. The pandemic has caused great panic, anxiety and depression to various populations overseas leading to poor sleep quality.[1] Depressive symptoms and suicide risk increased among the general population regardless of whether they contracted the virus or not.[2]

In the Philippines, more than the pandemic, there was a shortage of personal protective equipment and difficulty in sourcing protective equipment for the frontliners and healthcare workers,[3] increasing the risk of transmission in the healthcare setting. Furthermore, hospitals were not equipped with adequate beds and room to accommodate the surge of patients, overwhelming the healthcare facilities causing patients to stay at the emergency room for days while awaiting room availability.[4,5] Additionally, exposure to COVID-19 positive patients and COVID suspects caused fear of infection and transmitting the virus to their families. Prolonged working hours due to high number of cases and inadequate healthcare workers contributed to the stress, fatigue and depression.[6]

It is thus important to know the impact of the current pandemic on the mental health of our frontliners. The extent of depression, stress and anxiety should be properly addressed through hospital management. The generated data would also increase awareness about the mental health of frontliners in the country which, hopefully, can lead to national legislation supporting this cause. The aim of this study is to identify the prevalence of depression, anxiety and stress among frontliners in a tertiary hospital during the COVID-19 pandemic using the Depression, Anxiety and Stress Scale (DASS-21).

METHODOLOGY

Study Design

This was a cross-sectional descriptive study that included the frontliners, both medical and non-medical, of the University of Santo Tomas Hospital, Sampaloc, Manila. The hospital is a tertiary hospital in the country's capital with a 700-bed capacity. It was one of the designated hospitals that accommodated both COVID and non-COVID patients.

Study Population

The target population involved regular staff at the hospital aged 18 to 60 years old. Medical staff included consultants, fellows, residents, nurses, medical technologists, pharmacists, respiratory therapists and radiation technologists, while the non-medical personnel included nurse aides, guards, janitors and billing clerks. Those with prior medical diagnosis of depression and anxiety by a psychiatrist were excluded.

The following data regarding participants will also be included in the study: age, sex, profession, designated area of work, educational attainment, years of affiliation with the hospital, marital status, parental status (no children, has children <18 years old, has children >18 years old, has children >18 years old and <18 years old), extent of COVID exposure (direct contact with a confirmed case, direct contact with a suspected case, indirect contact with a confirmed case, indirect contact with a suspected case, no exposure to confirmed case and suspected case) COVID exposure, previous COVID infection, living status (living alone, living with one person, two persons, three to five persons, more than five persons) and comorbidities.

Sample Size

The University of Santo Tomas employs 850 frontliners, working both on the medical and non-medical field, who work in the frontlines together against COVID-19. A minimum of 341 frontline healthcare workers was required for this study based on the prevalence of normal stress of 66.7[7] in frontline healthcare workers, level of significance of 5% and precision of +5%. The adjusted sample size based on a population of 850 was 244. The participants were selected by convenient sampling.

Research tool – the Depression, Anxiety and Stress Scale (DASS)-21

The DASS-21 is a set of three self-report scales with seven items per scale that measures the state of a person's depression, anxiety and stress. It has seven items each and the total score varies from 0 to 21 points. The score on each scale will be tallied and assessed accordingly; a higher score shows increased stress, anxiety and depression of the subject.[8]

Several studies have shown that the scale has good internal reliability and was valid in the evaluation of depression, anxiety and stress before and during the COVID-19 pandemic.[9,10] It has no direct implications nor was used as a diagnostic test for depression, anxiety and stress unlike Diagnostic and Statistical Manual of Mental Disorders (DSM) and International Classification of Diseases (ICD).[8]

Data Collection

Data collection commenced upon receiving approval from the Research Ethics Committee, and from different departments involved which was done last July to September 2022. Questionnaires were personally given to answer, upon signing the informed consent. The participants will be given 24-48 hours to answer, and return it to the principal investigator. The participants may choose to answer either the English version or Filipino version of the DASS-21; they may choose to answer the questionnaire privately, and return it to the investigator once completed.

Statistical Analysis

Descriptive statistics was used to summarize the general and clinical characteristics of the participants. Independent/paired sample T-test, Mann-Whitney U/Wilcoxon Signed rank test and Fisher's Exact/ Chi-square test was used to determine the difference of mean, median and frequency between groups, respectively. Kruskal-Wallis test and Fisher's Exact test was used to determine the difference of mean, median and frequency, respectively. Odds ratios and the corresponding 95% confidence interval from binary logistic regression was computed to determine the association between profiles and depression, anxiety and stress. All valid data was included in the analysis. Missing variables were neither replaced nor estimated. Null hypothesis was rejected at 0.05 α-level of significance. R 4.1.2 was used for data analysis.

Ethical Considerations

This study was reviewed by the University of Santo Tomas Hospital - Research Ethics Committee (USTH-REC). An informed consent from each participant was obtained prior to the start of this study.

RESULTS

We analyzed responses from 272 hospital frontliners (Table 1). Their median age was 34 years, female to male ratio was 3:2 and most were single (60%) and without children (64%). A third of respondents (33%) were living with three to five other household members. About 86% were at least college graduates, and most commonly worked in the nursing services (36%) or as allied health professionals (22%). The majority had worked at the hospital for less than five years (47%).

The most reported comorbid illness was cardiovascular disease (20%). Slightly over half (52%) already had a history of SARS-CoV-2 infection. The most frequent designations of work were non-COVID-19 wards (54%), ancillary units (41%), COVID-19 wards (35%), and emergency room (33%).

More than half of the respondents (57%) had normal scores for DASS-21. There were 37 (13.60%) respondents who had increased scores in all depression, anxiety and stress domains. There were 18 with depression only, 37 anxiety only, and 1 with stress only. There were 22 (8.09%) with increased scores for depression and anxiety but not for stress, and 1 each for depression and stress yet no anxiety, and for anxiety and stress but without depression.

Among the medical staff (n=223), the prevalence of severe to extremely severe depression, anxiety and stress among respondents were 6.73%, 9.42% and 4.04%, respectively, while among the non-medical staff (n=49), the statistics were 2.04%, 6.12% and 0%, respectively. There was no statistically significant difference in the distribution of depression, anxiety and stress categories between medical and non-medical staff.

Among those who had a positive history for COVID-19 (n=142), the prevalence of severe to

Table 1 Clinico-demographic profile of respondents (n = 272)

	Frequency (%); Median (Range)
Age, years	34 (22–60)
Sex	
Male	111 (40.8)
Female	161 (59.2)
Marital status	
Single	164 (60.3)
Married	101 (37.1)
Widowed	6 (2.2)
Separated	1 (0.4)
Age of offspring(s)	
No children	173 (63.6)
<18 years	55 (20.2)
>18 years	29 (10.7)
Both <18 and >18 years	15 (5.5)
Living arrangement	
Alone	52 (19.1)
With 1 person	43 (15.8)
With 2 persons	40 (14.7)
With 3-5 persons	90 (33.1)
With >5 persons	47 (17.3)
Educational attainment	
High school or lower	38 (14)
College	168 (61.8)
Postgraduate	66 (24.3)
Profession	
Consultant	7 (2.6)
Fellow	19 (7)
Resident	38 (14)
Nursing services	98 (36)
Allied health professions	61 (22.4)
Non-medical staff	49 (18)
Years worked at USTH	
<5	128 (47.1)
5-10	46 (16.9)
11-15	24 (8.8)
16-20	21 (7.7)
>20	53 (19.5)
Designated area of work	
COVID-19 ward	96 (35.3)
Non-COVID-19 ward	147 (54)
Emergency room	90 (33.1)
Operating room	27 (9.9)
Ancillary units	111 (40.8)
Ambulatory care services	56 (20.6)
Administrative office	35 (12.9)
Janitorial services	12 (4.4)
Others	8 (2.9)
COVID-19 exposure	
Direct contact	
With confirmed case	147 (54)
With suspected case	145 (53.3)
Indirect contact	
With confirmed case	145 (53.3)
With suspected case	126 (46.3)
Prior COVID-19 infection	
Yes	142 (52.2)
No	130 (47.8)
Comorbidities	
Cardiovascular disease	55 (20.2)
Diabetes mellitus	22 (8.1)
Pulmonary disease	17 (6.2)
Arthritis	9 (3.3)
Chronic kidney disease	1 (0.4)
Liver disease	1 (0.4)
Malignancy	0 (0)
Cerebrovascular accident	0 (0)
Others	16 (5.9)

extremely severe depression, anxiety and stress among them were 7.75%, 11.97% and 4.93%, respectively; and among those not previously infected with COVID-19 (n=130), the prevalence rates were 3.85%, 5.38% and 1.54%, respectively. There was no statistically significant difference in the distribution of depression, anxiety and stress categories between staff with versus without COVID history.

The prevalence of depression, anxiety and stress were not statistically different between the medical (n=223) and non-medical staff (n=49). Between respondents with versus without COVID history, the prevalence of depression and anxiety were not significantly different. Meanwhile, stress was significantly higher in the COVID+ group at 19.72% versus 9.23%, p = 0.015.

Among the different demographic and baseline characteristics of respondents stratified according to the level of depression (Table 2), the following were found to be significant factors: age (p = 0.004), living arrangement (0.03), age of offspring (0.023), educational attainment (0.002), profession (p<0.001), number of years working in the hospital (p = 0.002), designated area of work (p = 0.016) and pulmonary disease (p = 0.011). Younger individuals, having no children, living alone, having postgraduate studies, nursing profession, having worked for less than five years at the hospital, working at the non-COVID ward, ambulatory care services and other areas like hospital grounds, and having pulmonary comorbidities are the characteristics found to be significant across the depression group. Moreover, other frontliner characteristics such as sex, marital status, COVID-19 exposure and prior COVID-19 infection were not statistically significant.

Among the frontliners, married frontliners were less likely to experience the risk of depression (cOR 0.33, 95% CI 0.17 – 0.06, p = <0.001). Frontliners with children <18 years old (cOR 0.30, 95% CI 0.12 – 0.64, p = 0.003), and with children >18 years old (cOR 0.28, 95% CI 0.08 – 0.76, p = 0.023) were also less likely to experience risk of depression. When it comes to living arrangements, respondents living with two persons (cOR 0.37, 95% CI 0.14 – 0.93, p = 0.040), and respondents living with >5 persons (cOR 0.26, 95% CI 0.09 – 0.66, p = 0.007), had lesser risk of depression.

Postgraduates were almost three times as likely to experience the risk of depression (cOR 2.94, 95% CI 1.21 – 7.75, p = 0.021). Among the staff, fellows were 20 times as likely to experience the risk of depression (cOR 20.29 95% CI 1.99 – 2771.63, p = 0.007), and residents were 14 times as likely to experience the risk of depression (cOR 13.54,

Table 2 Profile of respondents, by DASS-21 depression level (n = 272)

	None (n=194)	Mild – Moderate (n=62)	Severe – Ext. Severe (n=16)	*P*
	Frequency (%); Median (Range)			
Age, years	36 (22 - 60)	31 (23 – 58)	28 (23 – 50)	**.004**‡
Sex				.879†
Male	81 (41.8)	24 (38.7)	6 (37.5)	
Female	113 (58.2)	38 (61.3)	10 (62.5)	
Marital status				0.51§
Single	104 (53.6)	46 (74.2)	14 (87.5)	
Married	85 (43.8)	14 (22.6)	2 (12.5)	
Widowed	5 (2.6)	1 (1.6)	0	
Separated	0	1 (1.6)	0	
Age of offspring(s)				**.023**§
No children	110 (56.7)	49 (79)	14 (87.5)	
<18 years	47 (24.2)	7 (11.3)	1 (6.2)	
>18 years	25 (12.9)	3 (4.8)	1 (6.2)	
Both <18 and >18 years	12 (6.2)	3 (4.8)	0	
Living arrangement				**.030**§
Alone	31 (16)	14 (22.6)	7 (43.8)	
With 1 person	27 (13.9)	12 (19.4)	4 (25)	
With 2 persons	32 (16.5)	6 (9.7)	2 (12.5)	
With 3-5 persons	64 (33)	24 (38.7)	2 (12.5)	
With >5 persons	40 (20.6)	6 (9.7)	1 (6.2)	
Educational attainment				**.002**§
High school or lower	30 (15.5)	8 (12.9)	0	
College	127 (65.5)	35 (56.5)	6 (37.5)	
Postgraduate	39 (19.10)	19 (30.6)	10 (62.5)	
Profession				**<.001**§
Consultant	7 (3.6)	0	0	
Fellow	8 (4.1)	6 (9.7)	5 (31.2)	
Resident	20 (10.3)	13 (21)	5 (31.2)	
Nursing services	71 (36.6)	22 (35.5)	5 (31.2)	
Allied health professions	53 (27.3)	8 (12.9)	0	
Non-medical staff	35 (18)	13 (21)	1 (6.2)	
Years worked at USTH				**.002**§
<5	79 (40.7)	35 (56.5)	14 (87.5)	
5-10	31 (16)	14 (22.6)	1 (6.2)	
11-15	21 (10.8)	3 (4.8)	0	
16-20	21 (10.8)	0	0	
>20	42 (21.6)	10 (16.1)	1 (6.2)	
Designated area of work				
COVID-19 ward	64 (33)	23 (37.1)	9 (56.2)	.164†
Non-COVID-19 ward	98 (50.5)	35 (56.6)	14 (87.5)	**.016**†
Emergency room	61 (31.4)	20 (32.3)	9 (56.2)	.127†
Operating room	16 (8.2)	9 (14.5)	2 (12.5)	.351§
Ancillary units	87 (44.8)	19 (30.6)	5 (31.2)	.102†
Ambulatory care services	32 (16.5)	17 (27.4)	7 (43.8)	**.013**§
Administrative office	26 (13.4)	8 (12.9)	1 (6.2)	.786§
Janitorial services	9 (4.6)	3 (4.8)	0	.803§
Others	3 (1.5)	5 (8.1)	0	**.026**§

Table 2 Profile of respondents, by DASS-21 depression level (n = 272) (continued)

	None (n=194)	Mild – Moderate (n=62)	Severe – Ext. Severe (n=16)	*P*
	Frequency (%); Median (Range)			
COVID-19 exposure				
Direct contact				
With confirmed case	99 (51)	35 (56.5)	13 (81.2)	.060†
With suspected case	100 (51.1)	34 (54.8)	11 (68.8)	.399†
Indirect contact				
With confirmed case	99 (51)	34 (54.8)	12 (75)	.175†
With suspected case	86 (44.3)	29 (46.8)	11 (68.8)	.169†
Prior COVID-19 infection				.249†
Yes	96 (49.5)	35 (56.5)	11 (68.8)	
No	98 (50.5)	27 (43.6)	5 (31.2)	
Comorbidities				
Cardiovascular disease	44 (22.7)	8 (12.9)	3 (18.8)	.245§
Diabetes mellitus	19 (9.8)	3 (4.8)	0	.210§
Pulmonary disease	9 (4.6)	4 (6.5)	4 (25)	**.011**§
Arthritis	8 (4.1)	1 (1.6)	0	.426§
Chronic kidney disease	1 (0.5)	0	0	>.999§
Liver disease	1 (0.5)	0	0	>.999§
Malignancy	0	0	0	<.001§
Cerebrovascular accident	0	0	0	<.001§
Others	6 (3.1)	9 (14.5)	1 (6.2)	**.013**§

Statistical tests used: ‡ Kruskal-Wallis test; § Fisher's exact test; † Chi-square test.

95% CI 1.47 – 1802.14, p = 0.017) compared to consultants. Frontliners who worked for 11-15, 16-20 and more than 20 years were less likely to experience risk of depression (cOR 0.23, 95% CI 0.05 – 0.71, p = 0.022), (cOR 0.04, 95% CI 0 – 0.28, p = <0.001), and (cOR 0.42, 95% CI 0.19 – 0.87, p = 0.025), respectively.

In designated areas of work, frontliners who worked in ancillary units were less likely to experience risk of depression (cOR 0.55, 95% CI 0.31 – 0.95, p = 0.034), while those who worked in ambulatory care services were likely to experience the risk of depression (cOR 2.25, 95% CI 1.21 – 4.15, p = 0.009), and those who work in other designated areas such as hospital ground were four times as likely to experience the risk of depression (cOR 4.36, 95% CI 1.04 – 21.70, p = 0.48). Among the listed comorbidities, frontliners who have allergic rhinitis, polycystic ovary syndrome (PCOS), vertigo and such collectively were nearly five times as likely to experience the risk of depression (cOR 4.61, 95% CI 1.65 – 14, p = 0.004). We had insufficient evidence to demonstrate an association between the risk of depression with sex, COVID-19 exposure and prior COVID-19 infection.

Majority of the frontliners were single and experienced no anxiety (58%). Marital status was also significantly different (p = 0.038) across anxiety groups, with a higher proportion of married among those with none or mild to moderate anxiety versus severe anxiety.

Parental status or age of offspring/s was statistically significant (p = 0.016), where the majority have no children. Among the comorbidities, pulmonary disease was statistically significant (p = <0.001) across anxiety groups, with the severe group having relatively high proportion of pulmonary disease. In addition, age, sex, living arrangement, educational attainment, profession, years worked at the hospital, designated area of work, COVID-19 exposure, prior COVID-19 infection and some comorbidities were not statistically significant.

Having children or offspring and living arrangements were associated with the risk of anxiety. Specifically, respondents who had children (OR 0.42, 95% CI 0.21 - 0.83 for <18 years and OR

Table 3 Profile of respondents, by DASS-21 anxiety level (n = 272)

	None (n=175)	Mild – Moderate (n=73)	Severe – Ext. Severe (n=24)	*P*
	Frequency (%); Median (Range)			
Age, years	34 (22–60)	33 (23 – 58)	30 (23 – 56)	.192‡
Sex				.283†
Male	77 (44)	27 (37)	7 (29.2)	
Female	98 (56)	46 (63)	17 (70.8)	
Marital status				**.038**§
Single	101 (57.7)	45 (61.6)	18 (75)	
Married	70 (40)	27 (37.0)	4 (16.7)	
Widowed	4 (2.3)	1 (1.4)	1 (4.2)	
Separated	0	0	1 (4.2)	
Age of offspring(s)				**.016**§
No children	100 (57.1)	54 (74)	19 (79.2)	
<18 years	42 (24)	13 (17.8)	0	
>18 years	23 (13.1)	2 (2.7)	4 (6.7)	
Both <18 and >18 years	10 (5.7)	4 (5.5)	1 (4.2)	
Living arrangement				.223§
Alone	30 (17.1)	16 (21.9)	6 (25)	
With 1 person	25 (14.3)	11 (15.1)	7 (29.2)	
With 2 persons	32 (18.3)	5 (6.8)	3 (12.5)	
With 3-5 persons	58 (33.1)	27 (37)	5 (20.8)	
With >5 persons	30 (17.1)	14 (19.2)	3 (12.5)	
Educational attainment				.291§
High school or lower	27 (15.4)	9 (12.3)	2 (8.3)	
College	108 (61.7)	48 (65.8)	12 (50)	
Postgraduate	40 (22.9)	16 (21.9)	10 (41.7)	
Profession				.324§
Consultant	6 (3.4)	1 (1.4)	0	
Fellow	10 (5.7)	6 (8.2)	3 (12.5)	
Resident	22 (12.6)	9 (12.3)	7 (29.2)	
Nursing services	60 (34.3)	29 (39.7)	9 (37.5)	
Allied health	42 (24)	17 (23.3)	2 (8.3)	
professions	35 (20)	11 (15.1)	3 (12.5)	
Non-medical staff				
Years worked at USTH				.195§
<5	78 (44.6)	35 (47.9)	15 (62.5)	
5-10	25 (14.3)	18 (24.7)	3 (12.5)	
11-15	19 (10.9)	4 (5.5)	1 (4.2)	
16-20	17 (9.7)	4 (5.5)	0	
>20	36 (20.6)	12 (16.4)	5 (20.8)	
Designated area of work				
COVID-19 ward	60 (34.3)	25 (34.2)	11 (45.8)	.527†
Non-COVID-19 ward	92 (52.6)	38 (52.1)	17 (70.8)	.224†
Emergency room	57 (32.6)	24 (32.9)	9 (37.5)	.890†
Operating room	15 (8.6)	10 (13.7)	2 (8.3)	.428§
Ancillary units	71 (40.6)	32 (43.8)	8 (33.3)	.658†
Ambulatory care	35 (20)	14 (19.2)	7 (29.2)	.550§
services	27 (15.4)	6 (8.2)	2 (8.3)	.255§
Administrative office	8 (4.6)	4 (5.5)	0	.673§
Janitorial services	3 (1.7)	3 (4.1)	2 (8.3)	.132§
Others				
COVID-19 exposure				
Direct contact				
With confirmed case	89 (50.9)	42 (57.5)	16 (66.7)	.271†
With suspected case	89 (50.9)	41 (56.2)	15 (62.5)	.478†
Indirect contact				
With confirmed case	90 (51.4)	42 (57.5)	13 (54.2)	.677†
With suspected case	77 (44)	38 (52.1)	11 (45.8)	.510†

Table 3 Profile of respondents, by DASS-21 anxiety level (n = 272) (continued)

	None (n=175)	Mild – Moderate (n=73)	Severe – Ext. Severe (n=24)	*P*
	Frequency (%); Median (Range)			
Prior COVID-19 infection				.133†
Yes	86 (49.1)	34 (46.6)	7 (29.2)	
No	89 (50.1)	39 (53.4)	17 (70.8)	
Comorbidities				
Cardiovascular disease	36 (20.6)	14 (19.2)	5 (20.8)	.972§
Diabetes mellitus	17 (9.7)	5 (6.8)	0	.237§
Pulmonary disease	7 (4)	3 (4.1)	7 (29.2)	**<.001**§
Arthritis	6 (3.4)	3 (4.1)	0	.784§
Chronic kidney disease	1 (0.6)	0	0	>.999§
Liver disease	1 (0.6)	0	0	>.999§
Malignancy	0	0	0	<.001§
Cerebrovascular	0	0	0	<.001§
accident	8 (4.6)	6 (8.2)	2 (8.3)	.560§
Others				

Statistical tests used: ‡ Kruskal-Wallis test; § Fisher's exact test; † Chi-square test.

0.36 95% CI 0.13 - 0.87 for adult offspring) were less likely to have risk of anxiety and respondents who lived with two persons (OR 0.34, 95% CI 0.13 - 0.86) were also less likely to have risk of anxiety compared to those who lived alone.

Respondents' living arrangement, educational attainment, profession, particular designated areas of work, prior COVID-19 infection and particular comorbidities were found to be significantly associated to DASS-21 stress levels (Table 4). While most respondents with no stress (34.1%) and mild to moderate stress (35.5%) lived with three to five other people, most respondents with severe to extremely severe stress lived alone (55.6%). While most respondents with no stress (64.2%) and mild to moderate stress (54.8%) were college graduates, most respondents with severe to extremely severe stress had postgraduate degrees (77.8%). While most respondents with no stress (36.2%) and mild to moderate stress (38.7%) worked in nursing services, most respondents with severe to extremely severe stress were residents (55.6%). Most respondents with no stress (50.4%), mild to moderate stress (67.7%) and severe to extremely severe stress (100%) had worked in non-COVID-19 wards. Less than half of the respondents with no stress (43.5%) and severe to extremely severe stress (44.4%) worked in ancillary units, while 19.4% of those with mild to moderate stress did. Most respondents with no stress (17.7%), mild to moderate stress (32.3%) and severe to extremely severe stress (55.6%) worked in ambulatory care services. Around half of the respondents with no stress (49.1%), two-thirds of those with mild to moderate stress (67.7%) and more than three-fourths of respondents with severe to extremely severe stress (77.8%) had a history of COVID-19 infection.

Nine respondents with no stress (3.9%), five respondents with mild to moderate stress (16.1%) and three respondents with severe to extremely severe stress (33.3%) had pulmonary disease as comorbidities. Though significant, no respondents reported having malignancy or cerebrovascular accidents as comorbidities.

The following factors were found to be less likely to have the risk of stress: older age (OR 0.96, 95% CI 0.92 - 0.99), married status (OR 0.38, 95% CI 0.16 - 0.82), children <18 years (OR 0.17, 95% CI 0.03 - 0.57), living with more than 5 persons (OR 0.23, 95% CI 0.05 - 0.78) and diabetes mellitus (0.12, 95% CI up to 0.86).

Meanwhile, healthcare workers with postgraduate degrees were four times likely to have the risk of stress (OR 4.38, 95% CI 1.35 - 19.71), those working in a non-COVID ward were also three times likely to be stressed (OR 2.95, 95% CI 1.42 - 6.60), those who had a prior COVID infection were twice as likely to be stressed (OR 2.42, 95% CI 1.20 - 5.15) and those with a pulmonary comorbidity were six times as likely to be stressed (OR 6.19, 95% CI 2.18 - 17.37).

DISCUSSION

The study was conducted at a tertiary hospital in Manila, Philippines aiming to determine the

Table 4 Profile of respondents, by DASS-21 stress level (n = 272)

	None (n=232)	Mild – Moderate (n=31)	Severe – Ext. Severe (n=9)	*P*
	Frequency (%); Median (Range)			
Age, years	34 (22–60)	31 (23 – 57)	28 (23 – 33)	.012
Sex				.516§
Male	98 (42.2)	10 (32.3)	3 (33.3)	
Female	134 (57.8)	21 (67.7)	6 (66.7)	
Marital status				.057§
Single	134 (57.8)	21 (67.7)	9 (100)	
Married	93 (40.1)	8 (25.8)	0	
Widowed	5 (2.2)	1 (3.2)	0	
Separated	0	1 (3.1)	0	
Age of offspring(s)				.121§
No children	141 (60.8)	23 (74.2)	9 (100)	
<18 years	53 (22.8)	2 (6.5)	0	
>18 years	25 (10.8)	4 (12.9)	0	
Both <18 and >18 years	13 (5.6)	2 (6.5)	0	
Living arrangement				.040§
Alone	40 (17.2)	7 (22.6)	5 (55.6)	
With 1 person	33 (14.2)	8 (25.8)	2 (22.2)	
With 2 persons	36 (15.5)	3 (9.7)	1 (11.1)	
With 3-5 persons	79 (34.1)	11 (35.5)	0	
With >5 persons	44 (19)	2 (6.5)	1 (11.1)	
Educational attainment				.002§
High school or lower	35 (15.1)	3 (9.7)	0	
College	149 (64.2)	17 (54.8)	2 (22.2)	
Postgraduate	48 (20.7)	11 (35.5)	7 (77.8)	
Profession				.004§
Consultant	7 (3)	0	0	
Fellow	12 (5.2)	5 (16.1)	2 (22.2)	
Resident	27 (11.6)	6 (19.4)	5 (55.6)	
Nursing services	84 (36.2)	12 (38.7)	2 (22.2)	
Allied health professions	58 (25)	3 (9.7)	0	
Non-medical staff	44 (19)	5 (16.1)	0	
Years worked at USTH				.091§
<5	101 (43.5)	19 (61.3)	8 (88.9)	
5-10	41 (17.7)	4 (12.9)	1 (11.1)	
11-15	23 (9.9)	1 (3.2)	0	
16-20	21 (9.1)	0	0	
>20	46 (19.8)	7 (22.6)	0	
Designated area of work				
COVID-19 ward	77 (33.2)	14 (45.2)	5 (55.6)	.179§
Non-COVID-19 ward	117 (50.4)	21 (67.7)	9 (100)	.002§
Emergency room	74 (31.9)	11 (35.5)	5 (55.6)	.355§
Operating room	22 (9.5)	2 (6.5)	3 (33.3)	.059§
Ancillary units	101 (43.5)	6 (19.4)	4 (44.4)	.034§
Ambulatory care services	41 (17.7)	10 (32.3)	5 (55.6)	.007§
Administrative office	33 (14.2)	2 (6.5)	0	.266§
Janitorial services	10 (4.3)	2 (6.5)	0	.761§
Others	6 (2.6)	2 (6.5)	0	.422§
COVID-19 exposure				
Direct contact				
With confirmed case	121 (52.2)	19 (61.3)	7 (77.8)	.218§
With suspected case	119 (51.3)	21 (67.7)	5 (55.6)	.248§
Indirect contact				
With confirmed case	122 (52.6)	18 (58.1)	5 (55.6)	.887§
With suspected case	105 (45.3)	16 (51.6)	5 (55.6)	.696§

Table 4 Profile of respondents, by DASS-21 stress level (n = 272) (continued)

	None (n=232)	Mild – Moderate (n=31)	Severe – Ext. Severe (n=9)	*P*
	Frequency (%); Median (Range)			
Prior COVID-19 infection				.044§
Yes	114 (49.1)	21 (67.7)	7 (77.8)	
No	118 (50.9)	10 (32.3)	2 (22.2)	
Comorbidities				
Cardiovascular disease	51 (22)	3 (9.7)	1 (11.1)	.232§
Diabetes mellitus	22 (9.5)	0	0	.097§
Pulmonary disease	9 (3.9)	5 (16.1)	3 (33.3)	.001§
Arthritis	9 (3.9)	0	0	.555§
Chronic kidney disease	1 (0.4)	0	0	>.999§
Liver disease	1 (0.4)	0	0	>.999§
Malignancy	0	0	0	<.001§
Cerebrovascular accident	0	0	0	<.001§
Others	11 (4.7)	4 (12.9)	1 (11.1)	.136§

Statistical tests used: ‡ Kruskal-Wallis test; § Fisher's exact test.

prevalence of depression, anxiety and stress among its frontliners during the COVID-19 pandemic using the DASS-21 scale. Most of the participants of the study showed no symptoms of depression, anxiety and stress. Based on the data gathered, the prevalence of depression, anxiety and stress among the frontliners were 28.67%, 35.66% and 14.71%, respectively. These results were comparably higher compared to findings by Ming-Yu Si, et al., where 13.6%, 13.9% and 8.6% showed symptoms of depression, anxiety and stress, respectively.[11] In another study done by Tan, et al., 14.5%, 8.9% and 6.6% of healthcare workers' symptoms of anxiety, depression and stress, respectively were also lower compared to the data gathered.[12] The difference among these factors may be attributed to the following: possible longer working hours, lack of additional staff and availability of resources including medications, tests and equipment, all of which could have provided further strain to the care rendered to COVID-19 patients.

Results showed no significant difference between the levels of depression, anxiety and stress in terms of professional assignment (medical vs nonmedical staff) (p = 0.64, p = 0.73, p = 0.93). This finding may be attributed to: 1) properly placed and implemented health protocols and pathways within the hospital, 2) complete vaccination for COVID-19 offered by the hospital, 3) healthcare workers now being more knowledgeable about the disease and how it can be acquired and subsequently prevented and, 4) that there was no significant difference in the degree of exposure.

There was also no significant difference between prevalence of depression and anxiety in terms of previous COVID history; however, it was shown that respondents with previous COVID-19 infection had statistically significant increase in stress subscale compared to respondents without previous COVID-19 infection (19.72% vs 9.23%, p = 0.015). This may be due to: 1) fear of re-infection, 2) fear of spreading the disease to other people or family members and, 3) financial burden of re-infection (ie, hospitalization, medications, days without work and pay). The prevalence of stress and depression gathered in this study was lower in comparison to a study done by Banquirigo, et al., wherein healthcare workers were also in the Philippine setting but only those that previously tested positive for COVID-19 showed 46%, 54% and 32%, respectively.[13] This may be due to the timing of the study, wherein the data collection done by Banquirigo, et al., was done during the period where a possibly more virulent strain of COVID-19 was prevalent, and that the presentation of patients were more severe compared to the current predominant strain.[13] Furthermore, at present, there is a better understanding of the disease, complemented by succeeding vaccine boosters which may have contributed to lesser degree of measured variables.

Sociodemographic Factors

Among the respondents who showed symptoms of depression, it was seen that frontliners that are married, with children and living with two and

greater than five people are statistically with less risk of developing depression and stress. Furthermore, frontliners with no children were statistically higher in the severe to extremely severe depression group compared to none or mild to moderate depression group (p = 0.023). Subsequently, respondents who had children, who lived with two persons were found to have less risk of anxiety compared to respondents living alone, and in terms of stress subscale, results showed that 55.6% of respondents with severe to extremely severe stress lived alone. Results also showed that almost half (43.8%) of respondents with symptoms of severe to extremely severe depression lived alone. It was also noted that single people had statistically higher scores in the anxiety subscale when compared to those with none or mild to moderate versus severe anxiety (p = 0.038). These results are congruent to the study of Tee, et al., where the psychological impact of COVID-19 was assessed among the general population, and showed that respondents who were single and had no children had significantly higher stress, anxiety and depression scores.[14] The same results are seen in a study by Di Tella, et al., where single people have higher degree of depressive symptoms.[15] According to Dush, et al., married people have higher degree of well-being and social support;[16] furthermore, the support given by their spouses and loved ones may be of help to lessen the emotional burden brought about by the pandemic.

Occupational Characteristics

In this study, post-graduates were also three times as likely to experience risk of depression and four times likely to have risk of stress. Moreover, it was noted that more than half (62.5%) of those who showed symptoms of severe depression were postgraduates, especially the fellows-in-training which were 20 times likely to experience risk of depression, and residents-in-training who were 14 times likely to experience risk of depression compared to consultants. Likewise, respondents that showed severe to extremely severe symptoms of stress, 77.8% were postgraduates and 55.6% were residents. This may be attributed to the increased risk of contracting COVID-19 due to increased risk of exposure and directly handling the patients. Alshdaifat, et al., analyzed the impact of COVID-19 pandemic on the mental health of residents-in-training, where one of the reasons highlighted which affected the residents' mental health were the decreased number of workforce during the pandemic which may be due to increased number of on-call duties and doing nasopharyngeal swabs.[17] This is further supported by the study of Elbay, et al., which showed that physicians with longer working hours (who work both during daytime and nighttime shifts), have higher DASS-21 scores compared to physicians who work only during daytime or nighttime shift.[18] Therefore, this may also be the cause of increased risk of depression of this specific subset of population in this study since trainees usually work 24- to 48-hour duties, and have unpredictable duty schedules due to unprecedented quarantine of their colleagues due to COVID-19 infection, hence longer working hours for trainees.

In addition, results showed that of respondents with symptoms of mild to moderate stress, 54.8% were college graduates and 38.7% worked in nursing services. This is in line with the study done by Nadeem, et al. that showed mild stress in nurses during the COVID-19 pandemic. Several reasons stated were fear of getting sick and development of disease-related complications.[19] In a national cross-sectional study done by Prasad, et al., female nurses were found to have higher risk of stress during the pandemic. Several factors contributory to this are gender related discrimination, expectations in providing care and higher workload at home;[20] our study showed no significant difference in terms of sex and symptoms of stress. In our setting, increased risk of stress by nurses may be due to decreased workforce in our country leading to longer working hours, understaffed wards, unpredictable schedules accompanied by financial burden.[21]

The data gathered also showed increased scores in depression subscale of frontliners who worked less than five years (p = 0.002). This is comparable to the study by Elbay, et al., which cited that respondents with less work experience have increased scores in the survey.[18] This may be due to poor familiarity with the institution, and higher level of adjustment compared to healthcare workers who have been working at the same institution for a longer period of time.

Health Status

Pulmonary disease, allergic rhinitis and PCOS were statistically significant in terms of depression subscale

(p = 0.011 and p = 0.013). Also, it was noted that in patients with pulmonary comorbidities, 16.1% had mild to moderate symptoms of stress and 33.3% had severe to extremely severe symptoms of stress. This is in contrast to the study done by Banquirigo, et al., which showed diabetes to be statistically significant in respondents with depression.[13] Increased risk for depression in respondents with existing pulmonary disease may be due to the knowledge of increased risk of developing severe COVID-19 infection (higher need for intensive care unit admission and mechanical ventilation, and higher mortality) in patients with pre-existing pulmonary disease.[22]

There are several limitations in this study. First, this study was done during a period where the surge of cases had decreased and where second doses of booster vaccines were already administered, and second, the socioeconomic status of each respondent was not assessed, both of which may have contributed to the results of this study. Third, this is a self-reported study which is a subjective rather than objective study as medical data or data reported were not counterchecked with any medical records. Lastly, there may have been selection bias due to the voluntary nature of the study.

CONCLUSION

In the study, it was shown that being single, living alone, higher degree of educational attainment (postgraduate), trainees (residents and fellows) and having pulmonary comorbidities had higher scores for depression and stress. Respondents who had less work experience (less than 5 years) had significant depression; being single presented with higher anxiety; and those who had a previous COVID-19 infection had a higher degree of stress. The study recommends a close follow up to the participants who recorded high severity scores in the DASS 21 scale as well as regular psychological briefing and counseling to assess if there are other contributory factors to such responses. Ultimately, this may enlighten us on how to provide holistic care to our own hospital staff.

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