International Journal of Community Medicine and Public Health
Pujari J et al. Int J Community Med Public Health. 2024 Feb;11(2):921-935
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20240288

Original Research Article

A cross sectional study to assess the anxiety, stress and depression among nurses during COVID-19 at selected hospitals, Udaipur

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Received: 20 December 2023
Revised: 09 January 2024
Accepted: 10 January 2024

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ABSTRACT

Background: This study aims to assess anxiety, stress, and depression levels among nurses working during the COVID-19 pandemic.
Methods: A quantitative non-experimental approach was employed, utilizing a descriptive cross-sectional design with 300 nurses selected through simple random sampling. Data collection included demographic and clinical variables. Anxiety, stress, and depression levels were measured using the Beck anxiety inventory (BAI), perceived stress scale, and Hamilton depression rating scale, respectively. Pearson's correlation and Chi-square tests were used for analysis in statistical package for the social sciences (SPSS).
Results: A majority of staff nurses experienced mild anxiety (53.7%), stress (64.3%), and depression (71.7%). Scores indicated mean anxiety (14.42, SD=4.46), stress (13.74, SD=3.13), and depression (18.23, SD=4.23). Positive correlations were found between stress-anxiety ($p=0.002$, $r=0.376$) and anxiety-depression ($p=0.040$, $r=0.119$). A weak correlation existed between stress and depression ($p=0.068$, $r=0.105$). Anxiety correlated with age, professional experience, and marital status ($p<0.05$), while stress correlated with age and professional experience ($p<0.05$). Depression correlated with professional experience and marital status ($p<0.05$). Work-related variables and fears were associated with anxiety and stress but not depression among staff nurses during COVID-19.
Conclusions: The study underscores widespread mild anxiety, stress, and depression among nurses during the pandemic, emphasizing their interconnection. Age, professional experience, and marital status influenced mental health outcomes. Tailored interventions and targeted support are crucial to address these challenges and enhance nursing well-being. Healthcare institutions should prioritize implementing such strategies to bolster nurses' resilience and effectiveness in navigating ongoing and future challenges.

Keywords: Assess, Anxiety, Stress, Depression, Nurses, COVID-19

INTRODUCTION

The World Health Organization (WHO) identified the newly detected coronavirus (nCoV), subsequently known as coronavirus disease-2019 (COVID-19), as a public health emergency of international concern (PHEIC) at the end of January 2020. Coronaviruses are naturally divided into four primary types: gammacoronavirus, deltacoronavirus, betacoronavirus, and alphacoronavirus. Human CoVs come in six unique subtypes, including Betacoronaviruses HCoV229E and HCoV-NL63, alphacoronaviruses HCoVHKU1 and HCoV-OC43, middle east pulmonary syndrome coronavirus (MERS-CoV), and severe acute lung disease coronavirus (SARS-CoV). It is well known that SARS-CoV and MERS-CoV are incredibly virulent and infectious, originating from bats to dromedary camels or palm civets and lastly to humans.[1] The CDC states that symptoms may begin to show 2–14 days after viral exposure, and asymptomatic individuals may potentially spread the virus, primarily through contact with other people but also through aerosols from the

respiratory system. Children and infants are also at risk of getting the virus and developing severe sickness, as are elderly persons with underlying health problems.[2]

On 30 January 2020, India detected its initial instances of COVID-19 when three medical students from India, who had recently returned from Wuhan, were found to be infected. Lockdowns were implemented in Kerala on 23 March and extended to the rest of the nation on 25 March. In September, there was a decline in the rate of infections, with cases dropping from more than 90,000 per day in mid-September to fewer than 15 thousand in January of 2021. A more severe second wave emerged in March 2021, leading to severe limitations of healthcare supplies such as cylinders of oxygen, beds in hospitals, and vaccines in different regions of the country. By the end of April, India had the highest number of active COVID-19 cases globally, reporting over four million new cases in a single day on 30 April 2021. In late August 2021, Soumya Swaminathan suggested that India might have to adapt to living with the virus as it could become endemic rather than completely disappearing.[3] Prime Minister Modi ordered a 14-hour Janata curfew for all of India on 19 March 2020. The Prime Minister of India declared that the country would be in a "total lockdown" for a period of 21 days on 24 March with 519 confirmed cases and 9 fatalities. All non-essential tasks companies and services, with the notable exception of hospitals, supermarkets, and drugstores mandated to close, and leaving the house for anything other than necessities was "totally prohibited". Public transportation was stopped entirely. On 16 April, districts were designated into "red" (hotspot), "orange," or "green" (very little communication) areas with a category order based on the prevalence that is color-coded. There hasn't been a statewide lockdown when a pandemic's second phase entered India.[4]

Hospital employees, particularly nurses and doctors, face significant workplace pressures due to the demanding nature of their professions, leading to mental health difficulties. According to the National Institutes of Health (NIH), nursing ranks 27th out of 130 professions for mental health challenges. Stress-related burnout or disability affects 7.4% of nurses each week, marking an 80% higher incidence compared to other professions.[5] Those responsible for admitting or caring for COVID-19 patients encounter additional organizational and personal pressures, negatively impacting their physical and mental well-being. Recognizing and addressing these stresses are crucial for prevention, treatment, and stress reduction. Regular exercise is suggested as a beneficial step. Stress not only contributes to anxiety and depression but also affects job satisfaction, personal relationships, and may even lead to suicidal thoughts. Moreover, it hinders the effectiveness of psychological therapies by impacting mental health professionals' ability to interact efficiently with clients and make decisions.[6]

Nurses in emergency departments face significant psychological stress attributed to excessive workloads, long hours, and the challenges of caring for patients in a high-risk, fast-paced environment. This demanding setting often leads to fatigue, exhaustion, mental strain, and depression among nurses. Throughout the COVID-19 pandemic, frontline healthcare professionals, particularly nurses, grappled with heightened levels of anxiety, sadness, depression, and sleep disturbances. The lack of clinical understanding about the newly identified virus, coupled with shortages of protective equipment and medical supplies, contributed to these challenges. Consequently, healthcare workers experienced low morale at work, increased absenteeism, reduced interest, and diminished job performance.[7] Psychologists, psychiatric professionals, and behavioural scientists worldwide grapple with formidable challenges related to stress, anxiety, and depression. Among these, depression emerges as the most significant global mental health disorder, surpassing both physical and mental ailments in prevalence. The World Health Organization identifies depression as one of the most widespread behavioral disorders, characterized by symptoms like diminished mood, loss of interest, feelings of guilt and worthlessness, disrupted sleep and eating patterns, decreased energy levels, and difficulties in concentration. Depression and anxiety collectively affect 10 to 20% of the global population, making them the most prevalent mental illnesses.[8]

The COVID-19 pandemic has created a global public health emergency, bringing about uncertainty and instability across cultures. Managing a condition becomes challenging for healthcare providers when it lacks well-established prognoses and treatments. The unfamiliar nature of COVID-19, coupled with the absence of evidence-based knowledge, widespread beliefs, and societal stigma, poses significant challenges for healthcare practitioners. The ability of healthcare to respond to a pandemic is crucial for effective illness management and preventing disease-related problems and transmission. A study of 10 systematic reviews, encompassing 100 studies from 35 nations, found significant variability in the prevalence of depression, anxiety, and stress among medical practitioners. In 2020, a comprehensive review and meta-regression revealed that 25.8% of healthcare workers experienced anxiety, and 45% faced stress while providing treatment for COVID-19 patients. Sample size growth was inversely associated with the frequency of stress and anxiety. Another meta-analysis during the pandemic indicated a comparatively high incidence of depression, anxiety, and stress among healthcare personnel, emphasizing the need for resources to mitigate the risk of psychological issues. The psychological impact, particularly anxiety and stress, on nurses, who serve as frontline personnel, remains a significant concern amid the pandemic.[9-12]

Aim of study

The present study aims to assess the anxiety, stress and depression among nurses worked during COVID-19.

Objectives

Objectives of the study were: to assess the level of anxiety, stress and depression among nurses during COVID-19, to correlate between anxiety and stress, anxiety and depression, stress and depression among nurses during COVID-19, and to find out association between level of anxiety, stress and depression among nurses with their selected demographic and clinical variables.

METHODS

Study design and study settings

This study took a quantitative approach to assess stress, anxiety, and depression levels among staff nurses during COVID-19. Using a descriptive cross-sectional methodology, it aimed to capture real-world experiences. Conducted across hospitals in the Udaipur District—PIMS, Umarda, PMCH Bedla, GBH American General Hospital, and Sunrise Hospital—it delved into the diverse challenges faced by nurses in their daily roles. This approach, spanning various healthcare settings, aimed to ensure a comprehensive understanding of nurses' experiences within the region.

Study population and sampling procedure

The study focused on staff nurses actively engaged during the COVID-19 pandemic, employing a quantitative non-experimental design with a descriptive cross-sectional approach. A sample size of 300 nurses was selected using simple random sampling, ensuring representativeness. Formal permissions were obtained from hospital authorities, and inclusion/exclusion criteria were established to maintain relevance and consistency in the study population. This systematic sampling procedure aimed at providing a comprehensive understanding of the mental health challenges faced by staff nurses during the pandemic.

Inclusion criteria

Staff nurses who worked/working during COVID-19 to care for COVID patients, who are co-operative, and who are willing to participate were included.

Exclusion criteria

Staff nurses who have worked during COVID-19 for less than 1 week, and who are not available during data collection were excluded.

Sample size

The sample sizes needed for this particular investigation was chosen by availability of previous study data related to prevalence of anxiety, stress and depression by using formula used to estimate sample size (N) for descriptive study which came around 300.

$$N = Z^2pq/d^2$$

Data collection

Formal ethical clearance was secured through a written permission process initiated with the medical superintendent of the designated hospitals in Udaipur district. In preparation for data collection, comprehensive instructions on the research topic were provided to the staff nurses. This included a detailed explanation of the study's objectives, ensuring a clear understanding of the research context. Prior to obtaining data, the staff nurses were diligently briefed, and their informed consent was secured. Importantly, assurances regarding the privacy and security of the information they shared were communicated, underscoring the commitment to ethical considerations.

The data collection phase spanned from January 2, 2022, to December 25, 2022, during which eligible staff nurses who met the inclusion criteria actively participated. The data collection sessions, employing various tools to gather pertinent information, were conducted with meticulous attention to ethical standards. Each session had a duration of 45 to 60 minutes, allowing for a comprehensive exploration of the targeted variables. This timeframe was carefully chosen to balance the need for thorough data collection with the respect for participants' time and commitment. The culmination of these ethical and procedural measures underscored the integrity of the research process and the well-being of the participating staff nurses.

Data analysis

The study's robust data analysis, combining descriptive and inferential statistics, systematically addressed research questions and hypotheses. Using inferential statistics, the analysis drew meaningful insights about the broader population. The comprehensive plan included coding data, presenting demographics and clinical data in frequency and percentage, and detailing anxiety, stress, and depression variables. Total scores for nurses were calculated using mean, median, range, and standard deviation. Karl Pearson’s correlation explored relationships, while the Chi-square test examined associations with demographic factors. Chi-square analysis identified connections with clinical variables. This approach unveiled nuanced findings, illuminating the interplay of demographic, clinical, and psychological factors among staff nurses.

Ethical considerations

The study, ethically approved by the Sai Tirupati University committee in Udaipur, prioritized stringent ethical standards. Prior to participation, informed consent was obtained from willing participants, and requisite permissions were secured from hospital authorities. A crucial ethical dimension was the assurance of privacy, instilling trust by ensuring confidentiality of responses.

Transparent communication about the study's purpose was maintained, and participants were explicitly informed of their right to refuse participation, respecting their autonomy. These ethical safeguards underscored the commitment to upholding the highest standards throughout the research process.

RESULTS

Findings related to frequency and percentage distribution of participants according to demographic or clinical variables

The result revels that regarding the demographic variables of nurses, the majority (40.7%) were in the age group of 26-30 years, and the most common gender was female (76.3%). In terms of educational qualification, half of the nurses (50%) had completed B.Sc. Nursing, and the majority had 6-10 years of professional experience (40.6%). Marital status showed that 70.7% were married, and concerning monthly income, most (37%) earned between Rs. 20,000-30,000 per month. The predominant religion was Hindu (89.7%), and 63.3% lived in nuclear families. Dietary habits indicated that 56.3% were vegetarian (Table 1).

Regarding clinical variables, 57% of nurses were forced to work in COVID-19 wards, and 40% worked in such wards for 3-6 months. A significant portion (56.3%) had worked during both the 1st and 2nd waves of COVID-19, and 73.7% had not tested positive for COVID-19. The majority (63%) were isolated during work in COVID-19 wards. Concerning the availability of PPE kits, 54% reported not receiving them regularly. However, 100% of the nurses had been vaccinated for COVID-19, and 76.3% reported no fear of working in COVID-19 wards (Table 2).

Findings related to distribution of level of anxiety, stress and depression among staff nurses during COVID-19

The study's findings reveal the distribution of anxiety, stress, and depression levels among staff nurses during the COVID-19 pandemic. In terms of anxiety, the majority (53.7%) reported experiencing mild anxiety, while 46.3% indicated moderate anxiety. The scores on the Beck Anxiety Inventory scale ranged from 4 to 31, with a median score of 14 and a mean anxiety score of 14.42 (SD=4.46). This suggests a prevalent but varying degree of anxiety among the nursing staff, with the mean falling within the mild anxiety range.

Concerning stress levels, the data showed that a significant proportion (64.3%) of staff nurses reported mild stress, while 35.7% reported moderate stress. The perceived stress scale scores ranged from 7 to 22, with a median stress score of 13 and a mean stress score of 13.74 (SD=3.13). This highlights a noteworthy presence of stress among the nurses, with the mean falling within the mild stress category.

The findings related to depression levels among staff nurses during COVID-19 indicate that a substantial majority (71.7%) reported mild depression, while 28.3% reported moderate depression. The Hamilton depression rating scale scores ranged from 10 to 26, with a median depression score of 18 and a mean depression score of 18.23 (SD=4.23). This underscores the prevalence of depressive symptoms among the nursing staff, with the mean falling within the mild depression range.

Table 1: Frequency and percentage distribution of demographic variables of staff nurses (n=300).

Demographic variable	Frequency (N)	Percentage (%)
Age (years)		
21-25	79	26.3
26-30	122	40.7
31-35	60	20.0
36-40	39	13.0
Gender		
Male	71	23.7
Female	229	76.3
Educational qualification		
GNM	88	29.4
B.Sc. nursing	150	50.0
Post basic B.Sc. nursing	52	17.3
Masters in nursing	10	3.3
Professional experience (years)		
<1	30	10.0
1-5	68	22.7
6-10	122	40.0
Above 10	80	26.7
Marital status		
Married	212	70.7
Unmarried	88	29.3
Divorced	0	0.00
Monthly income (Rs.)		
Up to 10,000	60	20.0
10,000-20,000	70	26.3
20,000-30,000	111	37.0
Above 30,000	50	16.7
Religion		
Hindu	269	89.7
Muslim	21	7.0
Christian	10	3.3
Type of family		
Nuclear family	190	63.3
Joint family	110	36.7
Dietary habits		
Vegetarian	169	56.3
Non-vegetarian	131	43.7

Overall, the distribution of anxiety, stress, and depression levels suggests varying degrees of psychological impact on the staff nurses during the challenging circumstances of the COVID-19 pandemic. The comprehensive assessment of

these mental health indicators provides valuable insights into the well-being of healthcare professionals in the context of a global health crisis.

Table 2: Frequency and percentage distribution of clinical variables of staff nurses (n=300).

Clinical variable	Frequency (N)	Percentage (%)
Gone to work in COVID-19 ward		
Voluntary	129	43.0
Forced to work	171	57.0
Duration of work in COVID-19 ward (months)		
1	31	10.3
1-3	70	23.3
3-6	120	40
More than 6	79	26.4
Have you worked during COVID-19		
1st wave	81	27.0
2nd wave	50	16.7
Both	169	56.3
Stay during work in COVID-19 ward		
With family	141	47.0
Provided by employer	109	36.3
Paying guest	50	16.7
Food during work in COVID-19 ward		
Home	123	41.0
Provided by employer	89	29.7
Self-cooking	68	22.7
Hotels	20	6.6
Have you been tested for corona (+ve)		
Yes	79	26.3
No	221	73.7
Have you been isolated during work in COVID-19 ward		
Yes	189	63.0
No	111	37.0
Do you get PPE kits regularly		
Yes	138	46.0
No	162	54.0
Have you been vaccinated for COVID-19		
Yes	300	100.0
No	0	0.0
Fear of working in COVID-19 ward		
Yes	71	23.7
No	229	76.3

Findings related to correlation between level of anxiety, stress and depression among staff nurses during COVID-19

The findings pertaining to the correlation between stress and anxiety among staff nurses during COVID-19, analyzed using Pearson correlation, demonstrated a moderate positive correlation (r=0.376). This indicates that as stress levels increased, there was a corresponding increase in anxiety levels among staff nurses during COVID-19, and the correlation was statistically significant (p=0.002).

In relation to the correlation between stress and depression among staff nurses during COVID-19, assessed using Spearman Brown correlation, a weak positive correlation (r=0.105) was observed. However, this correlation was found to be statistically non-significant (p=0.068), suggesting that the relationship between stress and depression among staff nurses during COVID-19 did not reach statistical significance.

Regarding the correlation between anxiety and depression among staff nurses during COVID-19, as determined by Spearman Brown correlation, a weak positive correlation (r=0.119) was identified. This correlation was statistically significant (p=0.040), indicating that there was a positive association between anxiety and depression levels among staff nurses during COVID-19.

These correlation findings provide insights into the interplay of stress, anxiety, and depression among staff nurses during the pandemic, highlighting varying degrees of association between these mental health indicators.

Findings related to association between level of anxiety among staff nurses during COVID-19 with their selected demographic and clinical variables

The findings regarding the association between the level of anxiety among staff nurses during COVID-19 and their selected demographic variables were examined using the chi-square test. The results indicated significant associations ($p<0.05$) with age ($\chi^2=11.17$), professional experience ($\chi^2=8.887$), and marital status ($\chi^2=6.764$). However, other demographic variables, including gender ($\chi^2=0.409$), educational qualification ($\chi^2=0.212$), monthly income ($\chi^2=0.121$), religion ($\chi^2=0.069$), type of family ($\chi^2=0.340$), and dietary habits ($\chi^2=0.103$), showed statistically non-significant associations with the level of anxiety among staff nurses during COVID-19 (Table 3).

Similarly, the association between the level of anxiety among staff nurses during COVID-19 and selected clinical variables was assessed using the Chi-square test. Significant associations ($p<0.05$) were found with variables such as going to work in COVID-19 ward ($\chi^2=5.821$), food during work in COVID-19 ($\chi^2=9.140$), regular receipt of PPE kits ($\chi^2=5.332$), and fear of working in COVID-19 ward ($\chi^2=8.157$).

Conversely, other clinical variables, including the duration of work ($\chi^2=0.096$), working during COVID-19 ($\chi^2=0.028$), stay during work in COVID-19 ward ($\chi^2=0.053$), being tested for COVID-19 ($\chi2=0.052$), isolation during COVID-19 ($\chi^2=0.118$), and vaccination for COVID-19 ($\chi^2=0.00$), demonstrated statistically non-significant associations with the level of anxiety among staff nurses during COVID-19 (Table 4).

Findings related to association between level of stress among staff nurses during COVID-19 with their selected demographic and clinical variables:

The findings regarding the association between the level of stress among staff nurses during COVID-19 and selected demographic variables were examined using the chi-square test. The results showed significant associations ($p<0.05$) with age ($\chi^2=19.08$) and professional experience ($\chi^2=27.91$). However, other demographic variables, including gender ($\chi^2=0.572$), educational qualification ($\chi^2=0.170$), marital status ($\chi^2=0.110$), monthly income ($\chi^2=0.258$), religion ($\chi^2=0.087$), type of family ($\chi^2=0.418$), and dietary habits ($\chi^2=0.108$), demonstrated statistically non-significant associations with the level of stress among staff nurses during COVID-19 (Table 5).

Similarly, the association between the level of stress among staff nurses during COVID-19 and selected clinical variables was assessed using the chi-square test. Significant associations ($p<0.05$) were found with variables such as going to work in COVID-19 ward ($\chi^2=29.05$), stay during work in COVID-19 ward ($\chi^2=11.44$), and regular receipt of PPE kits ($\chi^2=21.60$). Conversely, other clinical variables, including the duration of work ($\chi^2=0.212$), working during COVID-19 ($\chi^2=0.105$), food during work in COVID-19 ($\chi^2=0.102$), being tested for COVID-19 ($\chi^2=0.022$), isolation during COVID-19 ($\chi^2=0.118$), vaccination for COVID-19 ($\chi^2=0.00$), and fear of working in COVID-19 ward ($\chi^2=0.076$), demonstrated statistically non-significant associations with the level of stress among staff nurses during COVID-19 (Table 6).

Findings related to association between level of depression among staff nurses during COVID-19 with their selected demographic and clinical variables

The findings regarding the association between the level of depression among staff nurses during COVID-19 and selected demographic variables were analyzed using the chi-square test. The results showed significant associations ($p<0.05$) with professional experience ($\chi^2=8.193$) and marital status ($\chi^2=31.88$). However, other demographic variables, including age ($\chi^2=0.292$), gender ($\chi^2=0.014$), educational qualification ($\chi^2=5.885$), monthly income ($\chi^2=0.114$), religion ($\chi^2=0.128$), type of family ($\chi^2=0.104$), and dietary habits ($\chi^2=0.42$), demonstrated statistically non-significant associations with the level of depression among staff nurses during COVID-19 (Table 7).

Similarly, the association between the level of depression among staff nurses during COVID-19 and selected clinical variables was assessed using the chi-square test. Significant associations ($p<0.05$) were found with variables such as working in COVID-19 ward ($\chi^2=27.56$), being isolated during COVID-19 ($\chi^2=57.40$), and regular receipt of PPE kits ($\chi^2=26.70$). Conversely, other clinical variables, including the duration of work ($\chi^2=0.021$), working during COVID-19 ($\chi^2=0.103$), staying during work in COVID-19 ward ($\chi^2=0.110$), food during work in COVID-19 ($\chi^2=0.095$), being tested for COVID-19 ($\chi^2=0.101$), vaccination for COVID-19 ($\chi^2=0.00$), and fear of working in COVID-19 ward ($\chi2=0.064$), were found to be statistically non-significant with the level of depression among staff nurses during COVID-19 (Table 8).

Table 3: Association between level of anxiety among staff nurses during COVID-19 with their selected demographic variables (n=300).

Demographic variables	Level of anxiety		χ^2 value	df	P value
	Mild	Moderate			
Age in years					
21-25	45	36	11.17	3	0.010*
26-30	65	55			
31-35	21	19			
36-40	10	29			
Gender					
Male	41	31	0.409	1	0.522^{NS}
Female	120	108			
Educational qualification					
GNM	47	41	0.212	3	0.976^{NS}
B. Sc Nursing	79	70			
Post B. Sc Nursing	29	24			
M. Sc Nursing	6	4			
Professional experience (years)					
<1	17	13	8.887	3	0.030*
1-5	38	31			
6-10	75	48			
Above 10	31	47			
Marital status					

Continued.

Demographic variables	Level of anxiety		χ^2 value	df	P value
	Mild	Moderate			
Married	124	88	6.764	1	0.009*
Unmarried	37	51			
Divorced	--	--			
Monthly income (Rs.)					
Up to 10,000	33	27	0.121	3	0.989^{NS}
10,000-20,000	42	37			
20,000-300,000	58	52			
Above 300,000	28	23			
Religion					
Hindu	145	125	0.069	2	0.966^{NS}
Muslim	11	9			
Christian	5	5			
Type of family					
Nuclear family	99	90	340	1	0.560^{NS}
Joint family	62	49			
Dietary habit					
Vegetarian	91	79	0.103	1	0.957^{NS}
Non vegetarian	70	60			

*Significant, NS: non-significant

Table 4: Association between level of anxiety among staff nurses during COVID-19 with their selected clinical variables (n=300).

Clinical variables	Level of anxiety		χ^2 value	df	P value
	Mild	Moderate			
Gone to work in COVID-19 ward					
Voluntary	79	49	5.821	1	0.015*
Forced to work	82	90			
Duration of work in COVID-19 ward (months)					
1	17	14	0.096	3	0.992^{NS}
1-3	39	32			
3-6	63	56			
More than 6	42	37			
Have you worked during COVID-19					
1st wave	44	37	0.028	2	0.986^{NS}
2nd wave	27	23			
Both	90	79			
Stay during work in COVID-19 ward					
With family	75	66	0.053	2	0.974^{NS}
Provided by employer	59	51			
Paying guest	27	22			
Food during work in COVID-19 ward					
Home	66	57	9.14	3	0.027*
Provided by employer	47	42			
Self-cooking	37	31			
Hotels	11	9			
Have you been tested for corona (+ve)					
Yes	41	37	0.052	1	0.820^{NS}
No	120	102			
Have you been isolated during work in COVID-19 ward					
Yes	100	89	0.118	1	0.732^{NS}
No	61	50			
Do you get PPE kits regularly					
Yes	84	54	5.332	1	0.020*

Continued.

Clinical variables	Level of anxiety		χ^2 value	df	P value
	Mild	Moderate			
No	77	85			
Have you been vaccinated for COVID-19					
Yes	161	139	NA	NA	NA
No	--	--			
Fear of working in COVID-19 ward					
Yes	48	22	8.157	1	0.004*
No	113	117			

*Significant, NS: non-significant

Table 5: Association between level of stress among staff nurses during COVID-19 with their selected demographic variables (n=300).

Demographic variables	Level of stress		χ^2 value	df	P value
	Mild	Moderate			
Age in years					
21-25	54	27	19.08	3	0.002*
26-30	78	42			
31-35	47	13			
36-40	14	25			
Gender					
Male	49	23	0.572	1	0.449^{NS}
Female	144	84			
Educational qualification					
GNM	57	31	0.17	3	0.982^{NS}
B. Sc Nursing	95	54			
Post B. Sc Nursing	34	19			
M. Sc Nursing	7	3			
Professional experience (years)					
<1	20	10	27.91	3	0.001*
1-5	46	23			
6-10	98	25			
Above 10	29	49			
Marital status					
Married	136	76	0.11	1	0.918^{NS}
Unmarried	57	31			
Divorced	0	0			
Monthly income (Rs.)					
Up to 10,000	39	21	0.258	3	0.968^{NS}
10,000-20,000	51	28			
20,000-300,000	69	41			
Above 300,000	34	17			
Religion					
Hindu	174	96	0.087	2	0.957^{NS}
Muslim	13	7			
Christian	6	4			
Type of family					
Nuclear family	119	70	0.418	1	0.518^{NS}
Joint family	74	37			
Dietary habit					
Vegetarian	109	61	0.108	1	0.929^{NS}
Non vegetarian	84	46			

*Significant, NS: non-significant

Table 6: Association between level of stress among staff nurses during COVID-19 with their selected clinical variables (n=300).

Clinical variables	Level of stress		χ^2 value	df	P value
	Mild	Moderate			
Gone to work in COVID-19 ward					
Voluntary	108	20	29.08	1	0.001*
Forced to work	85	87			
Duration of work in COVID-19 ward (months)					
1	21	10	0.212	3	0.976^{NS}
1-3	46	25			
3-6	76	43			
More than 6	50	29			
Have you worked during COVID-19					
1st wave	52	29	0.105	2	0.997^{NS}
2nd wave	32	18			
Both	109	60			
Stay during work in COVID-19 ward					
With family	91	50	11.44	2	0.002*
Provided by employer	80	30			
Paying guest	22	27			
Food during work in COVID-19 ward					
Home	80	43	0.112	3	0.990^{NS}
Provided by employer	56	33			
Self-cooking	44	24			
Hotels	13	7			
Have you been tested for corona (+ve)					
Yes	50	28	0.102	1	0.961^{NS}
No	143	79			
Have you been isolated during work in COVID-19 ward					
Yes	121	68	0.022	1	0.883^{NS}
No	72	39			
Do you get PPE kits regularly					
Yes	108	30	21.6	1	0.001*
No	85	77			
Have you been vaccinated for COVID-19					
Yes	193	107	NA	NA	NA
No	0	0			
Fear of working in COVID-19 ward					
Yes	46	24	0.076	1	0.783^{NS}
No	147	83			

*Significant, NS: non-significant

Table 7: Association between level of depression among staff nurses during COVID-19 with their selected demographic variables (n=300).

Demographic variables	Level of depression		χ^2 value	df	P value
	Mild	Moderate			
Age in years					
21-25	59	22	0.292	3	0.962^{NS}
26-30	87	33			
31-35	42	18			
36-40	27	12			
Gender					
Male	52	20	0.014	1	0.904^{NS}
Female	163	65			

Continued.

Demographic variables	Level of depression		χ^2 value	df	P value
	Mild	Moderate			
Educational qualification					
GNM	62	26	0.126	3	0.989^{NS}
B. Sc Nursing	108	41			
Post B. Sc Nursing	38	15			
M. Sc Nursing	7	3			
Professional experience (years)					
<1	22	8	8.193	3	0.042*
1-5	49	20			
6-10	97	26			
Above 10	47	31			
Marital status					
Married	172	40	31.88	1	0.001*
Unmarried	43	45			
Divorced	--	--			
Monthly income (Rs.)					
Up to 10,000	43	17	0.114	3	0.990^{NS}
10,000-20,000	56	23			
20,000-300,000	80	30			
Above 300,000	36	15			
Religion					
Hindu	193	77	0.128	2	0.938^{NS}
Muslim	15	5			
Christian	7	3			
Type of family					
Nuclear family	135	54	0.104	1	0.905^{NS}
Joint family	80	31			
Dietary habit					
Vegetarian	121	49	0.046	1	0.829^{NS}
Non vegetarian	94	36			

*Significant, NS: non-significant

Table 8: Association between level of depression among staff nurses during COVID-19 with their selected clinical variables (n=300).

Clinical variables	Level of depression		χ^2 value	df	P value
	Mild	Moderate			
Gone to work in COVID-19 ward					
Voluntary	112	16	27.56	1	0.002*
Forced to work	103	69			
Duration of work in COVID-19 ward (months)					
1	22	9	0.021	3	0.999^{NS}
1-3	51	20			
3-6	85	34			
More than 6	57	22			
Have you worked during COVID-19					
1st wave	58	23	0.103	2	0.998^{NS}
2nd wave	36	14			
Both	121	48			
Stay during work in COVID-19 ward					
With family	101	40	0.11	2	0.947^{NS}
Provided by employer	78	32			
Paying guest	36	13			
Food during work in COVID-19 ward					
Home	89	34	0.095	3	0.992^{NS}

Continued.

Clinical variables	Level of depression		χ^2 value	df	P value
	Mild	Moderate			
Provided by employer	63	26			
Self-cooking	49	19			
Hotels	14	6			
Have you been tested for corona (+ve)					
Yes	56	22	0.101	1	0.977^{NS}
No	159	63			
Have you been isolated during work in COVID-19 ward					
Yes	164	25	57.4	1	0.001*
No	51	60			
Do you get PPE kits regularly					
Yes	119	19	26.7	1	0.001*
No	96	66			
Have you been vaccinated for COVID-19					
Yes	215	5	NA	NA	NA
No	--	--			
Fear of working in COVID-19 ward					
Yes	51	19	0.064	1	0.801^{NS}
No	164	66			

*Significant, NS: non-significant

DISCUSSION

This study aimed to comprehensively evaluate the levels of anxiety, stress, and depression among 300 actively working nurses during the COVID-19 pandemic, utilizing a quantitative non-experimental approach with a descriptive cross-sectional design. Employing tools such as the Beck Anxiety Inventory scale, perceived stress scale, and Hamilton depression rating scale, the research sought to explore correlations between anxiety, stress, and depression through Pearson's analysis. Additionally, it aimed to examine associations with demographic and clinical variables using the Chi-square test. The overarching goal was to provide a thorough understanding of the real-world experiences and challenges faced by nurses across multiple hospitals, including PIMS, Umarda, PMCH Bedla, GBH American General Hospital, and Sunrise Hospital, in the Udaipur District during this critical period. The study employed a simple random sampling technique to select a representative sample, with data collection spanning from 02 January 2022 to 25 December 2022, focusing on eligible staff nurses actively engaged in COVID-19 duties.

The demographic and clinical variables considered in this study provide valuable insights into the diverse factors influencing the psychological well-being of nurses during the COVID-19 pandemic. These variables encompassed age, gender, educational qualification, professional experience, marital status, monthly income, religion, type of household, food preferences, and a range of clinical aspects related to their experiences in COVID-19 wards.

The age distribution among the nurses indicated that a substantial proportion (40.7%) fell within the 26-30 age group. This aligns with findings from a study conducted in Nepal by Bhandari et al, where the majority of respondents were below 30 years.[13] A notable majority (76.3%) of the nurses in this study were female. This is consistent with the gender distribution reported in a study conducted in Egypt by Aly et al, where 70.3% of respondents were female.[14] The educational background of the nurses revealed that 50% had completed B. Sc. Nursing. A comparable pattern was observed in a study conducted in Ethiopia by GebreEyesus et al, where degree holders constituted the majority (57.6%).[15] Regarding professional experience, a significant percentage (40.6%) of nurses reported 6-10 years of experience. This mirrors findings from a study in Nepal by Bhandari et al, where the majority had below 5 years of experience.[13] A substantial portion (70.7%) of the nurses in this study were married. Similar marital status distribution was observed in a study in Egypt by Aly et al, where 69.9% were married.[14] The monthly income distribution indicated that 37% of nurses had an income of Rs 20,000-30,000. This is consistent with findings from a study in Chennai by Prathiba et al, where 50% of respondents had an income in the range of Rs 20,001-30,000.[16] The religious affiliation of the nurses showed a predominant Hindu majority (89.7%). A study in Perundurai, Erode, by Sasikala Gunasekaran et al, also found a higher percentage (64.26%) of Hindu respondents.[17] In terms of the type of family, a majority (63.3%) of the nurses were living in nuclear families. This aligns with findings from a study in Perundurai, Erode, by Gunasekaran et al, where 62.81% belonged to nuclear families.[17] The dietary habits of the nurses indicated that 56.3% were vegetarian. This corresponds with findings from a study in Chennai by Prathiba et al, where 50% of respondents were vegetarian.[16] The clinical variables describe gone to work in COVID-19 Ward a substantial percentage (57%) of nurses in this study reported being forced to work in COVID-19 wards. This contrasts with a study in Qatar by Nashwan et al, where 88.1% were willing

to treat COVID-19 patients.[18] The duration of work in COVID-19 wards varied, with 40% working for 3-6 months. In a study in Mumbai by Cornelio et al, 80.72% had exposure for 6-9 months.[19] Have you worked during COVID-19 a majority (56.3%) reported working during both the 1st and 2nd waves of COVID-19. This differs from findings in Egypt by Aly et al, where 48.09% worked during both waves.[14] The living arrangements during work indicated that 47% were staying with family. This contrasts with findings in Boston by Hoff et al, where 89.73% were living with others in the household.[20] Regarding food arrangements during work, 41% reported having food from home. This aligns with a study in Iran by Zakeri et al, where 41.35% preferred homemade food.[21] Have you been tested for corona (+ve): a majority (73.7%) reported not being COVID-19 positive. This is consistent with findings in the United Kingdom by Ball et al. (2023), where 74.35% were not infected.[22] Have you been isolated during work in COVID-19 ward: a significant portion (63%) reported being isolated during work in COVID-19 wards. This is supported by findings in Beijing by Zhou et al, where nurses were isolated during the pandemic.[23] Do you get PPE kits regularly: a substantial number (54%) reported not receiving PPE kits regularly. This corresponds with findings in Southern Iran by Zakeri et al, where 62.41% did not receive PPE kits regularly.[21] Have you been vaccinated for COVID-19: all nurses (100%) reported being vaccinated for COVID-19. Similar findings were reported in Lubbock, TX, USA, by Peterson et al, where 83.7% were vaccinated.[24] Fear of working in COVID-19 ward: a majority (76.3%) reported no fear of working in COVID-19 wards. This is supported by findings in a study by Troisi et al, which highlighted fear of COVID-19 among healthcare workers.[25]

The distribution of anxiety levels revealed that 53.7% had mild anxiety, and 46.3% had moderate anxiety, with a mean anxiety score of 14.42. This is in line with a study in Nepal by Neupane et al, where 88.4% expressed a typical level of worry.[26] The majority (64.3%) reported mild stress, and 35.7% reported moderate stress, with a mean stress score of 13.74. This contrasts with a study in Nepal by Neupane et al, where 54.7% reported moderate stress.[26] A significant proportion (71.7%) reported mild depression, and 28.3% reported moderate depression, with a mean depression score of 18.23. This aligns with a study in Nepal by Bhandari et al, where the prevalence rate for depression was 85.72%.[13]

The correlation analysis conducted on the data regarding stress and anxiety among staff nurses during COVID-19 indicated a moderate positive correlation with a Pearson correlation coefficient (r=0.376, p=0.002), signifying a statistically significant association. This finding implies that as stress levels increased, anxiety levels also tended to rise among the staff nurses. This observation aligns with a cross-sectional study conducted by Çelmeçe and Menekay at Spain in 2020.[27] Their study, involving 240 nurses, reported a positive and significant association between stress and anxiety, reinforcing the present study's findings.

Contrastingly, the correlation analysis between stress and depression yielded a weak positive correlation (r=0.105, p=0.068), indicating a statistically non-significant association. This implies that, in this study, stress levels were not significantly correlated with depression levels among staff nurses during COVID-19. This result diverges from a similar cross-sectional study conducted by Khraisat et al in Iran, which involved 365 nurses and reported a weak but statistically significant association between stress and depression.[28] Such discrepancies may arise from variations in sample characteristics, cultural factors, or methodological differences.

The correlation analysis between anxiety and depression revealed a weak positive correlation (r=0.119, p=0.040), suggesting that as anxiety levels increased; there was a corresponding increase in depression levels among staff nurses during COVID-19. This finding resonates with a cross-sectional study conducted by Khraisat et al in Iran, which reported a marginally significant positive association between anxiety and depression among 365 nurses.[28]

The association between anxiety levels and selected demographic variables demonstrated that age (χ^2=11.17), professional experience (χ^2=8.887), and marital status (χ^2=6.764) were significantly associated at p<0.05 level. However, gender (χ^2=0.409), educational qualification (χ2=0.212), monthly income (χ^2=0.121), religion (χ^2=0.069), type of family (χ^2=0.340), and dietary habits (χ^2=0.103) showed no statistically significant association with anxiety levels. Similar findings were reported by Kaur and Sangeetha, supporting the association of work experience and the use of PPE kits with anxiety among nurses.[29] Kumar and Muthu also emphasized a strong correlation between age, qualification, working hours, and accommodation with nurses' anxiety during COVID-19.[30]

The association analysis for stress and demographic variables revealed that age (χ^2=19.08) and professional experience (χ^2=27.91) were significantly associated at p<0.05 level, while other demographic variables showed no statistically significant association with stress levels. In clinical variables, variables such as going to work in COVID-19 ward (χ^2=29.05), staying during work (χ^2=11.44), and receiving PPE kits regularly (χ^2=21.60) were significantly associated with stress levels at p<0.05. Nadeem et al supported these findings, highlighting that the department in which nurses were stationed and job experience were significant predictors of depression, anxiety, and stress.[31] Specifically, nurses working in COVID-19 wards were more likely to develop depression, anxiety, and stress.

Lastly, the association analysis for depression and demographic variables revealed that professional experience (χ^2=8.193) and marital status (χ^2=31.88) were significantly associated at p<0.05 level, while other demographic variables showed no statistically significant association with depression levels. In clinical variables,

variables such as working in a COVID-19 ward (χ^2=27.56), being isolated during COVID-19 (χ^2=57.40), and receiving PPE kits regularly (χ^2=26.70) were significantly associated with depression levels at p<0.05. These results were in line with Kumar et al, who found a strong association between age, qualification, working hours, and accommodation with nurses' stress during COVID-19.[30] Sheikhbardsiri et al also supported these findings, emphasizing a considerable connection between gender, marital status, level of education, and monthly hours at work among those surveyed who suffered from stress, anxiety, and depression.[32]

Several limitations must be acknowledged in interpreting this study. The cross-sectional design hinders establishing causation, and self-report measures for anxiety, stress, and depression introduce potential response bias. The study's reliance on a convenient sample limits generalizability, overlooking diversity within the nursing profession. The exclusive focus on quantitative methods excludes nuanced qualitative insights into nurses' experiences and coping mechanisms. Moreover, the study's static nature does not capture changes in mental health over time. Future research, employing longitudinal designs and diverse samples, is essential for a more comprehensive understanding of nurses' mental well-being during and post-pandemic.

CONCLUSION

In conclusion, this study sheds light on the prevalent occurrence of mild anxiety, stress, and depression among nurses working amidst the challenges of the COVID-19 pandemic. The interconnected nature of these mental health issues underscores the need for a comprehensive approach to address the well-being of the nursing workforce. The identified factors such as age, professional experience, and marital status play significant roles in influencing the mental health outcomes of nurses.

The study findings highlight the importance of recognizing and addressing the psychological impact of the pandemic on healthcare professionals, particularly nurses who have been at the forefront of the crisis. The moderate positive correlations between stress and anxiety, as well as anxiety and depression, emphasize the intertwined nature of these mental health challenges. The weak positive correlation between stress and depression further underscores the complexity of the psychological burden experienced by nurses.

Importantly, the associations between anxiety, stress, and depression with demographic variables provide valuable insights for targeted interventions. Tailored strategies considering the unique needs of nurses based on age, professional experience, and marital status are essential for promoting mental well-being.

As healthcare institutions plan for the future, prioritizing the implementation of supportive measures and interventions is crucial. Providing resources, fostering a supportive work environment, and offering targeted mental health support can contribute to enhancing the resilience and effectiveness of the nursing workforce. These efforts are imperative not only for the immediate well-being of healthcare professionals but also for ensuring a robust and resilient healthcare system in the face of ongoing and unforeseen challenges.

Recommendations

To enhance the study's impact, we recommend replicating it on a larger scale with an expanded nurse cohort and extending the research to include diverse healthcare professionals. A comparative study between nurses and other healthcare providers during the pandemic would provide valuable insights. Exploring factors exacerbating mental health challenges among nurses through an exploratory study is essential. An experimental study focusing on coping strategies tailored for nurses in pandemic conditions would offer practical interventions. Evaluating mental health during different critical situations through dedicated studies adds valuable context. Extending research to community-level settings and diverse healthcare environments broadens the understanding of mental health dynamics. Correlating patient satisfaction with nursing care during pandemics with nurses' mental well-being provides a holistic perspective. These recommendations aim to guide future studies for a comprehensive exploration of mental health challenges in varied healthcare contexts, ensuring broader insights and effective interventions.

ACKNOWLEDGEMENTS

Authors would like to thank Sai Tiruapti University and Dr. (Prof.) M. U. Mansuri.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Pujari J, Mansuri MU. A cross sectional study to assess the anxiety, stress and depression among nurses during COVID-19 at selected hospitals, Udaipur. Int J Community Med Public Health 2024;11:921-35.