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STRESS LEVELS AMONG COVID-19 PATIENTS, DOCTORS, AND PATIENT ATTENDANTS DURING THE PANDEMIC IN PAKISTAN

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ABSTRACT

Background: The COVID-19 pandemic has seriously increased stress levels in the general public of Pakistan, which is intensely affecting the mental and physical health of people. To investigate the correlation between Body Mass Index, physical activity, and stress levels during the pandemic among COVID-19-infected individuals, healthcare providers, and patient caregivers in Pakistan.

Methods: This study was conducted at Khyber Teaching Hospital and Rehman Medical Hospital in Peshawar, Pakistan A 'cross-sectional survey' of confirmed corona-positive patients, doctors, and attendants. We used the 'Perceived Stress Scale (PSS-14)' to determine the perceived stress level among participants. The 'Chi-square test, Spearman's correlation, and multivariate regression' were used to establish an association between variables. Stress scores among groups were compared using the Mann–Whitney test.

Results: This study found that 95% of the doctors, 'COVID-19 patients, and 85% of attendants had moderate stress'. 'The mean perceived stress scores among the groups were significantly different' (31.12±5.54 for doctors, 29.65±4.9 for COVID-19 patients, and 26.74±6.8 for attendants). Physical exercise highly significantly affected the PSS stress scores ($p = 0.027$) for the lower stress levels in people with physical activity than those without it. On the other hand, the overall stress scores were inversely related to BMI.

Conclusion: Most of the study subjects expressed moderate stress, whereas physical exercise-related low-stress status was seen; higher stress levels were positively associated with the increment of age. It is indeed very important to recognize and address the symptoms 'of stress among COVID-19 patients, doctors, and attendants'.

Keywords:' COVID-19, stress, doctor, attendant, patient, BMI'

Introduction

The coronavirus disease 2019 (COVID-19) outbreak began in Wuhan, China, in December 2019 and quickly spread worldwide. [1]. It has started as an outbreak of pneumonia and slowly got into the human population and increased over time as a wide pandemic that covered many countries

around the world [2]. The first case of coronavirus in Pakistan was reported on 26th February 2020, and the total number of confirmed cases had reached 4601, with 66 deaths by 10th April 2020 [3]. As a result, the government of Pakistan took some hard and fast measures, according to which there was a strict binding enforced by the government with respect to social gathering, including restrictions regarding Friday prayers and the shutting down of all educational institutions and offices [3]. This caused an extreme disruption in daily routines, eating patterns, physical activity, and body weight changes due to the nationwide lockdown policy adapted at that time [4].

Routine physical activity has been documented to reduce mortality and improve immunity, but with the lockdown restrictions, the majority of people, especially those who were overweight, increased weight and subsequently their BMI indices due to decreased physical activity [5-6]. For instance, in research by Robinson the same period saw 56% of adults indulging in snacking, while 40% were less active [7].

Many studies reported that there have been high levels of perceived stress due to COVID-19 [8]. Perceived stress is a feeling or thought about the degree of stress an individual thinks they are under at a particular moment [9]. For instance, in a study conducted in Italy, it was realized that about 22% of the general population had high perceived stress, while in Paraguay, 78% reported moderate to high levels of perceived stress [10-11]. The COVID-19 pandemic has had a significant negative impact on mental health, leading to psychiatric disorders [12]. Fear of falling ill was a potential contributory factor that increased mental stress not only among doctors but also among the general population [13-14].

In this regard, healthcare workers had been playing a role in screening suspected cases, quarantining those found to be positive, and at the same time raising awareness of preventive measures [15]. But they also experienced tremendous stress due to deteriorating situations, long working hours, higher exposure, and financial loss [16-17]. The personal fear of getting infected and spreading it to near and dear ones with psychological worry about the well-being of family members was also significant among the doctors [18]. A China-based study documented enormous anxiety and stress disorder levels in taking care of infected COVID-19 patients among the health care professionals themselves [19]. Similarly, COVID-19 patients who were hospitalized remained in strict quarantine and had the least contact with the outside world, which made them experience feelings of isolation and further stress [20-21].

In general, a pandemic created many new types of stressors, which resulted in psychological consequences for both doctors and their patients and attendants. The pandemic hit Pakistan badly, plunging it into economic uncertainty, social disruption, a halt in international trade, unemployment, and shortages of essential amenities. Pakistan is an underdeveloped country with a weak mental health infrastructure, and hence psychological ramifications of COVID-19 further burdened society. The long-term consequences of high stress levels include psychological disorders, disabilities, suicidal tendencies, loss of productivity, and physical morbidities. This study was done to estimate the relationship ‘between BMI, physical activity, and stress during the ongoing pandemic in Pakistan’. ‘The participants included patients’ who had been infected with the COVID-19 virus, treating doctors, and the attendants of these patients.

Materials and Methods

The ethics committee approved ethical approval was obtained from ‘Khyber Medical University’ in Peshawar, Pakistan. The study protocol adhered to the Helsinki Declaration guidelines. Participants provided consent to participate and could withdraw at any time without consequences. This cross-sectional observational study was conducted at Khyber Teaching Hospital (public) and ‘Rehman Medical Hospital (private) in Peshawar, Pakistan’.

The inclusion was patients with infected Covid-19 by PCR testing. The study included ‘healthy, previously infected patients who tested positive for COVID-19 via PCR, inpatients with COVID-19, their attendants (friends or family members accompanying them), and treating doctors’.

Excluded were doctors not on duty in isolation wards, patients with comorbidities or psychotic disorders, and those who refused consent.

The survey collected demographic details (age, gender, weight, height) and assessed daily physical activity (exercise for more than 30 minutes). BMI was calculated using the formula BMI = kg/m².
The PSS-14 assessed perceived stress levels based on thoughts, feelings, and stressful situations 'in the month before diagnosis'. It included 'negative and positive items' rated on a 5-point Likert scale from 0 (never) to 4 (very often). The total PSS score, ranging from 0 to 56, indicated stress levels: low (0–18), moderate (19–37), and high (38–56). The scale demonstrated reliability (Cronbach's alpha = 0.78) [23-27].

Sample Calculation 'Using OpenEpi software (version 3) with a 95% confidence level and 5% margin of error, a sample size of 300 was calculated' subdivided into 100 participants each for doctors, patients, and attendants.

Statistical Analysis: Data analysis was performed using 'SPSS (version 22, IBM, USA)'. 'Descriptive statistics were calculated as percentages, means, and standard deviations'. The Mann–Whitney U test and Kruskal-Wallis test compared continuous variables, while the Chi-square test compared 'categorical variables'. 'Spearman's correlation evaluated the association between PSS scores and demographic variables'. 'Multivariate regression analysis investigated factors associated with perceived stress scores'. 'A p-value of ≤0.05 was considered statistically significant'.

Results

Among the 300 participants, the average age was 36±14.26 years (ranging from 15 to 81), with an 'average height' of 1.62 meters and an 'average weight' of 72.98 kilograms. Almost 75% of the individuals (224) did not participate in exercise, and the average BMI was 28.69 (±5.84). Approximately 42% (130) lived in rural areas, while 28% (81) were from urban areas (Table 1).

Table 1. Characteristics of Demographical details.

Parameters		**n (%)**
Sex		
	Male	244(81%)
	Female	56(19%)
Groups		
	Attendees	100 (33.33%)
	Doctors	100 (33.33%)
	Patients With COVID-19	100 (33.33%)
Address		
	Rural	130 (42%)
	Urban	10 (28%)
	Missing/not responded	90 (30%)
'Physical Activity'		
	'No'	224(75%)
	'Yes'	76(25%)
Age	Years	36.49±14.26
BMI	kg/m^2	28.69±5.84

The Perceived Stress Scores Most participants had moderate stress levels: 97% of 'doctors and COVID-19 patients and 83% of attendants'. Nine percent of attendants reported high-'stress' levels. 'The mean perceived stress scores differed significantly among the groups (doctors: 31.12±5.54, patients: 29.65±4.9, attendants: 26.74±6.8, $p < 0.001$)'.

Table 2. PSS Categories and P-values for Various Variables

Variable	'PSS Category Low Stress (0-18)'	'PSS Category Moderate Stress (19-37)'	'PSS Category High Stress (38-56)'	'p-value'
Patients				
- Attendees	12 (12%)	83 (83%)	11 (11%)	0.002
- Doctors	6 (6%)	97 (97%)	3 (3%)	
- Patients	3 (3%)	97 (97%)	6 (6%)	
Age range				0.344
- 15-30	11 (9%)	118 (87%)	13 (10%)	
- 31-49	5 (4%)	89 (90%)	10 (9%)	
- 50 and above	3 (4%)	64 (95%)	5 (7%)	
Sex				0.128
- Male	16 (7%)	223 (90%)	11 (5%)	
- Female	3 (5%)	52 (91%)	7 (12%)	
Residence/address				0.127
- Rural	8 (6%)	120 (92%)	7 (6%)	
- Urban	7 (8%)	68 (85%)	10 (13%)	
'Physical Exercise'				0.027
- 'No'	9 (4%)	207 (93%)	14 (6%)	
- 'Yes'	10 (13%)	68 (90%)	4 (6%)	

Table 3: Correlation Spearman's rho between 'PSS score, BMI, and Age overall and group-wise'.

	'PSS Score'			
	Overall	Attendance	Doctors	Patients with COVID
Body Mass Index	-0.140*	-0.036	-0.258	-0.431**
p-value	0.02	0.9	0.2	0.001
Age	0.134*	0.218	0.249	0.001
p-value	0.03	0.392	0.283	0.8

'* Significant at 0.05; ** Correlation is significant at the 0.01 level'

Table 4: Analysis of Multiple Regression Associated with Perceived Stress Score

Variables in Equation	Unstandardized Coefficients B	Std. Error	95.0% Confidence Interval for B	p-value
(Constant)	29.679	4.587	22.093 to 34.771	0.00*
'BMI'	-0.101	0.193	-0.433 to 0.231	0.1
'Age'	0.094	0.067	-0.010 to 0.178	0.08*
'Gender'	3.264	1.609	-1.066 to 7.594	0.09
'Residence'	0.568	1.315	-1.161 to 2.297	0.9
'Physical Activity'	-0.876	1.357	-5.517 to 3.765	0.09*

*Note: * significant at the 0.05 level

The Demographics and Stress Scores Correlation The average age of attendants was 27.26±5.95 years, doctors 29.89±4.9 years, and COVID-19 patients 52.32±14.2 years, with significant age distribution differences ($p < 0.001$). Age was significantly associated with stress levels ($p = 0.344$), with a gradual rise in moderate stress levels across age groups (15-30: 85%, 31-49: 89%, ≥50: 94%). The average PSS scores among males and females were 28.61±5.97 and 31.61±5.97, respectively, with no significant association between gender and stress levels ($p = 0.128$). Rural participants had moderate stress levels (91%), similar to urban participants (83%), with no significant association ($p = 0.127$).

Physical Activity and Stress: Participants engaging in physical exercise showed moderate stress levels (87%), with 11% showing low stress. Among those not exercising, 92% showed moderate stress, and 5% high stress. Physical exercise significantly affected PSS stress scores ($p = 0.027$).
BMI and Stress: COVID-19 patients had a significantly higher average BMI '(29.29±4.23) compared to attendants and doctors (26.77±4.84 and 26.68±5.2, respectively, $p = 0.001$)'. There was 'a weak but significant negative correlation between BMI and stress scores ($r = -0.140$, $p = 0.015$)'. 'Lower BMI correlated with higher stress among COVID-19 patients ($r = -0.320$, $p = 0.001$)'. Age positively correlated with stress levels ($r = 0.134$, $p = 0.020$).
Multivariate Regression Analysis: 'Higher perceived stress was significantly associated with increasing age ($\beta = 0.094$, $p = 0.08$), and stress levels were lower among participants engaging in physical exercise ($\beta = -0.876$, $p = 0.09$)'. Other demographic variables showed insignificant associations (Table 4).

Discussion

This study aimed to identify the association between perceived stress levels, physical activity, and BMI among treating doctors, COVID-19-'infected patients, and their attendants'. Previous 'literature has identified high-stress levels among treating doctors during the pandemic' [28]. Most respondents exhibited moderate stress levels, with higher PSS-14 scores than reported in Cohen et al.'s study [29], though similar to findings during the 2003 SARS outbreak [30]. 'Moderate stress can lead to depressive symptoms and post-viral fatigue syndrome' [13].
Hospitalized patients in this study reported moderate stress levels, consistent with Tinelli et al.'s findings of high depression and anxiety among hospitalized patients, suggesting the need for psychological screening before discharge [31]. Similarly, Suzuki et al. reported negative impacts on Parkinson's disease patients and their caregivers during the pandemic [32]. The isolation and societal perceptions of COVID-19 patients exacerbated their stress levels. Effective mental screening is essential, as our study indicates a gradual rise in moderate stress with age, particularly in patients aged 31-49 (89%) and ≥50 (94%). Parchani et al. also reported high stress among patients aged 41-50 [33].
Doctors faced significant stress, higher than the general population, with female doctors experiencing more stress. Verma et al. found increased anxiety among physicians working with COVID-19 patients [13], and high stress and depression levels were reported among U.S. physicians and trainees [35]. Factors such as hectic schedules, fear of infection, and psychological worries contributed to this stress.
Patient attendants, continuously exposed to high stress, also reported moderate stress levels. Limited studies have assessed stress among family members of hospitalized patients. A Japanese study found increased traumatic stress among ICU patient families, aligning with our findings [37].
A negative correlation between BMI and stress levels was identified, with lower BMI associated with higher stress among COVID-19 patients. Stressed individuals tend to reduce dietary intake, lowering their BMI [40, 41]. Physical exercise was linked to lower stress levels, emphasizing the importance of maintaining an active lifestyle during the pandemic [41, 42].
Recommendations include training hospital staff to handle stressful situations, conducting psychological education, and arranging psychotherapy sessions. Campaigns, workshops, and seminars by the health department can educate individuals on managing health-related stress. Discharged patients should be screened for psychiatric assistance needs. Counselling sessions for doctors should be arranged to address pandemic-related stress.

Strengths and Limitations

This study is one of the first in Pakistan to evaluate the relationship between BMI, physical activity, and stress among COVID-19-infected patients, treating doctors, and patient attendants. However, the data was collected from a single city without a control group of healthy individuals, limiting generalizability. Future studies with larger, representative samples are recommended. The

questionnaire-based data collection may introduce subjective bias, and the cross-sectional nature prevents tracking changes in anxiety levels over time.

Conclusion

Most participants exhibited moderate stress levels, with lower stress among those engaging in physical exercise. Higher stress levels correlated with increasing age. Identifying and managing stress in COVID-19 patients, doctors, and attendants is crucial, especially for older or less active individuals. Proper preparedness and psychological support programs are necessary to counter future pandemics' mental health impacts. Further research is needed to understand the full scope of pandemics' psychological effects.

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