

Perceived stress and sleep quality among health care faculty and postgraduate students during COVID-19 pandemic lockdown

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ABSTRACT

Background: Perceived Stress and quality of sleep are major determinants of physical and mental health.

Objective: To determine perceived stress and sleep quality among medical, dental and rehabilitation sciences faculties and its association with age, discipline and designation.

Methods: This cross-sectional study was conducted at Islamic International Medical and Dental Colleges, and College of Rehabilitation Sciences of Riphah International University from July till September 2021. Two validated questionnaires perceived Stress Scale (PSS) and Pittsburgh Sleep Quality Index (PSQI) were administered with informed consent using convenience sampling after ERC approval. Data was analyzed by SPSS 20. Spearman rank-order correlation test was used for correlation between variables. $P < 0.05$ was considered significant.

Results: Out of 220 study participants, there were 119 (54.1%) medical, 56 (25.5%) dental and 45 (20.5%) rehabilitation sciences professionals with 184 (83.6%) postgraduate residents and 40 (12.2%) consultants. Moderate stress was reported by 111 (93.3%) medical, 56 (100%) dental and 42 (93.3%) rehabilitation sciences professionals. Higher levels of stress were reported at ages 27-40 years ($p = 0.007$), rehabilitation sciences ($p < 0.001$) and postgraduate students ($p < 0.001$). Poor sleep quality was found in medical and dental professionals ($p = 0.008$) and post-graduate students ($p = 0.01$). There was a positive intermediate correlation between stress and sleep disturbance ($p < 0.05$). Sleep showed a weak negative correlation with discipline ($p < 0.05$) and designation ($p < 0.05$). Stress was weakly correlated with designation ($p < 0.05$) and positively with age ($p < 0.05$).

Conclusion: A higher level of stress was detected in health care professionals in 27-40 years age groups, rehabilitation sciences and postgraduate students while poor sleep quality was reported more in medical and dental faculties and post graduate students' group.

Keywords: COVID-19, dental, health workers, physiotherapy, sleep, stress

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Introduction:

In Pakistan, as of 20th January 2023, there have been 1,576,109 confirmed cases of COVID-19 with 30,635 deaths, reported to WHO.(1) Pre-pandemic stressors for educators included classroom management, curriculum design, behavioral issues, and lack of respect; however, additional stressors in Covid-19 were added regarding physical health, sleep quality,

safety, and wellbeing.(2) Moreover, widespread closure of educational institutions led to urgent shift from traditional to virtual learning: an additional challenge for faculty.(3) Those who were infected with COVID-19 had personal health issues. Others had to take care of family members, elderly relatives living with them and young children during COVID-19. Additional tasks of preparing meals and household chores added to stress as all domestic help was unavailable because of pandemic lockdown. The faculty enrolled in higher education programs faced academic deadlines, assessments and virtual meetings with supervisors during pandemic.(4)

Sleep is a physiological process the body uses to restore its normal functions. Stress from daily routine can negatively impact an individual's well-being if there is insufficient sleep recovery.(5) Literature suggests that sleep and stress are bidirectional, and the combination of high stress and lower sleep quality can increase allostatic load over time, resulting in long-term damage to health.(6) During the COVID-19 pandemic, sleep disturbances were associated with stressful conditions related to isolation, financial problems,

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sedentary lifestyles which compromised wellbeing of hospital nurses reported in literature.(7)

This study aimed to determine stress and quality of sleep among faculty of three disciplines of medicine, dental and physiotherapy, and to found out association with age, discipline and designation. Many studies have examined sleep and stress separately during COVID-19 and reported that each impacts daily well-being. It is unclear how age, discipline and educational status of senior and junior faculty members is associated with stress and sleep quality during COVID-19. This study could contribute to increased productivity at both individual and organizational levels by formulating effective psychological health management strategies.

Methods:

This cross-sectional study was conducted in Islamic International Medical College in collaboration with Riphah Dental College and Riphah College of Rehabilitation Sciences from July till September 2021. Faculty was enrolled in study using convenience sampling technique. A sample size of 220 was calculated using Open-Epi 3.0 with a confidence interval CI of 95% and 5% precision. Prevalence was estimated from a previous study conducted on healthcare workers where 82.7% of all participants had a high level of stress.(8) This study was reviewed and approved by the institutional ethical review committee of Islamic International Medical College Ref No Riphah/IIMC/IRC/22/2081. Two validated questionnaires were filled by participants in English after informed consent. Perceived Stress Scale (PSS) by Cohen et al, is a 10- item reliable scale with Cronbach’s alpha score of 0.75.(9) Scores from 0-40 divides the participants into three categories, low stress (0-13),

moderate stress (14-26) and high stress (27-40). Pittsburgh Sleep Quality Index (PSQI) scale is a 19-item questionnaire used to assess sleep quality. Variables assessed include sleep quality, sleep bedtime sleep latency, sleep duration, use of sleeping medication, and daytime dysfunction. The global score calculation ranges from 0-21 points where 0 indicates no difficulty and 21 indicates severe difficulty.(10)

Data was analyzed using SPSS 23. Descriptive statistics were calculated as percentages, median and interquartile range to assess the demographic characteristics age, discipline and educational level. The Shapiro-Wilk test was used to assess normality, and it revealed that data was not normally distributed. Mann-Whitney test was used for age and education analysis. The Kruskal-Wallis Test was used for intergroup discipline analysis. The Spearman Rank Test was used to explore the association between variables. R values represented in correlation value as: weak correlation (0 to 0.3); moderate correlation (0.3 to 0.7); strong correlation (0.7 to 1). P<0.05 was considered significant.

Results:

The demographic variables and self-perceived stress level scores are shown in table 1. Out of 220 study participants, there were 184 (83.6%) post-graduate residents and 36(16.4%) consultants. Ninety-six percent of respondents in the 27-40 age group had moderate stress. A total of 111 (93.3%) medical faculty members, 56 (100%) dental faculty members and 42 (93.3%) rehabilitation faculty members had moderate stress symptoms. About 94% of the post-graduate residents had moderate stress.

Table 1: Demographic characteristics of study population and perceived stress scores

Variables	Study population N =220	Perceived stress scores		
		Low Score (0-13) n=2(1%)	Moderate Score (14-26) n=209(95%)	High Score (27-40) n=9(4%)
Age				
27-40 years	180(81.8%)	2(1.1%)	173(96.1%)	5(2.8%)
41-59 years	40(12.2%)	-	36(90%)	4(10%)
Discipline				
Medical Sciences Faculty	119(54.1%)	2(1.7%)	111(93.3%)	6(5%)
Dental Sciences Faculty	56(25.5%)	-	56(100%)	-
Rehabilitation Sciences Faculty	45(20.5%)	-	42(93.3%)	3(6.7%)
Designation				
Postgraduate students	184(83.6%)	2(1.1%)	173(94%)	9(4.9%)
Consultants	36(16.4%)	-	36(100%)	-

Table 2 represents the total stress score comparison of the difference between the age, discipline and designation groups. Stress was increased in 27–40 age group with a median of 22 than 41–50 age group, which was 21. Stress was increased in the rehabilitation sciences discipline, with a median of 23 than dental and medical faculties. Stress was increased in graduate/post-graduate education with a median of 22 than consultants, which was 21. When the groups were compared with each other, statistically significant differences were observed in 27–40 age group, rehabilitation sciences and post-graduate residents' groups.

Study participants were asked questions about sleep quality during COVID-19. The calculated median score of sleep quality score (based on 7 components) is shown in table 3. Sleep disturbance was increased in the medical and dental professionals with a median of 14 than rehabilitation sciences group. Sleep disturbance was increased in post-graduate students with a median of 14 than that in consultants, which was 13. Therefore,

groups were compared with each other, statistically. Significant differences were observed in medical and rehabilitation sciences discipline, and postgraduate students. There was a positive intermediate correlation ($r=0.308$) between stress and sleep disturbance ($p<0.05$). The correlation had a moderately linear trend, suggesting that stress is associated with sleep disturbance. (Table 3)

Table 4 shows the correlations among age, discipline, designation, sleep components and total stress scores. Sleep quality ($r=0.151^*$), sleep disturbance ($r=-0.420$), use of sleep medication ($r=-0.136$) and total stress ($r=0.145$) showed a significant correlation with age. Sleep efficiency ($r=-0.147$), daytime dysfunction ($r=-0.132$) and total PSQI ($r=-0.159$) showed a significant correlation with discipline. Sleep latency ($r=-0.281$), sleep efficiency ($r=-0.139$), sleep disturbance ($r=-0.144$), daytime dysfunction ($r=-0.140$), total PSQI ($r=-0.175$), and total stress ($r=-0.065$) showed significant correlations with designation.

Table 2: Perceived Stress level score among health care faculty and post graduate students

Variables	Stress Score [Median (IQR)]	P Value
Age		
27-40 years	22(3)	0.007*
41-59 years	21(6)	
Discipline		
Medical Sciences Faculty	22(4)	<0.001*
Dental Sciences Faculty	22(6)	
Rehabilitation Sciences Faculty	23(3)	
Designation		
Post graduate Students	22(3)	<0.001*
Consultants	21(5)	

*Statistically significant with $P<0.05$

Table 3: Pittsburgh sleep quality score among health care faculty and post graduate students

Variables	PSQI Score [Median (IQR)]	P Value
Age		
27-40 years	13(1)	0.199
41-59 years	13(2)	
Discipline		
Medical Sciences Faculty	14(1)	0.008*
Dental Sciences Faculty	14(1)	
Rehabilitation Sciences Faculty	13(0)	
Designation		
Post graduate Students	14(1)	0.01*
Consultants	13(1.75)	

*Statistically significant with $P<0.05$

Table 4: Correlation values among age, discipline, education, sleep component and total stress (N=220)

Variables	Age	Discipline	Designation
Sleep quality	0.151*	-0.019	-0.074
Sleep Latency	0.030	-0.029	-0.281**
Sleep Duration	-0.67	0.040	-0.017
Sleep Efficiency	-0.006	-0.147*	-0.139*
Sleep disturbance	-0.420**	-0.038	-0.144*
Use of Sleep Medication	-0.136*	0.060	-0.128
Daytime dysfunction	0.103	-0.132*	-0.140*
Total PSQI	-0.087	-0.159*	-0.175**
Total stress	0.145*	0.021	-0.065*

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed).

Discussion:

Our results suggest a higher level of stress in health care professionals in 27-40 age groups, rehabilitation sciences and postgraduate students (table 2), while poor sleep quality was reported more in medical and dental faculties and post graduate students' group (table 3). The current study found that 96% of respondents in the 27-40 age group had moderate stress. More stress is reported in graduate/post-graduate education group with a median of 22 than consultants' group, with a median of 21. The postgraduate residents are usually the ones aged 27-40 who have experienced more stress scores because of increased teaching load. It is also hypothesized that the 27-40 age group follows their own deadlines regarding their MPhil degree programs such as assignments, data collection, and coping up with research tasks. Senior faculty might have better socioeconomic and other support systems which enables them to cope with the stress during covid-19. Our results are consistent with the findings of Mei S et al who found younger age professionals need special facilitation as age moderated the direct and indirect effects of family stress on life satisfaction scores during Covid 19.(11) Huang et al found that a better income and a higher qualification level enables a worker to adapt better towards working goals in a workplace and these findings are consistent with our results.(12)

Prior to the pandemic, factors contributed to faculty members' stress were scientific research output, administrative affairs, teaching support and professional support. During the pandemic, dynamics

of teaching changed with closure of educational institutions due to increased risk of infection leading to online or hybrid teaching modalities. In our study, self-perceived stress score calculation revealed that 95% of study participants had a moderate stress. The reason for this finding in the academic role in both online and on-campus teaching. These in turn needed more planning, inadequate resources, faculty development programs and administrative hurdles to manage workload leading to more stress. It also required team work to create high quality reading content such as scenarios and case studies to be used in online sessions. Besides tasks increases as separate records are needed to be kept as per attendance, participation and assessments. Stanton et al reported moderate stress of 8% and higher in the 18-45 years of age group in Australian adults. Our study had a low sample size conducted on faculty members which might be the reason for this inconsistency.(13) Our findings regarding more stress in rehabilitation sciences faculty are supported by results from Ditwiler RE et al who have explored many reasons of stress in physiotherapists treating Covid-19 patients which includes moral distress, patient care goals, uncertainty, working conditions, ethical and professional challenges.(14)

Sleep disturbance was increased in all the three faculties in this study as shown in table 3 (p=0.008). The findings of the present study are in concordance with another study in health care workers in China with higher prevalence of sleep disturbances and worse sleep quality, PSQI scores (9.3 ± 3.8 vs 7.5 ± 3.7; P < 0.001)

when compared to healthcare professionals who were not working frontline.(15)

A similar study in India reported sleep pattern abnormalities in 150 COVID-19 doctors in a tertiary care hospital. It was seen that all the 7 subscale scores (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency score, sleep disturbances, use of sleep medications, and daytime dysfunction scores) were significantly higher among poor sleepers than good sleepers ($P = 0.001$). Moreover, poor sleepers ($n=67$) reported more stress (11.40 ± 2.25 Vs 7.13 ± 2.35 , $p= 0.001$).(16) A study by Khan et al also demonstrated 10% psychological stress and 59% poor sleep quality in health care professionals in a tertiary hospital during COVID 19.(8)

Age is positively correlated with stress and negatively correlated with sleep disturbance and use of medication as shown in table 4. It is observed that faculty members experience more stress with increasing age. It has also been observed that more sleep disturbance and medication use was observed in young age during covid-19. Finding of our study is in line with the findings of Alomari et al who reported that younger participants were more likely to experience sleep disturbance and medication use.(17) Conversely, another study from India has reported similar results in health care workers and it was noted that sleep disturbance was significantly associated with age <30 years ($P=0.04$).(18)

Discipline (medical sciences faculty, dental sciences faculty and rehabilitation sciences faculty) is negatively correlated with subjective sleep quality and efficiency, and daytime dysfunction. Present study finding is supported by another study which has reported 26% increased daytime sleeping hours especially in bachelor's degree holders and 18% reported reduced sleeping hours.(17) Our study findings suggested PSQI score of rehabilitation sciences ($p= 0.008$). This is consistent with the results of similar study in physiotherapists conducted in Brazil with prevalence of poor sleep quality of 86% with worse scores on sleep latency, disturbances and daytime dysfunction ($p \leq 0.037$).(19)

Designation is not only negatively correlated with sleep quality, but also with sleep efficiency, sleep dysfunction and disturbance, and stress. This negative correlation suggests that early career professionals have additional workload during preparation and delivery of online classes and assessment especially related to their

course work. Also, younger kids and household chores lead to additional burden of responsibility. It also includes taking care of elderly and poor domestic help especially during lockdown.

COVID-19 is a global crisis contributing towards devastating health in economic and educational sectors. All health care workers including academicians have suffered loss globally due to the closure of institutions due to intermittent lockdowns. This has created havoc in all domains of education, finances and health. This calls for a comprehensive programme to address these issues. Some innovations have been introduced such as a virtual heartfulness meditation programme introduced for eight weeks in USA which led to improved sleep quality and stress scores.(20)

More studies are needed to identify which specific psychosocial interventions are effective in certain populations considering age, discipline and educational background. Without sufficient support from teachers, they may experience job-related stress and become more susceptible to mental illness. This can negatively affect their ability to do their jobs well and ultimately lead to less favorable outcomes for students.(21)

These findings should be interpreted in the context of certain limitations. Firstly, this study did not assess the history of faculty employment, which may be a relevant factor related to the findings. Secondly, the self-reported measures used in the study may be particularly prone to a response bias. It is a single center study with a low sample size.

Conclusion:

There is a positive intermediate correlation between increased stress and deteriorating sleep quality during COVID-19. A higher level of stress was detected in health care professionals in 27-40 age groups, rehabilitation sciences and postgraduate students while poor sleep quality was reported more in medical and dental faculties and post graduate students' group. These findings suggest sleep and stress management strategies training in vulnerable individuals at individual and institutional level.

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Conflict of Interest: One of the authors; Ali S, was part of the ethics review committee. She was not included in review process of current study and other members of ERC reviewed the proposal.

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Authors Contribution:

Rahim A: Conception of idea, data collection, data analysis, manuscript writing and critical revision of final article.

Farooq F: Designing of study, data analysis, data interpretation and results, draft editing with critical revision until final manuscript.

Ali S: Designing of study, questionnaire development, data collection and entry, critical revisions.

Nazir SNB: Designing of study, Data entry and analysis, interpretation and drafting of tables, critical revision of manuscript.

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