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Addressing Environmental Factors for SDG 3-Health and Wellbeing: Perceived Stress, Sleep Quality, and Coping among Medical Students in Pakistan

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Abstract

The objective of this study was to investigate the interplay between perceived stress, sleep quality, and coping mechanisms among medical students, with a view to understand their implications for Sustainable Development Goal 3 (SDG 3) - "Good Health and Well-being," and considering environmental factors. Conducted as a cross-sectional study and 300 medical university students (152 men, 148 women), aged 18 to 25 years (mean age = 22.73, SD = 1.78), were selected using stratified random sampling based on their academic year. The study employed the Perceived Stress Scale, General Sleep Scale, and Brief COPE to assess the study variables. The results revealed gender differences in coping strategies, with female students exhibiting higher scores in avoidant and emotion-focused coping, while male students leaned towards problem-focused coping. Notably, perceived stress and avoidant coping emerged as significant predictors of poor sleep quality ($p<.05$) among the participants. This study found significant relationship among use of green spaces, stress, sleep quality, and coping strategies among medical students, aligning with SDG 3's objective of ensuring healthy lives and promoting well-being for all. Furthermore, while the study did not directly address environmental factors, it indirectly emphasizes the importance of creating conducive environments for health and well-being. Environmental considerations such as access to green spaces and a healthy physical environment can influence individuals' stress levels and sleep quality, contributing to holistic health outcomes. Given these findings, the study recommends that counseling centers in universities develop strategies for managing students' stress and sleep quality, while promoting healthy coping skills. By addressing these factors comprehensively, universities can contribute to enhancing students' psychological well-being and advancing progress towards SDG 3 and create sustainable and healthy environments, as outlined in SDG 13 (Climate Action), to complement initiatives focused on fostering sustainable environments conducive to health and well-being.

Keywords: sleep, stress, coping, green spaces, sustainable environment, mental health, medical education

INTRODUCTION

High academic and professional requirements mark the medical field as a stressful educational program for students which has its effects on their physical and mental health. Pressures faced by the students in the medical school make them more

vulnerable to psychological stressors as compared to students of other disciplines (Safhi et al., 2020; Waqas et al., 2015). Numerous stressors for medical students have been documented which include academic burden, frequent examinations, lack of study-life balance, interpersonal relationships, poor student guidance, comprehensive curricula, financial constraints, overnight duties, future uncertainty, and the need for success (Santen et al., 2010). Other difficulties reported by students include adjustment issues, moral problems, students on campus bullying, personal life events, and educational debt. A research study conducted on Canadian and American medical students reported higher degree of psychological distress, depression and suicidal ideation in them (Dyrbye et al., 2006). Global researches also reported that students belonging to medical field in Malaysia, Saudi Arabia, Nepal, and Pakistan experience higher levels of stress than students studying in other disciplines (Abdulghani et al., 2011; Shaikh et al., 2004; Sherina et al., 2004; Sreeramareddy et al., 2007). One of the possible adverse effects of psychological stress include impaired functional performance, lack of interest in daily activities and inability to retain mindful attitude towards life.

Stress is an unavoidable part of life. Literature views stress as a stimulus, response, or a transaction. The transaction model of stress and coping is a leading stress theory by Lazarus and Folkman (1984) which postulates that the perception of an individual about his/her psychological condition regulates whether the event is considered stressful or not. A person's perception of threat, vulnerability and the capability to cope with the situation mainly determines how stress will be experienced. The thoughts and responses to stress inducing situations are called coping. Lazarus and Folkman (1984) defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person". Coping is a learned behavior of responding to stressful situation and needs behavioral and cognitive effort. But this does not mean that people need to be cognizant of this effort.

Coping is an attempt or response to manage the situation; not controlling or mastering it (Lazarus & Folkman, 1984). A person's resources and strategies determine their aptitude to cope. There are mainly two types of coping. First one is problem focused coping, which aims at changing the sores of the stress creating situation and manage by taking action for coping and second one is emotion focused coping which is directed at regulating the emotions that carry perception of stress; this type of coping mechanism is used to reduce the negative emotions associated with the stress by restructuring the thoughts. A good fit between the coping strategy used and the stressor faced can lower the level of distress experienced. To handle controllable stressors, problem focused coping is favorable to use whereas uncontrollable stressors are effectively handled by using emotion-focused coping (Jeter & Brannon, 2016).

Another coping strategy that is considered an unhealthy response to stressors is the avoidant coping strategy. The person tries to deny the fact that the event happened or tries to fantasize about alternative consequences. People who use this coping mechanism are more prone to indulge in behaviors like smoking and use of illegal drugs for escape from stressful situations and actually end up experiencing poor sleep quality, eating disorders, deteriorated problem-solving and cognitive restructuring. This coping style also makes people more prone to anxiety because they try to avoid anxiety-provoking thoughts and situations to prevent stress (Furman, 2018). However, in today's fast-paced society, stress-related problems and poor quality of sleep in students are quite obvious parts of their academic careers. They try to keep up with their career demands by healthy and unhealthy coping strategies. Literature portrays

that sleep quality play important role in stress, coping, and cardiovascular health. Sleep is a resting condition of the body and brain which is vital for the learning, performance, and health of individuals. Poor sleep in university students is a periodic condition that affects cognitive processes and increases the probability of poor school performance (Lin & Huang, 2012). Among students, reduced sleep quality is strongly interrelated to emotional disturbances like feelings of tension, depression, anger, exhaustion and confusion, as well as cognitive and memory dilemmas and generally a state of low life satisfaction. Sleep deprivation is considered to be one of the most common causes of daytime sleepiness and fatigue. A study on third-year university students from France found that students who used avoidant coping strategies were more involved in unhealthy behaviors such as sedentary lifestyle, sleep disturbances, substance abuse, and smoking.

Furthermore, students who were using adaptive coping strategies (i.e. problem-solving and thought restructuring in response to stressors and less use of distraction or avoidance) were more proactive, had increased physical activity, a better quality of sleep, and less substance abuse (Doron et al., 2014). Based on aforementioned studies, it is evident that stress and coping mechanisms impact psychological well-being and health behaviors. Sleep disturbance and poor quality of sleep can negatively impact several aspects of life. As literature precipitate those rising levels of psychological stress and deteriorating quality of sleep have adverse effects on psychological and physical health (Almojali et al., 2017; Satti & Khan, 2019). Already present literature illustrates that little research work has been done on identifying the quality of sleep among medical students of Pakistan so that intervention plans for stress management and sleep hygiene in medical students could be addressed. However, from our perspective, it is essential before intervention plans, to find out the prevalence and association among quality of sleep, stress and coping styles in medical students.

In the context of climate and environment, it's worth noting that the stressors experienced by medical students also intersect with broader environmental concerns. For instance, the heavy workload and long hours often associated with medical training can contribute to increased carbon emissions from commuting and energy use in medical facilities. Furthermore, the mental health challenges faced by medical students may be exacerbated by the looming threat of environmental crises, such as climate change, which can further amplify feelings of stress, anxiety, and uncertainty about the future.

Addressing the mental health needs of medical students and promoting a supportive learning environment is crucial not only for the well-being of students but also for cultivating a future healthcare workforce that is resilient in the face of environmental and climate-related challenges. Efforts to mitigate stress and promote mental wellness among medical students can contribute to a more sustainable and environmentally conscious healthcare system. Previous studies have indicated green spaces at campus to be associated with better mental health in students. The study showed that green spaces at campus promoted mental health positively and improved healing and psychological recovery from stress (Julia et al., 2021). Natural environments are observed to have a positive impact on physical and emotional health of individuals (Zhang et al., 2024). Green environments at workplace are specifically associated with reduced stress and enhanced wellbeing in students (Holt et al., 2019). Studies have also examined the impact of doing physical activity programs in the green outdoors and found it to be positively associated with better mood, self-esteem and

mental health. Consequently, it contributes to better sleep quality through the facilitation of healthy environment and mental health (Barton & Pretty, 2010; Tsomokos et al., 2024). Data on the relationship of stress, sleep and coping with green spaces on campus or near campus for medical students is not available for Pakistan. To address this literature gap, the study examined the relationship among green spaces use, sleep quality, perceived stress, avoidant coping, emotion focused coping and problem focused coping in medical students of Pakistan. Another objective was to look into the gender differences among the above-mentioned variables. And lastly, it examined perceived stress, avoidant coping, emotion focused coping, problem focused coping and demographic variables as predictors of sleep quality.

METHODOLGY

Research Design

A cross sectional survey research design was used for conducting the study.

Participants

A sample of 300 medical students (men=152, women=148) was included with age range from 18 to 25 years (M=22.73, SD=1.78). The data was recruited from two public sector medical universities of Lahore, Pakistan through stratified random sampling. For sampling, the proportion of students in each medical year were considered and in the next step, both male and female students from that class were randomly asked to fill the questionnaires. Participants were included if they were 18 years and above with at least three months of study period into a particular medical year in the university. Participants who were able to read and understand English language were included so that they could fill out the survey forms without any language barriers. Students with a history of any psychological disorder were excluded to control the confounding impact on study variables.

Assessment Measures

Perceived Stress Scale (Cohen, 1983)

Perceived Stress Scale was used for assessing perceived stress. It is a 10 item self-report scale which assesses the degree to which an individual appraises his/her life situations as stressful. Higher scores indicate greater level of stress. The scale has excellent internal consistency reliability (a=.86)

General Sleep Scale (Malik & Muazzam, 2017)

Sleep quality was measured using the six items General sleep scale which assesses sleep quality. It is a self-report measure with a five point likert response format. Higher scores indicate poor quality of sleep. It has excellent internal consistency reliability (a=.93) in Pakistani population (Malik & Muazzam, 2017).

Brief COPE (Carver, 1997)

The brief COPE consists of 28 items which measure an individual's effective and ineffective coping strategies to various life events and stressors. The scale can assess three broad coping styles namely problem focused, emotion focused and avoidant coping (Carver, 1997). It has good internal consistency reliability (a=.72)

Procedure and Ethical Consideration

The study was approved by the departmental ethical review committee and board of studies. After the initial permissions, the universities were approached for data collection and permission was obtained from the relevant authorities there. The students who fulfilled the inclusion criteria were approached and notified about the study objectives. Informed consent was taken and they were assured of the confidentiality of their responses as well as their right to withdraw participation from the study anytime. The full set of questionnaires was given to the students who took about 10-15 minutes on average to complete it. The data was obtained from 340 students, however, 40 forms were discarded due to missing data. The response rate was 88%.

RESULTS

The results indicated perceived stress to be prevalent in quite a number of medical students (44%). The mean stress scores among the medical students were 25.42+8.91. It was observed that 15% of the students had low stress, 18% had moderate stress, and 11% had high stress.

Table 1.
Socio-demographic Characteristics of the Students (N=300)

Variables	*Categories*	*Frequency (%)*	*M (SD)*
Gender	Male	152 (51)	
	Female	148 (49)	
Education	Year 1	95 (32)	
	Year 2	88 (29)	
	Year 3	59 (20)	
	Year 4	58 (19)	
Age (in years)			22.73(1.78)

Table 1 shows the demographic characteristics of the medical students. Majority of the students who participated in the study were in first year (32%) of their medical studies followed closely by year two students (29%). The percentage of both male (51%) and female (49) participants was almost equal.

Table 2.
Mean, Standard deviation and Correlations for study Variables (N = 300)

Variables	1	2	3	4	5	6	7	8	9
1.Age	-	-.16**	.70**	-.07	-.42**	-.03	-.04	.07	.10
2.Gender		-	-.20**	.31**	.21**	.12*	.19**	-.16**	-.13*
3.Year of study			-	-.08	-.54**	-.10	-.03	.05	.09
4. Sleep				-	.18**	.15*	.08	-.05	-.11*
5. Perceived Stress					-	.15*	.07	.01	-.14*
6. Avoidant coping						-	.03	-.08	.09
7.Emotionfocused coping							-	-.05	.13*
8.Problemfocused coping								-	.16**
9.Use of green space(hrs)									-
M	22.73	1.49	2.26	12.70	25.42	18.97	33.60	22.96	4.4
SD	1.77	.50	1.10	4,36	8.91	2.81	5.83	3.51	1.12

Note. **p<.01; *p<.05

Bivariate correlation was conducted to explore the strength and direction of relationship among the variables (Table 2). The results found that greater perceived stress and lower sleep quality was significantly associated with female students and

the younger ones. Gender also had significant associations with coping styles, with female gender associated with avoidant and emotion focused coping whereas males with problem focused coping. Avoidant coping style had significant association with poor sleep and increased stress levels. Use of green spaces was significantly associated with male gender, sleep, stress and emotion and problem focused coping.

Table 3,
Comparison of Men and Women on Sleep, Stress and Coping (N=300)

	Men (N=152)		Women (N=148)				95% CI	
Variables	*M*	*SD*	*M*	*SD*	*t*	*P*	*LL*	*UL*
Sleep	11.38	3.03	14.04	5.06	-5.50	.000	-3.61	-1.71
Stress	23.59	9.04	27.30	8.37	-3.69	.000	-5.69	-1.73
Problem focused coping	23.51	3.13	22.39	3.78	2.79	.006	.33	1.91
Emotion focused coping	32.48	6.47	34.75	4.83	-3.44	.001	-3.56	-.966

Significant differences were found between men and women on sleep, stress and three types of coping (Table 3). Both sleep (p=.000) and stress (p=.000) were worse in female students as compared to males. It was found that females used more of emotion-focused (p=.001) and avoidant coping (p=.03) than males, whereas male students were better at problem focused coping mechanisms (p=.006) than females.

Table 4.
Multiple Linear Regression for Sleep Quality (N=300)

	Sleep Quality			95% CI	
Variables	B	SE	*B*	LL	UL
Constant	4.12	4.81		-5.35	13.59
Gender	2.34	.51	.27**	1.35	3.34
Age	-.04	.19	-.02	-.41	.33
Year of study	.29	.33	.073	-.36	.94
Perceived stress	.07	.03	.25**	.01	.14
Problem focused coping	-.01	.07	-.00	-.14	.13
Emotion focused coping	.01	.04	.02	-.07	.10
Avoidant coping	.17	.09	.14*	-.01	.34
F	5.75**				
R	.35				
R^2	.12				

Note: **p<.001; *p<.01

Multiple linear regression analysis was conducted to predict the impact of perceived stress, coping and sociodemographic variables on sleep. The results depicted female gender (β=.27, p< .001), perceived stress (β=.25, p< .001) and avoidant coping style (β=.11, p< .05) to be significant predictors of poor sleep quality in students. The overall model was found to be significant and added 12% of the variance in sleep quality (Table 4).

DISCUSSION

This study was conducted to highlight the relationship among perceived stress, coping, and quality of sleep in medical students as well as to assess the predictors of sleep quality in this population. It also evaluated the prevailing gender differences

present in the medical students related to perceived stress, coping styles and quality of sleep. The results of the current study showed a significant positive association among use of green spaces, stress, coping, and poor quality of sleep. This indicates that students who lack effective stress management skills and spent less time in green outdoors had reduced coping or often temporarily cope with the stressful situation consequently leading to poor quality of sleep. These results were depicted by another study that found consistent disturbed sleep to be associated with higher stress levels which in the future could be a reason for developing clinical anxiety or depression (Kashani et al., 2012). Avoidance, escaping and other maladaptive coping strategies increase the levels of stress and deteriorate the quality of sleep (Furman et al., 2018). On the contrary, people who use adaptive coping tactics have better quality of sleep (Schmied et al., 2015).

Studies who have examined the use and impact of green spaces on students' stress and sleep also had consistent results with current study. They found it to be positively associated with better mood and mental health. They also found better sleep quality and reduced stress to be associated with increased use of green environment and mental health (Barton & Pretty, 2010; Tsomokos et al., 2024).The current study also found significant gender differences related to perceived stress, coping styles, and sleep quality among medical students of Pakistan. Congruent with previous studies, our results also indicated that poor quality of sleep and perceived stress were higher in female medical students as compared to male students (Faber & Schlarb, 2016; Harutyunyan et al., 2020). Many researchers have indicated that females are emotional thinkers, use more avoidant coping styles, cry easily, perceive more stress more than experiencing the stress, and need more social support to cope up with life stressors (Beaslay, 2003). Our study did not differ from this fact and found female medical students used more emotion-focused and avoidant coping strategies than males. Ironically immunizing to the literature, our study also found male medical students were better at problem-focused coping mechanisms in comparison to female medical students, and adopted more problem-focused and action-oriented strategies for coping with stressors of life.

Men who used problem-focused strategies are more effective at handling controllable stressors, whereas females who use emotion-focused strategies are more effective at handling uncontrollable stressors (Beaslay, 2003; Eaton & Bradley, 2008). Recent researches conducted in Pakistan have found the provenance of poor quality of sleep in students (Javaid et al., 2020; Surani et al., 2015). In this light, our study revealed the predictors of poor quality of sleep and found female gender, perceived stress and avoidant coping style to be significant predictors of poor sleep quality in students. Congruently, this direct or indirect impact of stress on sleep disturbances has been reported widely in previous researches (Ahrberg et al., 2012; Zunhammer et al., 2014). Another study found similar results and concluded that participants who were insomniacs and had difficulty sleeping were experiencing more stress than non-insomniacs (Morin et al, 2003). Avoidant coping strategy was found to be the strongest predictor of poor sleep which is in line with previous literature showing that individuals who avoid confrontation or escape from the stressful situations are more likely to have poor quality of sleep. They try to reduce the emotional pain by running away from the problem. These individuals report more depressive and anxiety symptoms (Liverant et al., 2004). Coping strategies are considered a strong predictor in the efficacy of a person to have

sleep. Avoidant coping strategy is an unhealthy and ineffective way of dealing with stress which result in poor quality of sleep and other significant health issues (Bathory & Tomopoulos, 2017). The study has some limitations. One, the findings are built on self-reported information given by students which could include some degree of reporting bias due to certain interpretation of one's emotions or questions. Also, this was a cross-sectional study with a limited sample size and future studies are recommended to incorporate longitudinal research design so that association among study variables could be examined over the five-year medical study period.

CONCLUSION

The study uncovered a moderate prevalence of perceived stress within the medical student population, highlighting its significance in the context of health and well-being, as outlined in Sustainable Development Goal 3 (SDG 3). Notably, the findings underscored a notable association between use of green spaces, perceived stress, coping mechanisms, and subpar sleep quality. Recognizing the potential detrimental impact on both physical and mental health, the study advocates for targeted interventions aimed at promoting healthier sleep habits, increased use of green outdoor spaces, and bolstering effective coping strategies. In alignment with SDG 3's objectives, counseling centers within universities are urged to play a proactive role in equipping students with the necessary tools to navigate the challenges of their environment. With reference to medical education, the medical training environment could include more workshops on stress management, coping mechanisms and healthy lifestyle choices. By offering such workshops and personalized guidance, these centers can empower students to effectively manage stressors, ultimately fostering a culture of well-being and resilience amidst academic pressures. Through stress management workshops and personalized guidance, students can develop the skills needed to navigate stressors effectively, aligning with the objectives of Sustainable Development Goal 3 (SDG 3) on health and well-being while embracing the principles of green psychology to promote environmental consciousness and sustainable living. The study also suggests integration of mental health education in medical curriculum.

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