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ORIGINAL ARTICLE

Relationship between Neck Pain, Sleep Quality, and Mindfulness in Undergraduate Medical Students of Rawalpindi/Islamabad

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Author`s Contribution

[1-5] Substantial contributions to the conception or design of the work for the acquisition, analysis or interpretation of data for the work, Drafting the work or reviewing it critically for important intellectual content, Final approval of the version to be published,

Article Info.

Received: July 01, 2024
Acceptance: November 11, 2024

Conflict of Interest: None
Funding Sources: None

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Cite this article as: Khalid Q, Abbas S, Tahir N, Khalid S, Rehman A, Younis A, Relationship between neck pain, sleep quality, and mindfulness in undergraduate medical students of Rawalpindi/Islamabad. JRCRS 2024:12(4): 203-207 https://dx.doi.org/10.53389/JRCRS.2024120407

A B S T R A C T

Background: Neck pain is a chronic musculoskeletal condition and is the fourth leading cause of years lived with disability. It affects the individual's life as it is a constant discomfort that impairs the quality of life. Psychological distress and stress are common among medical students which impacts their mindfulness. Mindfulness is a trait of consciousness that promotes well-being. Due to lack of concrete evidence, this study was done to find the relationship of neck pain, sleep quality, and mindfulness in undergraduate students.

Objective: To identify the relationship between neck pain, sleep quality, and mindfulness in undergraduate medical students of Rawalpindi/ Islamabad, Pakistan.

Methodology: The study design was analytical cross sectional, and the data was collected from various medical institutes of Rawalpindi and Islamabad over a period of five months. The sampling technique was non-probability based convenient sampling and sample was taken through Raosoft. The data collection tools were Northwick Park Pain Questionnaire, Pittsburg Sleep Quality Index, and Mindful Attention Awareness Scale (MAAS).

Results: Statistical analysis was done through SPSS version 21. Normality tests were applied which data was statistically significant. Total of 377 students were included; 286 DPT, 51 MBBS, and 40 BDS students. The mean age was 21.01±1.74. The correlation coefficient between neck pain and mindfulness was -0.288 with a p-value of 0.00. For sleep quality and mindfulness, the correlation coefficient was -0.390 with a p-value of 0.00.

Conclusion: In conclusion with increase in neck and poor sleep quality, mindfulness decreases in undergraduate medical students.

Keywords: Medical Students, Mindfulness, Neck Pain, Sleep Quality, Quality of Life.

Introduction

Neck pain is defined as a chronic musculoskeletal condition with continuous, recurring, or fluctuating pain and disability.[1] It is a multifactorial disease and is a chief concern in the modern society. People who present with neck pain may have different etiologies like poor posture, muscular imbalances, psychological issues like depression, or work-related concerns.[2] The economic burden of neck pain is notable and takes account of surging treatment costs, diminish productivity and job-related complications.[3] Around 70% of individuals experience neck pain at least once in their lifetime. [4] Moreover, it is considered as the fourth notable cause of years lived with disability, while for musculoskeletal diseases, the neck pain lies at the 10th place respectively.[5]

The effects of neck discomfort are severe for the sufferer, the community, and the medical system as a whole. Because it

is a persistent discomfort that might lead to impairment and lower quality of life. Researches manifest that there is an increasing trend of neck pain in undergraduate students.[6] In addition to this, neck pain is considered as a paramount cause of ailment, deficient educational achievement, and absenteeism from the university classes, thus it jeopardizes the professional prospects of students.

Students are particularly at risk for developing neck discomfort because they spend a lot of time reading, writing, and using computers that predispose students to experience neck pain.[7]

Sleep is pivotal for one's health as it is a principal parameter for ameliorating prime neurocognitive functioning and all other physiological mechanisms of the body.[4] Sleeping habits differ for all individuals depending on their age, occupation, body demands, and psychological characteristics. [8] The general population frequently experiences sleep issues, with about one-third of adults reporting insomnia of a certain kind.[9] Sleep disturbance commonly occurs in the individuals with chronic pain, this includes neck pain, low back pain and various other musculoskeletal related conditions. Musculoskeletal discomfort is made worse by sleep disturbances, which also depresses the pain threshold of the person.[4] Furthermore, the heavy workload that medical students have could be a factor in their inability to get enough sleep which presumably exacerbate mental stress leading towards the appearance of neck pain. In a study, more than 90% of the undergraduate medical students faced undue sleepiness in class, with more male students than females were affected.[9] According to another study conducted on medical students, 39.5% of them reported being excessively sleepy during the day at the start of the semester. Moreover, by the end of the semester, 22% of the remaining students experienced daytime tiredness and sleepiness.[10]

Mindfulness is a trait of consciousness that promotes well-being. It has been described as a process of bringing a certain quality of attention to moment-by-moment experience. Awareness and attention both come under the umbrella of the term 'consciousness'. [11] Attention is a process of focusing on conscious awareness, providing heightened sensitivity to a limited range of experiences.[12] An enhanced form of awareness and attention is known as mindfulness.[11] Mindfulness typically is a cognitive property to be aware of the present without any judgment or attachment to outcomes. [13] The study carried out by Tamres and Helgeson describes that mindfulness scores are higher in males than females. The higher the mindfulness, the better the emotional and psychological state of the individual. [(14)] The evidence explained the reason for it is that females focus and indulge in negative feelings more than their male counterparts.[14] Additionally, many pieces of research showed that medical students have a high risk of having psychological issues. Negative situations can leave them on the brink of mental breakdown and lead to depression or even suicide.[15] Undergraduate students are particularly important in this regard because of a high prevalence of 21% of depression and suicide-related outcomes.[16] This study was carried out to find the relationship between one of the most important causative factors i.e., neck pain in undergraduate medical students. Treating the neck pain can help the students to cope up with the mindfulness issues.

The aim of the study was to find the relationship of neck pain, sleep quality, and mindfulness in medical undergraduate students. During the literature search, no concrete evidence of this relationship was found. There is evidence of sleep alteration due to chronic pain in working adults. However, there is a literature gap here. The relationship in undergraduate medical students has not been studied yet. Similarly, the association of neck pain on mindfulness has not been studied as well. Finding out a relationship will help physical therapists to incorporate a holistic approach including physical therapy treatment procedures while keeping psychological measures in mind while treating patients of neck pain to improve their quality of life.

Methodology

An analytical cross-sectional study was conducted among 377 undergraduate medical students. The participants were inducted from Margalla Institute of Health Sciences, Shifa Tameer-e-Millat University, Islamic International Medical College, and Foundation University Islamabad. Non-probability convenience sampling technique was used. The sample size calculated through Raosoft sample calculator was 377 with population size of 20,000, margin of error 5%, confidence level 95%, and response distribution of 50%.

The ethical approval was taken from Foundation University Islamabad (FF/FUMC/215-53 Phy/20). The undergraduate medical students from MBBS, BDS, and DPT departments within the age group 18-25 years, studying in private or public medical colleges were included. The students from each department were divided into two groups; clinical and pre-clinical. In MBBS program, 1st and 2nd year students were considered in pre-clinical whereas 3rd-5th year were included in the clinical category. For BDS program, 1st and 2nd year students were considered clinical and 3rd and 4th year students were in the clinical group. Moreover, for DPT program, 1-4 semesters were designated in pre-clinical and 5-10 semesters

were included in the clinical category. Students having digestive issues, obstructive sleep apnea, restless leg syndrome, memory impairment, trauma to the neck, and regular usage of anti-arrhythmic, beta-blockers, diuretics, steroids, and anti-depressants were excluded from the study.

The data related to neck pain was collected through Northwick Park Pain Questionnaire. This scale is used for the measurement of pain in the neck region and the potential disabilities. The questionnaire provides scores that help to estimate outcomes and to scrutinize symptoms in acute or chronic neck pain patients. It consists of nine items related to pain intensity, duration of symptoms, numbness at night, pain affecting sleep, effect on social life, carrying, reading/watching television (TV), working/housework, and driving. For each item, there are five possible responses depicting a higher level of difficulty (from 0 = no difficulty to 4 = severe difficulty). The overall percentage is calculated by adding together the score for particular item (0–36) (total score/36×100%). The intraclass correlation coefficient ranged from 0.933 to 0.970. [17]

Pittsburgh Sleep Quality Index (PSQI) evaluates sleep quality over a period of one month. The test takes five to ten minutes to complete and consists of 19 distinct items. In the scoring of this questionnaire, the questionnaire is divided into seven components. Each component is scored individually from 0 to 3, where 0 means there was no difficulty and 3 shows extreme/severe difficulty. After scoring the components individually, the score of each component is added to get a global score that ranges from 0 to 21. A high global sum reveals worst sleep quality. Each component scores the following: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. It has 89.6% sensitivity and 86.5% specificity. [18]

Mindful Attention Awareness Scale is a scale having 15-items 6-point Likert-type scale (6=almost never; 1=almost always) designed to measure the extent to which individuals pay attention during several tasks. It assesses the attention and awareness of the present time and events. These values touch the state of consciousness of self-regulation and individual well-being. It measures the individual's tendency towards mindfulness or mindlessness. [11] The scale has manifested strong psychometric properties. Higher mindfulness scores are typically correlated with higher levels favorable affect, positive thinking, self-actualization, together with higher self-esteem. [19]

Results

The mean age of the 377 subjects was 21.01+1.74. The gender distribution showed that females were 326 (86.5%) and males were 51 (13.5%). A total of 286 DPT, 50 MBBS, and 41 BDS students (Department Wise) participated in the study. (Table I) The frequency and percentage of department and distribution of level of studies is given. (Table II)

Table I: Frequency and Percentage of Department Wise Distribution.

Degree	N(%)
DPT	286 (75.9%)
MBBS	50 (13.3%)
BDS	41 (10.9%)
Total	377 (100%)

Table II: Frequency and Distribution of Level of Studies.

Level of studies	Degree	N	N(%)
Pre-Clinical	DPT	110	61.1
	MBBS	34	18.9
	BDS	36	20
	Total	180	100
Clinical	DPT	176	89.3
	MBBS	16	8.1
	BDS	5	2.5
	Total	197	100

The normality testing showed that data was non-normally distributed (<0.05), thus Spearman's correlation test was applied. The results exhibited that there was weak positive correlation (0.293, p=0.00) between neck pain and sleep quality. As, high global sum of PSQI reveals worst sleep quality, so the result depicted that when neck pain increased in undergraduate medical students leads to the emergence of poor sleep quality. Moreover, the correlation between neck pain and mindfulness was weak negative (-0.290, p=0.00). This demonstrated that with the increased neck pain in the undergraduate students, the mindfulness was compromised. Thus, with an increase in neck pain, attention and awareness decreases significantly. (Table III)

Table III: Correlation Analysis.

Variables	Correlation Coefficient (r)	p-value
Neck Pain (NPQ Score) Sleep Quality (PSQI Score)	0.293	0.00*
Neck Pain (NPQ Score) Mindfulness (MAAS Score)	-0.290	0.00*

*p-value is significant at < 0.05

Abbreviations: NPQ; Northwick Park Pain Questionnaire, PSQI; Pittsburg Sleep Quality Index, MAAS; Mindful Attention Awareness Scale

Discussion

For many years, medical students have been linked with neck pain, poor sleep quality, and psychological stress. The results found in this study revealed a correlation between neck pain, sleep quality, and mindfulness.

The finding of this study revealed that with an increase in the score of neck pain, there is a decrease in mindfulness of the

students. This result is consistent with a study performed on dentistry students which showed a high occurrence of neck pain in them. This pain affected life quality of these students which went downhill and ultimately affected their psychological health. Hence, this study concluded that neck pain leads to poor mental health. [20]

Another study done by Hanvold et.al in 2010 shows that neck pain affects the life quality of an individual immensely. It is a discomfort that is always present and limits certain activities related to everyday life. This leads to reduced quality of life and consequent psychological problems. [6]

Research performed in California concluded that musculoskeletal issues were extremely high in undergraduate dental students. These problems caused trouble in their individual lives. It had the worse influence on their personal and professional responsibilities. This study showed dentist students are prone to excessive musculoskeletal issues specially neck and back pain. Senior dentistry department students do not report their musculoskeletal problems because they believe that is due to excessive clinical work as compared to their junior counterparts. This in turn effects their work related as well as mental well-being. The study concluded that neck and back pain have a huge impact on the daily lives of dentistry students. The study recommended the use of self-care techniques to improve the quality of life of dental students. Thus, this study also lines with the results of the current study.[21]

The results of this study also prove that there is a moderate negative correlation between sleep quality and mindfulness indicating that with the increase in score of sleep quality i.e., higher scores represent poor sleep quality, there is a decrease in mindfulness of the students.

A study done among medical students and resident physicians showed similar results. The night shift workers mainly experience sleep problems due to their work timings. This not only affects their health but also the overall working capability. The results of this study showed excessive sleep problems due to professional and extraprofessional commitments. Poor sleep quality causes excessive daytime sleepiness and therefore reduces attention and focus, leading to psychological problems. [22]

Another study by Aherne et.al done in the year 2016 showed that the chances of a medical professional developing psychological, emotional, and personal problems is high. This adversely impacts their well-being. This study showed that nearly 20% of undergraduate students had poor sleep that affected the overall well-being of the student. This study tested the effect of mindfulness related program in both first- and second-year medical students. These are pre-clinical students, and both showed a high amount of stress. The second-year students took mindfulness related program more seriously and gained its benefits as compared to the first years, who took it as a burden. [23]

Another similar study in Turkey revealed significant differences in the quality of sleep and values of quality of life as well as depression in patients with chronic pain in the neck region. Patients with prolonged neck pain showed depression and poor sleep quality. [24]

A study carried out in Australia supported the idea that improvement in self-care and mindfulness will reduce psychological distress and stress among medical students. [25] A study on working professionals shows that pain for prolonged periods of time ultimately affects the sleep. [26]

A study conducted by Lemma et. al on undergraduate university students to assess the quality of life, depression, and anxiety-related symptoms as well as stress level. The result showed that poor sleep is prevalent in university students and has notable effects on overall mental health status. Depression and anxiety symptoms were also common among university students. Thus, the study concluded that university students experience more emotional and psychological health issues due to poor sleep and an increase in workload. Due to workload, they reduce their sleep. Hence, the vigorous cycle continues. The study also suggested that improving sleep quality will consequently improve psychological problems. It will have a positive impact on the individual's health and subsequently academic performance. [8]

A study by Stanely concluded that maintaining good sleep quality is important to prevent the negative aspects of sleep. The negative aspect of sleep disturbance impacts both the physical and mental performance of an individual. Mental issues affect every sphere of the everyday activities. Stanely's study further describes that daytime sleepiness affects the safety of a person. This means that a person is not attentive and focused on the task in hand posing danger to his safety. [27] Sleep disturbances cause depression in adults. It has been found as a major cause of psychological problems. It is also linked with other co-morbidities reducing the quality of life in the geriatric population. [28]

A study conducted in 2015 on undergraduate students found out that those who slept less than seven hours had more chances of having a poor life quality than those sleeping above seven hours. Thereby, poor quality of sleep affects the mental being of an individual. This consequently decreases their scores related to the quality of life. (28) The incidence of decline in sleep quality is higher not only in medical students but non-medical as well as in the general population. A study conducted in China demonstrated that 90% of undergraduate medical students faced excessive sleepiness during class. Sleep-related issues vary from population to population and

place to place. However, a constant graph of excessive sleep problems was found among medical students all around the world. [9]

Conclusion

In conclusion with increase in neck and poor sleep quality, mindfulness decreases in undergraduate medical students.

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