



LOW BACK PAIN AND MENTAL WELL-BEING AMONG MEDICAL STUDENTS DURING THE COVID-19 PANDEMIC

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ABSTRACT

Introduction: Low back pain is a common complaint in students. Stress and prolonged hours of studying put them at an increased risk of low back pain, which has been further aggravated by the COVID-19 pandemic and the lockdown. This study aims to estimate weight gain, anxiety, depression and the prevalence of low back pain in medical students during the pandemic era. **Methods and Materials:** A cross-sectional study involving 426 Medical students from 1st year of undergraduates to interns at a tertiary care hospital in New Delhi was carried out with the help of an online standard questionnaire, and the resultant data was analysed. **Results:** 426 medical students participated in the study. The mean age was 21.04 ± 1.9 years, with 38.3% female and 61.74% male participants. There was significant weight gain during the COVID-19 pandemic (p value = 0.0001), with 35.21% of participants gaining weight > 3 kgs. There was no significant change in the prevalence of low back pain during the pandemic compared to the pre-pandemic era (p -value 0.098). The prevalence of anxiety and depression on the hospital anxiety and depression scale was 58.45% and 57.98%, respectively. **Conclusion:** The physical and mental well-being of medical students needs to be evaluated as they are likely to be the next line of defence in the fight against the deadly pandemic virus.

KEYWORDS : Low Back Pain, Medical Students, COVID-19 Pandemic, Spine

INTRODUCTION

Pain in the lower back is a common orthopaedic problem. It is usually non-specific for no organic cause is found[1]. It usually affects people above the age of 30 and peaks in the ages of 45 to 60 years[2].

The vulnerability of medical students due to stress and prolonged hours of studying puts them at an increased risk of low back pain. This has further been aggravated by the COVID-19 pandemic and the lockdown, which has restricted the physical activity of college-going students, with students now resorting to online lectures in non-ergonomic conditions of their homes with minimal physical activity. The added stress of the pandemic has also affected the mental health of the students who already deal with a high-stress environment because of the rigorous medical curriculum. Therefore, the prevalence of anxiety, and depression, is likely to have increased among this subset of the population. Reduced physical activity and increased stress have also been known to increase weight, thus it is also important to see the effect of the pandemic on the students' weights[3].

This study, therefore, aims to estimate the prevalence of low back pain, anxiety, depression and weight gain in medical students during the pandemic era and compare it with the pre-pandemic era to gauge the impact that the COVID-19 pandemic and the lockdown have had on their physical and mental well-being.

METHOD AND MATERIALS

A cross-sectional study involving 426 Medical students from their first year of undergraduate to interns at a tertiary care hospital in New Delhi was carried out using an online standard questionnaire from June 2021 to October 2021, following the ethical guidelines and the resultant data was analysed.

Inclusion Criteria

1. Medical students from 1st year to medical intern.
2. All consenting medical students.

Exclusion Criteria

1. All non-consenting medical students.
2. Students with a history of spine surgery.
3. Students with a spine deformity.
4. Pregnant females.

Questionnaires Used

An online questionnaire was formulated using Google Docs and circulated among the medical students as Google Questionnaire. The questionnaire covered age, medical year, COVID-19 vaccination status, prevalence of low back pain pre- and post-pandemic, weight gain, and physical activity level.

The prevalence of depression and anxiety among the medical students

was assessed using the hospital anxiety and depression scale (HADS). It is a self-assessment scale and is also valid in the community setting. It consists of 7 questions each in the anxiety and depression subscale scored from 0-3, with a total score of 21 each. A score of 8 or above was considered positive for screening cases for both anxiety and depression[4,5]. The HADS was chosen for this study since it provided us with the opportunity to screen for both anxiety and depression with one easy to use, well-validated and widely used scale.

Outcome Variables-

Primary Outcome Variables-

1. Prevalence of low back pain during the COVID-19 pandemic.
2. Prevalence of anxiety as assessed by the proportion of subjects scoring 8 or above on the anxiety subscale of the hospital anxiety and depression scale during COVID-19 pandemic.
3. Prevalence of depression as assessed by the proportion of subjects scoring 8 or above on the depression subscale of the hospital anxiety and depression scale during COVID-19 pandemic.
4. Mean weight of subjects before and during the COVID-19 pandemic.

Secondary Outcome Variables-

1. Comparison of prevalence of low back pain before and during the COVID-19 pandemic.
2. Comparison of mean weight of subjects before and during the COVID-19 pandemic

Numbers and percentages (%) were used to present categorical variables. At the same time, the quantitative data was presented as the mean $\pm$ SD and median with 25th and 75th percentiles (interquartile range). The Kolmogorov-Smirnov test was used to check the data normality. We used non-parametric tests for cases in which the data was not normal. The following statistical tests were administered for the results:

1. The comparison of the pre-pandemic and current weight was analysed using the Wilcoxon signed-rank test.
2. The comparison of low back pain before the COVID-19 pandemic and during the pandemic era was analysed using the Chi-Square test.

The data was entered in the Microsoft EXCEL spreadsheet. The Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 21.0 was used for the final analysis.

A p -value of less than 0.05 was considered statistically significant.

RESULTS

Students' Characteristics

A total of 426 medical students participated in the study. The mean age

of participants was 21.04 ± 1.9 years, ranging from 18 to 29 years. There were 162 (38.3%) females, 263 (61.74%) males and 1 (0.23%) participant who did not wish to share their gender. The medical year-wise distribution of the participants was: 131 (30.75%) in the first year, 45 (10.56%) in the second year, 133 (31.22%) in the third year, 46 (10.8%) in the final year and 71 (16.6%) in internship (Table 1).

COVID-19 Infection and Vaccination Status

A total of 103 (24.3%) students tested positive for COVID-19 infection, with the majority of cases clustering in April 2021. Complete vaccination (2 doses of vaccine) was reported in 63.5% of participants, 24.5% were vaccinated with only a single dose of the vaccine, and 12% were not yet vaccinated.

Activity

In our study, 17.4% of participants did not exercise, 49.3% exercised sometimes (once/week), and 33.3% exercised twice or more than twice per week before the pandemic. Walking for more than 30 minutes was the leading exercise, followed closely by outdoor sport.

During the pandemic, 16.9% of participants reported never exercising, 44.4% reported exercising once per week, and 38.7% reported exercising twice or more a week, with indoor sports being the leading exercise.

Low Back Pain

Before the pandemic, 97 (22.77%) of the study participants reported having low back pain, while during the pandemic, 118 (27.70%) students reported having low back pain. There was no significant increase in the prevalence of low back pain, with a p-value of 0.098 (Table 2).

Weight Change

The mean weight of the study population was 65.76 kg, which increased to 66.51 kg during the pandemic era. There was a significant increase in weight, with a p-value of 0.0001. 150 (35.21%) study participants report gaining three or more than three kilograms over the lockdown period, 85 (19.95%) students report gaining less than three kilograms, 60 (14.08%) report no changes in weight, and 131 (30.75%) report having lost weight (Table 3). 185 students responded to changes in the diet out of which 55.1% respondents reported an increased intake of sugar/sweetened beverages while 50.8% respondents reported an increased consumption of ready-to-eat foods.

Anxiety and Depression

Responding to the hospital anxiety and depression scale's anxiety section, 249 (58.45%) students screened positive for anxiety (score of 8 or more) and 177 (41.55%) students screened negative for anxiety (score of 0-7).

Responding to the hospital anxiety and depression scale's depression section, 247 (57.98%) students screened positive for depression (score of 8 or more) and 179 (42.02%) students screened negative for depression (score of 0-7) (Table 1).

DISCUSSION

A total of 426 medical students participated in our study. Using a standard questionnaire, the physical and mental health of the students was assessed. First-year and third-year students were the major participants of the study. The questionnaire was designed to inquire about the medical year level, COVID-19 infection and vaccination status, physical activity before and after the pandemic, low back pain, weight gain during the pandemic, and anxiety and depression among students during the pandemic.

Nearly one-fourth (24.3%) of students tested positive for COVID-19 infection, with most cases clustering in April 2021. This figure is concerning given that the national prevalence of COVID-19 was much lower at 3% [6]. This may be because medical students, especially interns, are usually at the frontline in government hospitals, with their work generally entailing history taking, blood sampling, and dressings, all of which demand considerable patient interaction. A previous study by Hani et al. in Jordan reports a prevalence of 13% of medical students testing positive for COVID-19, of which 52% were clinical students and 48% were pre-clinical students[7]. This difference may be due to the overall lower prevalence of COVID-19 in Jordan compared to India. Complete vaccination (2 doses of vaccine) was reported in 63.5% of participants, 24.5% were vaccinated with only a single dose of the vaccine, and 12% were not yet vaccinated at

the time of study. This indicates the ease of accessibility to the COVID-19 vaccine for medical students, which was readily available at the hospitals in New Delhi. This was similar to a meta-analysis which showed a 61.9% vaccination rate among medical students worldwide and 64.5% in India [8].

In our study, 17.4% of participants did not exercise, 49.3% exercised sometimes (once/week), and 33.3% of participants exercised twice or more than twice per week before the pandemic, with walking for more than 30 minutes being the leading exercise, followed closely by outdoor sport. During the pandemic, 16.9% of participants reported never exercising, 44.4% reported exercising once per week, and 38.7% reported exercising twice or more weekly, with indoor sports being the leading exercise. This shift from outdoor to indoor sports represents the effects of the lockdown. In a study by Bramwell RC, Streetman AE, Besenyi GM it was that the outdoor group's perceived stress ($p < 0.001$) was reduced more than the indoor group post-intervention[9]. A study done by Wafi et al. among medical students found that 53% of the participants reported no change or even increased physical activity during lockdown period[10]. The current study however did not enquire about methods of maintaining physical activity during lockdown which remains an active research topic.

Low back pain is a common orthopaedic problem, which has a massive impact on the physical and mental well-being of patients. Prolonged hours of sitting and a sedentary lifestyle further add to the insult. Low back pain also leads to increased work leaves and analgesic consumption. Medical students with demanding study schedules are at a higher risk for such a lifestyle. With the COVID-19 pandemic leading to a lockdown, this subset of the population was further put at a higher risk because of the limitations on physical activity and the added stress of being at the frontline of fighting the pandemic. In our study, before the pandemic, 97 (22.77%) of the study participants reported having low back pain, while during the pandemic 118 (27.70%) students reported having low back pain. This increase in the number of students having low back pain during the lockdown could be because of restrictions on physical activity and the added stress of a pandemic. However, this increase in the point prevalence was not found to be significant ($p = 0.098$). In their study, Aymeric Amelot et al. reported that 72.1% of medical students had low back pain[11]. This figure is significantly more than our statistics the reason being a small sample size of 426 in our study as compared to 1243 in their study and the age group in their study being in the range of 18-44 years while in our study, the range was 17-29 years. In an Indian study by Nupur Aggarwal et. al., the prevalence of LBP in medical students was reported as 32.5%, which is closer to our study[2].

Weight gain was also assessed in our study, and it was found to be significant, with 35.21% of students gaining more than 3 kgs over the lockdown period. In a study done in the Spanish population by Enrich Sanchez et al., it was reported that 44.5% of study participants gained weight during the lockdown period[12]. Weight gain was mainly due to a decrease in physical activity and altered eating habits, as noted in our study.

The prevalence of anxiety was 58.45% of the student population, while that of depression was 57.98% of the student population. These scores were higher than a previous study among adults in a general outpatient clinic using HADS- where the prevalence of anxiety cases was 54%, and the prevalence of depression was 31%[4]. Similar findings were also seen in another study, which found the prevalence of anxiety and depression to be 43% and 59%, respectively[13]. The prevalence of anxiety and depression in our sample was even higher than that in a similar study on medical students in the post-pandemic era, where it was found to be 39.4% and 26.6%, respectively[14]. However, when compared to studies in the pre-pandemic era, similar rates of anxiety (66.9%) and depression (51.3%) among medical students were seen[15]. Our study indicates that more than half of the students are dealing with significant anxiety and depression and need psychological and psychiatric interventions. A rigorous curriculum, uncertainty regarding the scheduling and format of exams, the stress of competitive exams, low levels of physical activity, and a pandemic to fight, all these risk factors have accumulated together to create such an environment for our medical students, which can lead to burnout, mental and physical fatigue, and increased leaves from work.

These statistics indicate an urgent need for intervention to protect the physical and mental well-being of medical students who will eventually be on the frontline of another pandemic. Telemedicine

services are an effective method for dissemination, not only of treatment but also of prevention strategies. Telepsychiatry initiatives have flourished in the COVID-19 pandemic and have increased accessibility to mental healthcare. These services need to be further coordinated and regulated for optimal use in any future pandemic[16]. Mental well-being and the ability to face stressful situations have been associated with resilience[17]. Hence, resilience building is an important step that needs to be taken in this direction, with a focus on easy interventions that can be taught in online modes like self-help, mindfulness-based exercises, engaging in physical activity and maintaining contact with friends and family[18]. The use of positive coping strategies such as humour, acceptance, positive reframing and emotional support needs to be encouraged among medical students[19]. These strategies will not only help them deal with the stress of everyday life and academics but also prepare them for any possible COVID-19 pandemic-like situation in the future.

The strengths of the study are that it sheds light on an important and relevant topic which is the physical and mental well-being in the COVID-19 pandemic with a focus on medical students. Multiple variables related to low back pain, weight gain, anxiety and depression were assessed in this study. However, there were some limitations such as the use of self-reported questionnaires and scales which may lead to recall bias and social desirability bias, especially when answering questions related to mental health, considering the stigma associated with it. The prevalence of anxiety and depression was assessed using the hospital anxiety and depression scale was used which was primarily created for use in a hospital setting but now has been validated and widely used in a community setting. While the study included data before and during the pandemic, it did not include data after the COVID-19 pandemic which would be necessary to assess its long-term impact. Further studies are needed to assess the long-term impact of the COVID-19 pandemic on the physical and mental health of medical students. Although our study included multiple factors on physical and mental health, future studies may also include factors like socioeconomic factors, access to mental healthcare, lifestyle, resilience, and coping strategies to see their influence on physical and mental health. This will help us better understand and address the needs of medical students in terms of physical and mental well-being.

CONCLUSION

There was significant weight gain during the COVID-19 pandemic (p value= 0.0001), with 35.21% of participants gaining weight > 3 kgs. There was no significant change in the prevalence of low back pain during the pandemic compared to the pre-pandemic era (p-value 0.098). The prevalence of anxiety and depression on the hospital anxiety and depression scale was 58.45% and 57.98%, respectively.

Table No. 1: Demographic Distribution and Distribution of Anxiety and Depression of Study Subjects

Table no. 1a: Distribution of demographic characteristics of study subjects			
Demographic characteristic	Mean ± SD	Median(25th-75th percentile)	Range
Age (years)	21.04 ± 1.9	21(20-22)	17-29
Gender	Frequency	Percentage	
1. Male	263	61.74%	
2. Female	162	38.03%	
3. Prefer not to say	1	0.23%	
Medical year level	Frequency	Percentage	
1. 1st year	131	30.75%	
2. 2nd year	45	10.56%	
3. 3rd year	133	31.22%	
4. 4th year	46	10.80%	
5. Intern	71	16.67%	
Table no. 1b: Distribution of anxiety and depression of study subjects during COVID-19 pandemic			
Anxiety	Frequency	Percentage	
1. Absent (0-7)	177	41.55%	
2. Present (8-21)	249	58.45%	
Depression			
1. Absent (0-7)	179	42.02%	
2. Present (8-21)	247	57.98%	

Table 2:-Comparison of Low Back Pain Before and During the COVID-19 Pandemic Era

Low back pain	Before Covid-19 pandemic (n=426)	During pandemic era (n=426)	P value
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No	329(77.23%)	308 (72.30%)	0.098*
Yes	97(22.77%)	118 (27.70%)	
Total	426(100%)	426 (100%)	

* Chi-square test

Table 3:-Descriptive Statistics of Weight(kg) of Study Subjects.

Weight (kg)	Mean ± SD	Median (25th -75th percentile)	Range	P value
Pre-pandemic	65.76 ± 12.52	65(56-75)	36-110	0.0001†
Current Weight	66.51 ± 12.22	65(57-75)	35-115	

† Wilcoxon signed rank test

Statements and Declarations

Financial Interest

The authors declare that there are no financial or non-financial interests related to the work submitted.

Author Contribution

All authors contributed equally to the study.

Consent

Informed consent was obtained from all the participants included in the study.

Data Availability

The datasets used and/or analysed during the current study are available in the supplementary files submitted.

Ethics Approval

Written informed consent was obtained for each participant. They were reassured that their participation was voluntary and that they were free to withdraw at any time. In addition, all information was gathered anonymously and handled confidentially. The study design assured adequate protection of study participants, and neither included clinical data about patients nor configured itself as a clinical trial. Institutional ethic clearance was taken from VMMC and safdarjung hospital ethics committee with IEC number : IEC/VMMC/SJH/2020-11/CC-199. All methods were carried out in accordance with relevant guidelines and regulations as laid down by the ethics committee.

Consent to Participate

All participants gave voluntary consent to participate in the study.

Human Ethics Consent

The study is done following all ethical codes laid down by the Institutional ethics committee.

Competing Interest

The authors declare no competing interests.

Funding Declaration

The study received no funds.

REFERENCES

- Urquhart DM, Berry P, Wluka AE, et al. 2011 Young Investigator Award winner: increased fat mass is associated with high levels of low back pain intensity and disability. *Spine (Phila Pa 1976)* 2011;36:1320-5.
- Aggarwal N, Anand T, Kishore J, et al. Low back pain and associated risk factors among undergraduate students of a medical college in Delhi. *Educ Health Abingdon Engl* 2013;26:103-8.
- Overweight and Obesity - Causes and Risk Factors | NHLBI, NIH [Internet]. 2022 [cited 2024 Nov 6]. Available from: <https://www.nhlbi.nih.gov/health/overweight-and-obesity/causes>
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta psychiatrica scandinavica*. 1983 Jun;67(6):361-70.
- Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale: an updated literature review. *Journal of psychosomatic research*. 2002 Feb 1;52(2):69-77.
- India Country Overview | World Health Organization [Internet]. [cited 2024 Nov 6]. Available from: <https://www.who.int/countries/ind>
- Bani Hani A, Alaridah N, Abu Abeeel M, Shatarat A, Rayyan R, Kamal A, et al. Medical students and risk of COVID-19 infection: A descriptive cross-sectional study from the University of Jordan. *Ann Med Surg*. 2021 Oct 1;70:102775.
- Ulbrichtova R, Svihrova V, Svihra J. Prevalence of COVID-19 Vaccination among Medical Students: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health*. 2022 Mar 29;19(7):4072.
- Bramwell RC, Streetman AE, Besenyi GM. The Effect of Outdoor and Indoor Group Exercise Classes on Psychological Stress in College Students: A Pilot Study with Randomization. *Int J Exerc Sci*. 2023 Aug 1;16(5):1012-1024. PMID: 37650002; PMCID: PMC10464750.
- Wafi AM, Moshle AA, Mutaen AA, Hakami DF, Baeshen RA, Rajhi SA, et al. The impact of COVID-19 on maintaining physical activity and its associated factors among medical students. *Int J Environ Res Public Health* [Internet]. 2022;19(23):15752. Available from: <http://dx.doi.org/10.3390/ijerph192315752>
- Amelot A, Mathon B, Haddad R, Renault M-C, Duguet A, Steichen O. Low back pain among medical students: A burden and an impact to consider! *Spine (Phila Pa 1976)* [Internet]. 2019 [cited 2024 May 10];44(19):1390-5
- Sánchez E, Lecube A, Bellido D, Monereo S, Malagón M, Tinahones F, et al. Leading factors for weight gain during COVID-19 lockdown in a Spanish population: A cross-sectional study. *Nutrients* [Internet]. 2021 [cited 2024 May 10];13(3):894. Available from: <https://www.mdpi.com/2072-6643/13/3/894>
- Raja S, Balasubramanian G, Rani RJ. Prevalence of depression, anxiety and stress among private medical college students in South India: A cross-sectional study. *Journal of Education and Health Promotion*. 2022 Jan 1;11(1):373.

14. Vengadessin, N., Ramasubramani, P. and Saya, G.K., 2024. Anxiety and depression during post covid-19 lockdown period among medical students, and it's relation with stress and smartphone addiction in India. *International Journal of Adolescent Medicine and Health*, 36(2), pp.195-201.
15. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. *Indian journal of medical research*. 2015 Mar 1;141(3):354-7.
16. Omboni S, Padwal RS, Alessa T, Benczúr B, Green BB, Hubbard I, et al. The worldwide impact of telemedicine during COVID-19: current evidence and recommendations for the future. *Connect Health*. 2022 Jan 4;1:7.
17. Skalski SB, Konaszewski K, Büssing A, Surzykiewicz J. Resilience and Mental Well-Being During the COVID-19 Pandemic: Serial Mediation by Persistent Thinking and Anxiety About Coronavirus. *Front Psychiatry*. 2022 Jan 27;12:810274.
18. Barthélemy EJ, Thango NS, Höhne J, Lippa L, Koliass A, Force WYNFRT, et al. Resilience in the Face of the COVID-19 Pandemic: How to Bend and not Break. *World Neurosurg*. 2020 Nov 27;146:280.
19. Kavanagh BE, O'Donohue JS, Ashton MM, Lotfaliany M, McCallum M, Wrobel AL, et al. Coping with COVID-19: Exploring coping strategies, distress, and post-traumatic growth during the COVID-19 pandemic in Australia. *Front Psychiatry [Internet]*. 2022 Oct 20 [cited 2024 Nov 7];13.