ACUTE LOW BACK PAIN AMONG BOTH MEDICAL AND NON-MEDICAL STUDENTS POST COVID-19: A CROSS-SECTIONAL STUDY IN JORDAN

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ABSTRACT:

Background: *Low back pain (LBP) is a common complaint among university students, and it is a leading cause of major musculoskeletal disability. Therefore, it is critical to recognize potential risk factors for LBP at an early stage to prevent further complications.*

Aim of the work: *This study aims to evaluates LBP prevalence, severity, and associated factors among undergraduate university students in Jordan.*

Methodology: *This is a comparative cross-sectional study conducted involving 322 medical and 153 non-medical students during 2021/2022 academic year. After obtaining ethical approval, data were collected via a self-administered online questionnaire distributed through social media platforms and in-person collections. Socio-demographic data and questions about e-learning and physical activity were included. Characteristics of LBP were determined and measured using a numeric grading scale.*

Results: *Mean age was 20.66 for medical students and 21.76 for non-medical students, with females' predominance. Around 70% experienced LBP in 2021, and most did not seek medical advice (83.5% medical, 76.1% non-medical). Pain severity averaged 4 ± 1 for both groups. Online learners reported higher LBP incidence, and both groups had sedentary lifestyles.*

Conclusion: *The prevalence of LBP appears to be high among undergraduate students. Moreover, online learning did not show a statistically significant effect on the development of LBP. This research identified two statistically significant correlations: the relationship between being female and developing LBP, as well as the relationship between carrying a backpack and experiencing LBP. Further studies should be conducted to address this topic due to its importance and the burden it places on healthcare systems.*

Keywords: *Low back pain, online learning, undergraduate students, COVID-19.*

INTRODUCTION:

Low back pain (LBP), defined as pain and discomfort situated below the costal margin and above the inferior gluteal folds, with or without accompanying leg pain, is among the most common medical

conditions[1]. Leading the cause of musculoskeletal disability worldwide, LBP's cost to healthcare systems escalates, creating a significant burden in developed nations as well as low and middle-income countries[2,3].The high cost of coping with LBP extends beyond financial strain and into a complex interplay of physical, psychological, and social influences affecting a broad demographic of adults, both young and old. Therefore, LBP represents a significant global challenge globally [3&4].

Research shows that LBP is quite common among healthcare workers [5], and in some cases, it even predates their career commencement [6]. This challenges the conventional wisdom that LBP predominately affects older individuals, as it is frequently also found among adolescents [7]. According to the available literature, medical students in advanced semesters undertaking increased hospital-based practical activities experience a higher prevalence of LBP compared to their juniors [4].

The pandemic triggered a notable surge in instances of LBP, largely due to lockdown measures. Research examining the impact of COVID-19 on back pain in the U.S. found an 84% rise in reported back pain complaints in November 2020 compared to the same month in the previous year [8]. As COVID-19 began to retreat, new regulations and adaptations gave rise to a new lifestyle, marked by elements such as blended teaching models, vaccine programs, and heightened medical awareness. This study was designed to assess the effects of COVID-19 on LBP by exploring prevalence, intensity, and associated risk factors among medical students in Jordanian universities as compared to their non-medical counterparts. Given the extended hours of remote learning, we expect a heightened prevalence of LBP among medical students in this comparative cross-sectional study. Additionally, this research also evaluates the correlation between remote learning, extensive computer use, and prolonged study hours on the severity of LBP.

MATERIALS AND METHODS:

This cross-sectional study examines the prevalence, risk factors, and characteristics of low back pain (LBP) among medical and non-medical students at Jordanian universities in the wake of the COVID-19 pandemic. The research contrasts medical and dentistry students with peers from various disciplines, such as pharmacy, nursing, rehabilitation, engineering, law, and art, during the 2021/2022 academic year.

The initial study comprised 520 participants, of whom 475 were included, while the remainder were excluded due to pre-existing back pain, metabolic bone disease, bone tumors, or prior back surgery. Students were enlisted to voluntarily participate in the study via social media and face-to-face data collection. The data was collected through an online self-administered questionnaire. The questionnaire, split into four sections, is accompanied by a brief cover letter outlining the study protocol, objectives, and assurance of data anonymity.

The first section gathered socio-demographic data, including gender, age, height, weight, university affiliation, field of study, current year of study, smoking habits, and baseline physical activity levels. The second section focused on lifestyle questions, probing the type and duration of any potential exercise routines. The third section queried about the average time spent both in face-to-face and online lectures, as well as typical study postures. Finally, participants were asked whether they had experienced LBP during the previous academic year. If their response was affirmative, they were directed to answer subsequent questions detailing the nature of the pain, including its duration, frequency, type, potential spread, and severity.

An initial version of the questionnaire underwent a pilot study to evaluate its validity, incorporating participants' suggestions to refine the final version. The Research Ethics Committee at the University of Jordan gave ethical approval. The IBM®SPSS® Statistics Version 29.0.0 enabled the statistical analyses. A significance level of p-value <0.05 was set for this study.

Ethical consideration:

The consent process was carefully conducted in line with ethical standards. This ensured each participant understood the study before responding to the questionnaire. The study received Institutional Review Board (IRB) approval in June 2021, under reference number 1878.

RESULTS:

We recruited a total of 475 participants, of whom 322 were medical students, and the remaining 153 were from other fields. The average age was 21.6 for the medical group and 20.7 for the non-medical group. There was a higher female-to-male ratio in both groups. The majority of the medical students were in their third year (26.7%), in contrast to non-medical participants, who were mostly second-year students (28.1%). Non-smokers comprised 86.6% and 79.1% of the medical and non-medical groups, respectively. The mean body mass index (BMI) indicated a normal range (18.5–24.9 Kg/m^2) for both groups. Among the participants, most lived in their own homes, 85.1% and 81.7% for the medical and non-medical groups, respectively Table (1).

Table (2) details the incidence of LBP in the two groups, reporting that 58.4% of medical students experienced LBP, compared to a higher rate of 73.9% in the non-medical group. According to Table (3), the majority of participants reported their peak pain in 2021: 70.1% of medical and 69.0% of non-medical. 51.0% of medical participants described their pain as dull, while 40.7% of non-medical participants experienced soreness. However, this did not interfere with their daily activities. In regards to seeking medical advice for their pain, most participants, 83.5% and 76.1% of medical and non-medical groups, respectively, did not do so. Additionally, most participants did not consume painkillers, 56.9% and 54.9% for medical and non-medical groups, respectively.

In relation to online learning, Table (4) shows that 85.6% of medical students with LBP practiced e-learning, a figure closely mirrored by non-medical participants at 89.3%. Table (5) presents the mean severity of pain: 4.32 for medical, and 4.64 for non-medical, with standard deviations of 1.6 and 1.7, respectively.

Table (6) considers students' habits of carrying backpacks and their approximate weights. A mere 32.8% of the students did not carry bags, while the majority carried their bags most or all of the time (46.1% and 21.1%, respectively). Most of the backpacks weighed less than 4 kg, with 49.5% being 1–2 kg and 40.8% being 3–4 kg. Table (7) presents the relationship between carrying a backpack and developing LBP. Out of 319 participants who carried bags, 221 reported feeling back pain at some point. Of the 156 students who did not carry a bag, around half (80 students) developed LBP.

Table (8) categorizes the details of e-learning for both groups. For the medical participants, 49.4% spent 1–2 h studying remotely, and 82.4% chose sitting as their dominant posture. The non-medical group predominantly studied for 3–4 h (46.2%), and 74.2% elected sitting as their primary posture.

Diagram (1) shows physical activity frequency for medical students. The majority, at a rate of 38.8% (dark blue), did not engage in any physical activity, while 37% (light blue) exercised 1–2 times a week. For the non-medical group, Diagram (2) illustrates that a majority, 37.9% (light blue), exercised 1–2 times a week.

Table 1: Socio-demographic data for medical and non-medical groups.

	Medical students (N=322)		Non-medical students (N=153)	
	Count	Percentage %	Count	Percentage %
Age	Mean 21.66		Mean 20.75	
Gender				
Female	178	55.3%	115	75.2%
Male	144	44.7%	38	24.8%
Academic year				
First	37	11.5%	28	18.3%
Second	48	14.9%	43	28.1%
Third	86	26.7%	42	27.5%
Fourth	59	18.3%	19	12.4%
Fifth	57	17.7%	20	13.1%
Sixth	35	10.9%	1	0.7%
Smoking				
Yes	43	13.4%	32	20.9%
No	279	86.6%	121	79.1%
BMI	Mean 23.78		Mean 22.78	
Household status				
Owned house	274	85.1%	125	81.7%
Rented house	48	14.9%	28	18.3%

Table 2: Incidence of low back pain among medical and non-medical students.

	Medical students (N=322)		Non-medical students (N=153)	
	Count	Percentage %	Count	Percentage %
Experienced LBP	188	58.4%	113	73.9%
Did not experience LBP	134	41.6%	40	26.1%

Table 3: Pain details for medical and non-medical.

	Medical students (N=188)		non-medical students (N=113)	
	Count	Percentage %	Count	Percentage %
Timing of pain				
First half of 2021	66	35.1%	35	31.0%
Second half of 2021	66	35.1%	43	38.0%
January - March 2022	31	16.5%	15	13.3%
April – June 2022	15	8.0%	12	10.6
July – September 2022	10	5.3%	8	7.1%
Type of pain				
Dull pain	96	51.0%	41	36.3%
Shooting pain	29	15.4%	26	23.0%
Soreness	62	33.0%	46	40.7%
Interference with daily life				
Yes	62	33.0%	56	49.9%
No	126	67.0%	57	50.4%
Seeking medical advice				
Yes	31	16.5%	27	23.9%
No	157	83.5%	86	76.1%
Taking pain killers				
Yes, daily	10	5.3%	8	7.1%
Randomly, upon need	**71**	**37.8%**	**43**	**38.1%**
None	107	56.9%	62	54.9%

Table 4: Pain severity for medical and non-medical patients.

Severity of pain			
	Mean	N	Std. Deviation
Medical students	4.32	188	1.60
Non-medical students	4.64	113	1.76

Table 5: Relationship between LBP and online learning for medical and non-medical students.

		Experienced LBP		Did not experience LBP	
		Count	Percentage %	Count	Percentage %
Medical students	Online learning				
	Yes	161	85.6%	106	79.1%
	No	27	14.3%	28	20.9%
Non-medical students	Online learning				
	Yes	101	89.3%	31	77.5%
	No	12	10.7%	9	22.5%

Table 6: Details about backpack weight and frequency of carrying it on.

	Count	Percentage %
How often did you carry a backpack?		
Always	100	21.1%
Couple of days	219	46.1%
Never	156	32.8%
Weight of the bag		
1–2 Kg	158	49.5%
3–4 Kg	130	40.8%
>5 Kg	31	9.8%

Table 7: Relation between carrying a backpack and developing LBP.

	Carry a bag (N=319)		Did not carry a bag (N=156)	
	Count	Percentage %	Count	Percentage %
Experienced LBP	221	69.3%	80	51.3%
Did not experience LBP	98	30.7%	76	48.7%

Table 8: Studying time and posture for medical and non-medical students.

	Count	Percentage %
Average time spent studying for medical students		
1–2 h	132	49.4%
3–4 h	92	34.5%
5–6 h	26	9.7%
More than 7 h	16	6.0%
Average time of Face-to-Face education for medical students		
1–2 h	74	27.7%
3–4 h	122	45.7%
5–6 h	52	19.5%
More than 7 h	19	7.1%
Regular posture during studying for medical students		
Laying down	22	8.2%
Sitting	220	82.4%
Standing/walking	25	9.4%
Average time spent studying For non-medical students		
1–2 h	52	39.4%

3–4 h	62	47.0%
5–6 h	16	12.1%
More than 7 h	2	1.5%
Average time of Face-to-Face education for non-medical students		
1–2 h	18	13.6%
3–4 h	61	46.2%
5–6 h	34	25.8%
More than 7 h	19	14.4%
Regular posture during studying for non-medical students		
Laying down	15	11.4%
Sitting	98	74.2%
Standing/walking	19	14.4%

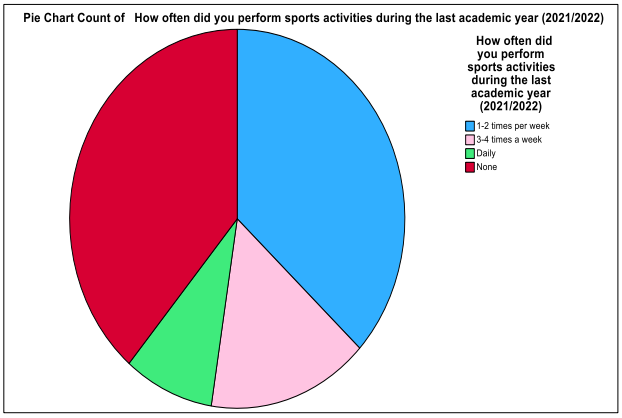

Diagram 1. Physical activity frequency for the medical group.

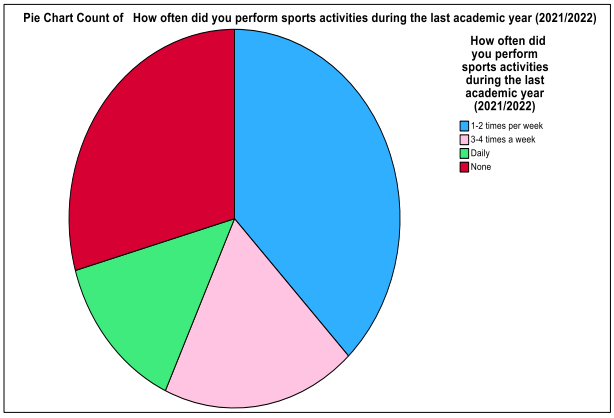

Diagram 2. Physical activity frequency for the non-medical group.

DISCUSSION:

This is a cross-sectional comparative study that was carried out post-COVID-19 on both medical and non-medical students in Jordanian universities. The analysis indicated that a higher percentage of participants experienced LBP compared to those who did not. However, no notable correlation was found between online learning and LBP among the medical ($p = 0.125$) and non-medical ($p = 0.061$) student groups.

On another note, research done on Chinese medical and dental students showed a prevalence of neck pain (NP) and LBP at 44.4% and 30.6%, respectively [9]. This study supports the idea that musculoskeletal pain is common among college students, but it is not affected by computer usage or physical activity levels [10]. This is unlike a systematic review that displayed a strong connection between prolonged smartphone usage and spine disorders [11].

There is evidence indicating that students who sit for more than 3 h daily using their laptops experience neck and back pain [12,13]. Extended periods of unbroken sitting have been shown to lead to postural changes that can contribute to future LBP [14]. Most students from both medical and non-medical groups indicated that they predominantly sit while studying or using smartphones. Another research found that the amount of sitting measured in minutes per day predicts poor hip posture but was not significant in predicting LBP [15].

Limited research indicates a significant correlation between LBP and prolonged sitting. The average ages for medical and

non-medical groups were 21.66 and 20.75, respectively. A substantial portion of both groups experienced LBP, suggesting that age does not significantly correlate with LBP development (p = 0.22). Research carried out on undergraduate students at a Saudi public university found no significant link between neck and back pain and age or gender [16].

Concerning the occurrence of LBP in relation to gender, a statistically significant correlation is indicated by a p-value of 0.001. A study involving Saudi adolescents revealed that females had a higher LBP prevalence rate at 74%, compared to their male counterparts at 48% [17]. The higher rate among females may be attributed to their smaller body dimensions and lower muscle endurance, potentially making them more susceptible to musculoskeletal pain (MSKP) than males [18-21]. However, other research does not point to a significant difference in LBP prevalence across genders [22-24].

No significant correlation was found between the onset of LBP and a BMI of 25 or greater. A cross-sectional study among Saudi Arabian high school students noted no significant difference in BMI between participants with and without LBP [17]. Oddly, other studies found LBP reported most frequently (58.8%) in students with a normal BMI, with only 14.3% of obese students reporting LBP [25]. However, a study conducted with medical students in Bangladesh found contradicting results where participants with a BMI greater than 25 kg/m^2 were twice as likely to develop LBP in the past year compared to those with a BMI equal to or less than 25 kg/m^2[2].

Researchers have found a statistically significant correlation between carrying heavy backpacks and developing LBP, in addition to the consideration of a participant's BMI. Notably, this study evidenced a significant correlation (with a p-value of <0.001) between backpack weight and reported LBP. On the other hand, an analytic cross-sectional survey involving Kuwaiti public high school students suggested no significant association between the bag's absolute weight and the occurrence of LBP[26].

In our study, less than half of the participants indicated that pain interfered with their daily routine. According to a separate study, 18.8% and 12.2% of students claimed that LBP hindered their work and recreational activities, respectively. Conversely, a study conducted in Saudi Arabia found that 19.1% (n=382) and 18.9% (n=377) of participants either reduced their overall activity or only leisure activities due to LBP. It was shown that the majority of participants (n=301) did not seek medical advice, nor did they use painkillers for pain management.

In another research, out of 213 students with LBP, a mere 4.2% had been hospitalized, 7.5% had switched their jobs, and 8.5% sought medical advice. Additionally, 11.3% of the participants in a different study reported hospital visits for LBP, and 10% consulted doctors, physiotherapists, or chiropractors for the same.

Both medical and non-medical students reported pain of a level 4 ±1 on a scale from 0 to 10, according to the Numeric Rating Scale (NRS). This score shows relatively mild pain, potentially explaining why the students did not feel a need for medical consultation.

Turning our attention to the frequency of physical activity among both medical and non-medical groups, a recent survey revealed no meaningful relationship, with p-values of 0.51 and 0.06, respectively. Meanwhile, a study on medical students in Bangladesh showed a higher prevalence of LBP among these students. The reason for this could be attributed to the demanding nature of their curricula, lengthy study and training hours, minimal to moderate physical activity, and a high-stress lifestyle [2].

It is vital to identify and avoid risk factors for LBP early to prevent it from becoming a chronic and recurring condition that could negatively impact an individual's career [(2)]. However, while interpreting these results, we should note several limitations. Firstly, this study exhibited both speech and recall bias. Moreover, the study's subjects predominantly consisted of medical students. Most of the participants were also females, which might affect the representativeness of the data. The severity of pain was assessed using a 0–10 scale; however, considering that pain is subjective to each individual, this might not be completely accurate. Furthermore, the various forms and types of physical activity make it hard to generalize. Lastly, our study was conducted on undergraduate students, limiting the findings' applicability to the broader population.

Conclusion:

In conclusion, both the medical and non-medical subjects demonstrated a higher likelihood of developing LBP, with prevalence rates of 16.8% and 47.8%, respectively. However, in our analysis, this difference was not statistically significant. Similarly, the effect of online learning on the development of LBP lacked statistical significance. Despite these findings, a significant correlation was identified between female gender and an increased likelihood of developing LBP. The relationship between LBP prevalence and carrying a backpack was also statistically significant. Notably, a majority of participants reported a preference for a sedentary lifestyle, persisting even after COVID-19 lockdown restrictions were lifted.

Conflict of interest statement

The authors declare no conflicts of interest.

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آلام أسفل الظهر الحادة بين طلاب الطب وغير الطب خلال فترة كوفيد-19 (دراسة مقطعية في الأردن)

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الخلفية: آلام أسفل الظهر هي شكوى شائعة بين طلاب الجامعات، وهي سبب رئيسي للإعاقة العضلية الهيكلية الرئيسية. لذلك، من الأهمية بمكان التعرف على عوامل الخطر المحتملة للإصابة بآلام أسفل الظهر في مرحلة مبكرة لمنع حدوث المزيد من المضاعفات.

الهدف: تهدف هذه الدراسة إلى تقييم مدى انتشار الإصابة بالتهاب المفاصل الروماتيزم العضلي الهيكلي وشدته والعوامل المرتبطة به بين طلاب الجامعات في الأردن.

المنهجية: هذه دراسة مقارنة مقطعية مستعرضة أجريت على 322 طالبًا في كلية الطب و153 طالبًا غير طبي خلال العام الدراسي 2022/2021. بعد الحصول على الموافقة الأخلاقية، تم جمع البيانات من خلال استبيان عبر الإنترنت تم توزيعه عبر منصات التواصل الاجتماعي والمقابلات الشخصية .تم تضمين البيانات الاجتماعية والديموغرافية وأسئلة حول التعلم الإلكتروني والنشاط البدني. تم تحديد وقياس خصائص التعلُّم الإلكتروني والنشاط البدني باستخدام مقياس رقمي للدرجات.

النتائج: كان متوسط الأعمار 20.66 عامًا لطلاب الطب و21.76 عامًا للطلاب غير الأطباء، وكانت الغلبة للإناث. عانى حوالي 70% منهم من آلام أسفل الظهر في عام 2021، ولم يطلب معظمهم المشورة الطبية (83.5% من الطلاب في الطب و76.1% من الطلاب غير الأطباء). بلغ متوسط شدة الألم 4 ± 1 لكلا المجموعتين. أبلغ الدارسون عبر الإنترنت عن ارتفاع معدل الإصابة بآلام أسفل الظهر، وكانت أنماط حياة كلا المجموعتين قليلة الحركة.

الخلاصة: يبدو أن معدل انتشار الإصابة بآلام أسفل الظهر مرتفع بين الطلاب الجامعيين. وعلاوة على ذلك، لم يُظهر التعلم عبر الإنترنت تأثيرًا ذا دلالة إحصائية على تطور الإصابة بآلام أسفل الظهر. حدد هذا البحث علاقتين ذات دلالة إحصائية: العلاقة بين كونك أنثى والإصابة بآلام أسفل الظهر، وكذلك العلاقة بين حمل حقيبة الظهر والإصابة بآلام أسفل الظهر. ينبغي إجراء المزيد من الدراسات لمعالجة هذا الموضوع نظرًا لأهميته والعبء الذي يضعه على أنظمة الرعاية الصحية.