

RESEARCH ARTICLE

COVID-19'S DISTANCE LEARNING IMPACT ON LOW BACK PAIN AMONG MEDICAL STUDENTS OF UMM AL-QURAUNIVERSITY; A CROSS SECTIONAL STUDY IN SAUDI ARABIA

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Abstract

Background: Low back pain (LBP)is a common musculoskeletal condition and represents a major concern in public health affecting diverse ages throughout the population. Medical studentsin particular havea highprevalence of LBP.During the COVID-19 pandemic, governments worldwide implemented precautionary measures to help decrease the spread of the virus and ensure public safety. Those measures include distance learning, which increased significantly in usage among medical students.

Methods:We conducted a descriptive cross-sectional internet-based survey using the Oswestry Low Back Pain Disability Questionnaire as the main tool, to assess the severity of disability due to low back pain in medical students from Umm Al-Qura university.

Results: A minimal disability scorewas observed among 313(94.3%) of the medical students. The most significant risk factor was identified as family history, p value (0.022), observed in 39.9% of our population. Prolonged sitting was not significant.

Conclusion:No significant link was established between prolonged sitting and LBP. Further studies are needed to investigate the effects of transitioning to distance learning among medical students.

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Introduction:-

Low back pain (LBP)is a common musculoskeletal condition and represents a major concern in public health affecting diverse ages throughout the population. LBP can have negative effects on a person's sleep quality, work productivity, and difficulties carrying out professional responsibilities (1). The lifetime prevalence of non-specific LBP is estimated at 60% to 70% in industrialized countries, with a one-year prevalence of 15% to 45% (2). Higher educational students, particularly medical students, have high international one-year prevalence of LBP, as reported by Cyberjaya University of Malaysia (46.1%)(3), Maulana Azad Medical College in India (47.5%)(4), Positivo and Evangelical Universities in Brazil (81.7%)(5), and Belgrade Medical College in Serbia (59.5%)(6). In the Middle East and North Africa (MENA) regional level, Ahlia University in Bahrain reported (34.04%)(7), and TarbiatModares University in Iran (60.3%)(8). In Saudi Arabia, a multi college study was conducted at King Saud University in Riyadh which included four colleges of medicine: King Saud University, King Abdulaziz University, Umm Al- Qura University, and Imam Abdulrahman Bin Faisal University, that reported a one year LBP prevalence

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of (67.6%)(9). Another multi college study from six colleges in Jeddah reported a one year LBP prevalence of (68.1%)(10). There are individual reports by Taif University of (33.3%)(11), and Jazan University of (61.4%)(12).

With the onset of the Covid-19 pandemic, governments worldwide implemented precautionary measures to help decrease the spread of the virus and ensure public safety. Those measures included social distancing, quarantines, and distance learning, also referred to electronic/E-learning or online-learning (1).Saudi Arabia started its national lockdown on 24^{th} of March 2020. Medical students switched to distance learning in order to continue their education.A resultant lack of exercise, increase in weight, prolonged sitting in front of computer stations, along with the psychological stress of new online assessment methods all contributed to the development of LBP(13). The prevalence of low back pain increased from (38.8%) to (43.8%) after the quarantine (1).

A study at the Northern Border University of Saudi Arabia reported from April to July 2020 that (20.4%) of students of the medical and allied healthcare faculties had their first attack of LBP during the Covid-19 pandemic. The most reported protective measure was proper ergonomic sitting practice (51% of all LBP cases)(13). Thus, more research is warranted due to scarcity of data. This data is required to positively influence the ongoing changes to the learning modalities of medical education.

Our study aims to investigate the prevalence and causes of LBP among medical students at Umm Al-QuraUniversity since the initiation of distance learning, via a redesigned electronic questionnaire.

Materials And Methods:-

Study Design and Population.

Our aim is to determine the influence of COVID-19 pandemic on the prevalence of Low Back Pain (LBP) severity and intensity associated with the transformation to distance learning during the lockdown period among the medical students of Umm Al-Qura university. This is a descriptive cross-sectional study to compare between the pre- Covid-19 and the Covid-19 era. The Faculty of Medicine at Umm Al-Qura University in Makkah, Saudi Arabia is home to more than 1500 medical students, from 2nd to the clinical internship year (14). Our primary population is the 774 students who are in the 4th to 6thclinical years. The estimated sample size was calculated using the Open Epi calculator, obtaining 296individuals to be sampled to reach a 95% confidence level (15). We added 15% more to the target sample to account for incomplete data.

Ethical Approval and Study tools.

The study usedas the main tool thevalidated questionnaire tool "The Oswestry Disability Index," also known as Oswestry Low Back Pain Disability Questionnaire, to assess the severity of disability due to low back pain (16). It contains 10 sections with 6 items in each section. The score of a single section can range from 0-5 according to the item selected. The total scores will be summed for each section and divided by the maximum possible score to get the percentage of disability. (Table 1) shows the interpretation of disability percentages. The IRB committee of the UQU College of Medicine reviewedthe study protocol and ethical approval was obtained prior to starting the research. Consent was taken from each participant prior to being involved in the study.

Percentages %	Description
0% to 20%:	The patient can manage most activities of life. No treatment other than advice on lifting
minimal	weights. sitting and exercising
disability:	
21%-40%:	The patient experiences more pain and difficulty in sitting, lifting and standing.
moderate	Traveling and socializing are more difficult and work disability. Self-care, sexual
disability:	performance, and sleep are not severely affected, and patients can usually be managed
	with conservative measures.
41%-60%:	Pain is the main problem in this group and daily activities are impacted. Further
severe disability:	investigation for these patients is needed.

Table 1:- Interpretation of disability percentages.

61%-80%: crippled:	Back pain affects every aspect of a patient's life. Active intervention is required.
81%-100%:	These patients are either bedridden or exaggerate their symptoms.

Data Management and Statistical Assessment.

The pre-validated Arabic version of the disability index was translated to an internet-based selfadministrated Google form link (17). The purpose of the study and consent of voluntary participation were explained tthe outset. Participants could not continue completing the questionnaire without agreeing to the consent. Each part of the questionnaire was split into a single page to contain one major theme; the sociodemographic data, risk factors of low back pain, and the intensity and severity of LBP by the Oswestry Disability Index. The Google form link was given to data collectors to contact, distribute and to follow up withtheparticipating target population. After achieving the needed sample size, data was exported to the Microsoft Excel sheet for cleaning and coding. Lastly, statistical calculation was performed using the IBM Statistical Package for the Social Sciences (SPSS) softwareversion 25. Multiple tests were calculated according to variable type, whether quantitative or qualitative. Results with a p-value less than 0.05 were considered statistically significant in the analysis.

Results:-

We received a total of 331 responses from medical students of Umm Al-QuraUniversity. The majority were male 185(55.9%) and 146(44.1%) were female with an average age of 22.31 years, standard deviation $(SD) \pm 1.11$ years. Nearly half of our sample were fourth-year students 156(48%), with almost equal distribution between fifth- and sixth-year students at 25% for each year(Table 2). The mean GPA score was 3.60 $(SD) \pm 0.32$.

(Table 3) shows the distribution of disability index due to LBP among the medical students and the relationship with possible risk factors affecting quality of life. A minimal disability score due to LBP was observed among 313(94.3%) of the medical students. The averageOswestry disability index (ODI) score was 2.85 (SD) \pm 3.401. The prevalence of smoking, diabetes mellitus and psychiatric conditions in this population was (15.4%), (0.9%) and (9.1%), respectively. Furthermore, 256(77.3%) of the students reported prolonged sitting more than 3 hours, while 132(39.9%)reported a family history of LBP. Body mass indexes(BMI) were calculated for participants. We found (52.7%) were normal weight, (25.5%) were overweight, (13.3%) were obese and the rest were underweight(8.5%).

A chi-square test was used to assess the correlation between the disability index and risk factors. Only a family history of LBP was statistically significant with a disability index p-value of 0.02. Other parameters and proposed risk factors including smoking, DM, psychiatric conditions, prolonged sitting more than 3 hours and BMI categories did not show statistical significance.

Tuble 2 Demographics Data.	
Sample Characteristics (N=331)	N (%)
Gender:	
Male	185 (55.9%)
Female	146 (44.1%)
Academic Year:	
Fourth Year	159 (48.0%)
Fifth Year	83 (25.1%)
Sixth Year	89 (26.9%)
BMI:	
Underweight	28 (8.5%)
Healthy	174 (52.7%)
Overweight	84 (25.5%)
Obese	44 (13.3)

Table 2:- Demographics Data

Table 3:- Risk factors and Oswestry disability index.

Variables	Oswestry disability index			Р
	Mild disability	Moderate disability N(%	Severe disability N(%	value
	N(% within the	within the category)	within the category)	

		category)			
Gender	Males:	177 (95.7%)	7 (3.8%)	1 (0.5%)	0.311
	Females:	136 (93.2%)	10 (6.8%)	0 (0%)	
Academic	4 th Year	153 (96.2%)	5 (3.1%)	1 (0.6%)	0.281
year	5 TH Year	79(95.2%)	4 (4.8%)	0 (0%)	
	6 th Year	81 (91.0%)	8 (9.0%)	0 (0%)	
smoking	Yes	47 (92.2%)	3 (5.9%)	1 (2%)	0.061
	No	266 (95.0%)	14 (5.0%)	0 (0%)	
diabetes	Yes	3 (100%)	0 (0%)	0 (0%)	0.917
mellitus	No	310 (94.5%)	17 (5.2%)	1 (0.3%)	
Family	Yes	120 (90.9%)	12 (9.1%)	0 (0%)	0.022
History of	No	193 (97.0%)	5 (2.5%)	1 (0.5%)	
LBP					
Setting more	Yes	241 (94.1%)	14 (5.5%)	1 (0.4%)	0.757
than 3h	No	72 (96.0%)	3 (4.0%)	0 (0%)	
Psychiatric	Yes	29 (96.7%)	1 (3.3%)	0 (0%)	0.851
condition	No	284 (94.4%)	16 (5.3%)	1 (0.3%)	
BMI	Underweight	27 (96.4%)	1 (3.6%)	0 (0%)	0.602
	Healthy	165 (94.8%)	9 (5.2%)	0 (0%)	
	Overweight	77 (91.7%)	6 (7.1%)	1 (1.2%)	
	Obese	43 (97.7%)	1 (2.3%)	0 (0%)	

Discussion:-

The present study was conducted on medical students from 4th, 5th, and 6th years of the Faculty of Medicine of Umm Al-QuraUniversity, Makkah, Saudi Arabia. These academic years were specifically chosendue to their experience with both the traditional and distance learning methods of teaching.

Most of our study population had a normalbody mass index (BMI)with no significant association with a severity of disability on the Oswestry disability index(ODI). This is consistent with similar studies such asNordin et al in Malaysia(18). Yücel and Torun in Turkeysimilarly had no significant association between LBP and BMI among health science students(19). It should be noted that the only student with an ODI of severe disability had overweight BMI and a positive smoking history. Other risk factors investigated - smoking, diabetes, depression, anxiety, or somatization disorder, did not yield significance.

The Covid-19 pandemic and its subsequent lockdown contributed to the usage of distance learning with an attendant increased sitting time.Usage increased 61% for medical students and residents in Saudi Arabia as reported by Alsaywid et al(20). Romero-Blanco et al reported university students in Spain increasing sitting timeregardless of gender, academic year or other characteristics(21).In our population, the majority of students (77.3%) reported sitting more than 3 hours.This is in line with university students in the mid-Atlantic region of the United States of America (USA) where the average sitting time was 5.1 ± 2.2 h/d as reported by Vainshelboim et al (22).Coakley et al observed 8.61 h/day in southwest university students of the USA(23). South Korean students sat 7.96 h/day as observed by Lee and Kim (24).In Saudi Arabia, this was higher than reported in theNorthern Border University healthcare students (66.6%) as observed by Alrowaili(13). Prolonged sitting in our population, however, did not yield a significant p value.Therefore,we cannot definitively link distance learning and LBP. However, this does not diminish the rule of prolonged sitting as it has been linked to LBP(13,18). Therefore, medical students should be educated and encouraged to exercise regularly as both measures are shown to have the best effect regarding LBP prevention according to Foster et al (25).

The most significant risk factor according to the p-value (0.022) was family history of LBP observed in (39.9%) among thepopulation. This is higher than in National Border University, Saudi Arabia with (27.5%)(13) and Delhi (25%) observed by Aggarwal et al in students without LBP(4). Our findings were lower than medical students in Serbia as observed by Ilic et al (56.2%), in students without LBP(26). Family history is significantly associated with LBP as observed by Alshagga et al in Malaysian medical college students (3).Furthermore, family history is linked to spinal disease (27) which is animportant cause of LBP. In our population, moderate disability was observed the most among students with family history of LBP (9.1%) compared to other risk factors.

The Oswestry disability index of our population revealed the vast majority had minimal disability (94.3%), followed by moderate disability (5.1%), and lastly severe disability (0.3%). This is similar to AlShayhan and Saadeddinprior to the Covid-19 era in King Saud University, Riyadh, Saudi Arabia, where the majority of students recorded minimal disability (90.3%)(28). Boszczowski et al had a similar distribution after Covid-19 in Brazil, with medical students reporting minimal disability (94%) and moderate disability (6%)(29).

The average ODI score in our population was 2.85 (SD) \pm 3.401. This is lower than the average ODI score of 4.0 \pm 5.3 seen in medical students in New York, USA by Jerry et al (30)before the Covid-19 pandemic.

There were several limitations in the paper. Cross-sectional studies are not the optimum design to evaluate the risk factors associated with LBP. Our presuming risks factors were limited in number. More studies are needed to address the long-term effects on LBP asmost of our population were in the minimal disability category.

Conclusion:-

The Covid-19 pandemic allowed distance learning to surface as a new method of teaching in medical schools. With every new development in educational modality comes new challenges to be investigated and optimized. This study failed to establish a link between prolonged sitting and LBP for medical students engaging in distance learning at Umm Al-Qura University of Makkah, Saudi Arabia. Further studies are needed to investigate the effects of transitioning to distance learning.

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