Increased incidence and aetiological factors of back pain among Universiti Malaysia Sabah staff and undergraduates during the COVID-19 lockdown period

Rajesh Kumar Muniandy, MMed[1], Kamarudin Mudin, MMed[1], Yeap Boon Tat, MMed[1], Peter Voo Su Kiong, PhD[2]

[1]Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, [2]Faculty of Psychology and Education, Universiti Malaysia Sabah

ABSTRACT

Introduction: In response to the coronavirus disease 2019 (COVID-19) pandemic, many countries have introduced work from home campaigns. Most teaching faculties have moved to an online delivery mode, which could put students and teachers at risk of back pain. The aim of this study was to determine the frequency of newly diagnosed back pain among lecturers and undergraduates from a tertiary education centre during the COVID-19 lockdown and to identify the possible factors associated with this back pain.

Materials and Methods: This study was a cross-sectional survey conducted among 1,500 lecturers and students of Universiti Malaysia Sabah (UMS). The questionnaire used was modified from previous studies on back pain.

Results: There were 346 newly diagnosed cases of back pain among students and lecturers of UMS. More than half of the participants (61.2%) suffered lower back pain in the lumbar region. There was a significant correlation between increased time of sitting and reduced exercise time, and the incidence of back pain. Poor ergonomic sitting conditions and poor perceived health conditions during the lockdown period also had a significant impact on the frequency of back pain.

Conclusion: The university community has undergone a significant increase in sitting time and a decrease in exercise time during the lockdown. This has contributed to an increase in the frequency of back pain. It is recommended that further studies be done to guide the university community regarding the maintenance of exercise and management of sitting hours, in order to reduce the frequency of back pain.

KEYWORDS:
Back pain, COVID-19 lockdown

INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) emerged at the end of December 2019 in China.[1] The authorities in China took an unprecedented step in locking down parts of China to lower the risk of further disease transmission.[2]

The spread of COVID-19, however, was soon discovered in other parts of the world, and the World Health Organization

(WHO) soon declared it to be a pandemic.[3] In response to the pandemic, many countries, including Malaysia, have introduced travel restrictions, social distancing, self-isolation, lockdowns, and work from home campaigns. As of March 25, 150 countries have closed their schools and educational institutions nationwide, impacting over 80% of the world's students and teachers.[4]

Most teaching faculties have moved to an online delivery mode in response to this. Although online teaching is not a new concept, it has never been an inclusive mode entirely, especially in medical education. This mode of teaching involves increased screen time and sitting, which could be a risk factor for back pain.[5]

Back pain may be caused by a number of diverse factors. It may originate from disease, injuries, or stresses in many different structures, including the bones, muscles, ligaments, joints, nerves, or spinal cord. Often, the aetiology of the pain lies not only in terms of the pain itself but also in the way we stand, sit, rest, and play. Posture has a direct impact on the extent to which back pain occurs; research among patients suffering from back pain shows that 85% of all problems can be traced back to a long-term incorrect sitting position.[6]

About 70% of adults have suffered from back pain at least once in their lives.[7] In Malaysia, the prevalence of back pain was found to be 12%.[8] However, no study on back pain has been conducted in Malaysia during the COVID-19 lockdown period.

The aim of this study was to determine the frequency of newly diagnosed back pain among lecturers and undergraduates of UMS during the COVID-19 lockdown and to identify the possible factors associated with this back pain. Our research hypothesis is that there will be an increase in back pain during the lockdown period, compared to that before the lockdown.

MATERIALS AND METHODS

A cross-sectional survey was conducted among lecturers and students of UMS. Convenience sampling was utilised. Online questionnaires were distributed to 1,500 lecturers and students via an Internet-based application. The questionnaire used was modified from previous studies on back pain based on the local setting and culture.[9,10] Content

validity after modification was ensured through a focus group discussion that included clinical and academic experts in the field. All experts had more than five years of experience and will be in possession of a postgraduate qualification.

The questionnaire was organised into three parts: part one consisted of socio-demographic information, part two content included details of current changes in lifestyle due to the lockdown, and part three collected information regarding the characteristics of the pain. This included a self-assessment regarding the participants ergonomic conditions, medication for pain, exercise hours, sitting hours, and perceived health before, after, and during the lockdown. This study adopted a purposive sampling and lasted for six months. The pain score was categorised into three levels: mild (1–3), moderate (4–6), and severe (7 and above).

The questionnaire was pre-tested on 10 students before distributing it to the other subjects to ensure that the questionnaire was easily understood. After obtaining ethical clearance, the questionnaire was created online and distributed using a chat application. A cover letter was used to inform the participants of the purpose of the study and assure the anonymity and the entitlement of the respondents to complete or decline the survey questionnaire. The questionnaire was distributed for one week in early May 2020, which is six weeks after the COVID-19 lockdown in Malaysia.

Lecturers and students of UMS who were actively involved in teaching and learning during the pandemic period were eligible for inclusion of this study. Exclusion criteria were students with known spinal deformities, such as scoliosis, spondylolisthesis, spondylosis, spondylolysis, spinal stenosis, prolapsed intervertebral disc or any neurological deficit, and history of back pain before the COVID-19 quarantine.

Informed consent was inferred by voluntary completion and return of the questionnaire. Statistical analysis of the data was performed using SPSS software version 20.

RESULTS
After the distribution of 1,500 questionnaires, 842 responded to the survey. The response rate was 56.1%. However, only 346 participants fulfilled the criteria of newly diagnosed back pain.

Demography
Table I shows the demography of the participants. There were 346 newly diagnosed cases of back pain among students and lecturers of UMS. The average age of participants was 25.83 ± 8.88 years. There were 156 (45.1%) male participants and 190 (54.9%) female participants. More than half of the participants (61.2%) suffered lower back pain in the lumbar region. Of the participants who had lower back pain, 122 were females (57.5%), and 90 (42.5%) were males. Most participants (93.6%) reported a bad ergonomic condition of their chairs.

Impact of hours of physical activity and sitting hours on the frequency of back pain
A paired sample t-test indicates that there is a significant difference in some of the study variables, including exercise hours, sitting hours, and lower back pain before and after the lockdown. Exercise hours significantly decreased ($p < 0.001$; 95% CI = 2.731–2.910), from 3.16 ± 0.90 hours to 0.34 ± 0.48 hours. Correspondingly, sitting hours significantly increased ($p < 0.001$; 95% CI = −[2.774–2.590]), from 2.20 ± 0.45 hours to 4.88 ± 1.00 hours. Similarly, mean lower back pain increased from absent to mild (2.88 ± 0.86; $p < 0.001$; 95% CI = −[2.975–2.788]).

The Wilcoxon signed-rank test showed a significant difference ($p < 0.001$) in perceived health condition before and after the lockdown. The mean perceived health deteriorated from moderate (2.95 ± 0.23) to poor (1.63 ± 0.48). These data are presented in Table II.

Linear regression analysis (Table III) showed that the number of hours spent on physical activity significantly explains 2.0% of the variance in back pain ($F[1,344] = 7.892$; $p < 0.01$). The findings also reported β = 0.150 and 95% CI = 0.083–0.469, indicating that the number of hours spent on physical activity also significantly influence back pain.

Long sitting times significantly explained 6.3% of the variance in back pain ($F[1,344] = 24.334$; $p < 0.001$). The results showed that β = 0.257 and 95% CI = 0.137–0.319, indicating that the long hours of sitting significantly influence back pain.

Impact of ergonomic sitting conditions and perceived health conditions on the frequency of back pain
Binary logistic regression analysis (Table IV) indicated that people with poor ergonomic sitting conditions are about two times more likely to experience mild back pain compared to people with good ergonomic sitting conditions (odd ratio = 2.045; 95% CI = 1.177–3.583). In addition, participants with bad perceived health condition are two times more likely to experience moderate back pain compared to participants with good perceived health condition (odd ratio = 2.489; 95% CI = 1.765–3.511).

DISCUSSION
Back pain is among the most frequent reasons for visiting a doctor in Europe,[11,12] and the burden of illness from this problem is significant. The prevalence of back pain in developed countries is estimated to range from 10% to 31%.[13,14] In Malaysia, the prevalence of back pain was 12%, rated as the ninth and fifth most common complaint in public and private primary healthcare clinics, respectively.[15] However, to date, no data is available regarding back pain of university staff and students in Malaysian universities. Prevention strategies for back pain can only be successful if the associated risk factors are identified and better understood.[16]

There are several diverse risk factors associated with back pain,[17] including gender, age, posture, smoking, psychological factors, general health status, duration of

Table I: Demography of participants (n = 346)

Variables	
Pain location	**n (%)**
Cervical	99 (28.6)
Thoracic	32 (9.2)
Lumbar	215 (62.1)
Medication for pain	**n (%)**
Yes	21 (6.1)
No	323 (93.4)
Age	Mean ± SD
	25.83 ± 8.88
Gender	**n (%)**
Male	156 (45.1)
Female	190 (54.9)
Ergonomic condition	**n (%)**
Good	22 (6.4)
Bad	324 (93.6)

Table II: Difference in study variables before and during lockdown (n = 346)

	Mean ± SD			
	p **Before lockdown**	**CI** **During lockdown**	**p**	**CI**
Exercise hours [a]	3.16 ± 0.90	0.34 ± 0.48	< 0.001	2.731–2.910
Sitting hours [a]	2.20 ± 0.45	4.88 ± 1.00	< 0.001	−(2.774–2.590)
Perceived health [b]	2.95 ± 0.23	1.63 ± 0.48	< 0.001	-
Low back pain [a]	0.00 ± 0.00	2.88 ± 0.86	< 0.001	−(2.975–2.788)

[a] Paired sample t-test
[b] Wilcoxon signed-rank test

Table III: Linear regression analysis of the association between exercise and sitting hours (n = 346)

During lockdown	R2	β	α	CI
Exercise hours	0.020	0.150	0.005	0.083–0.469
Sitting hours	0.063	0.257	0.000	0.137–0.319

Table IV: Binary logistic regression analysis of the association between poor ergonomic condition and bad perceived health (n = 346)

	Risk estimate (CI)		
	Mild pain	**Moderate pain**	**α**
Poor ergonomic condition	2.054 (1.177–3.583)	0.398 (0.276–0.574)	0.000
Bad perceived health	0.676 (0.572–0.798)	2.489 (1.765–3.511)	0.000

computer usage, physical activity levels, and history of prior back pain. However, there are no specific risk factors identified for back pain during the current pandemic in Malaysia.

The study showed significant demographic differences in terms of gender. The female respondents were found to have a higher incidence of back pain. This finding is consistent with other studies that found similar gender differences.[14,18,19]

Our study also showed that the majority of respondents had lumbar back pain (62.1%), followed by pain in the cervical and thoracic areas. This echoes the results from a study in Saudi Arabia during the COVID-19 lockdown period.[20] This was due to excessive sitting involved in taking online classes, working on assignments, preparing lectures, and conducting online meetings. Studies showed that the use of computers for five or more hours a day showed a significant association with back pain in students.[21,22]

Studies have shown that with adequate exercise time, pain can be reduced.[23,24] Previous reviews have discussed the success of increasing home exercise and back health education in reducing back pain.[25,26] The study shows that exercise hours were reduced significantly during the lockdown period. This was anticipated due to the closure of

Original Article

exercise areas and social distancing protocols. This problem has significantly increased the frequency of back pain.

LIMITATIONS
Although this study offers valuable information regarding patients with back pain during the lockdown period, some important limitations should be considered when interpreting these findings. This study recruited participants from a university in Malaysia, and the participants are predominantly people with higher formal education, thus limiting the generalizability to a broader population of patients with back pain across the country. This, therefore, does not represent the back pain problem among the general population of Malaysia. In addition, it should be acknowledged that our study participants had online access, as the survey required Internet connection. Thus, this study may not provide adequate representation of individuals who do not have as much access to technology.

CONCLUSION
The use of computers is at its peak during this lockdown period. Our study showed that the university community has undergone a significant increase in sitting time and a decrease in exercise time during the lockdown. This has contributed to an increase in the frequency of back pain. It is recommended that further studies be done to guide the university community regarding the maintenance of exercise and management of sitting hours, in order to reduce the frequency of back pain. We are in the process of planning a Back Pain Module for our staff and students, in order to reduce back pain during this period. This module will include non-pharmacological methods, such as basic exercises and ergonomic knowledge.

ACKNOWLEDGEMENT

CONFLICT OF INTEREST
The authors declare no conflict of interest.

REFERENCES

1. Chahrour M, Assi S, Bejjani M, Nasrallah AA, Salhab H, Fares MY, et al. A bibliometric analysis of COVID-19 research activity: A call for increased output. Cureus 2020; 12(3): e7357.
2. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry 2020; 7(3): 228–9.
3. Kakimoto K, Kamiya H, Yamagishi T. Initial investigation of transmission of COVID-19 among crew members during quarantine of a cruise ship. CDC 2020; 69(11): 312–3.
4. UNESCO. COVID-19 educational disruption and response, 2020. [cited March 25, 2020] Accessed from:: https://en.unesco.org/themes/education-emergencies/coronavirus-school-closures.
5. Rini I, Lestari NT. The correlation between gadget usage and cervical muscle tension among the community of gamers. Enferm Clin 2020; 30: 149-53.
6. Arshad HA, Maqsood U. Awareness of sitting posture in patients having chronic low back pain. International Journal of Science and Research 2015; 4(4): 481-4.
7. Strine TW, Hootman JM. US national prevalence and correlates of low back and neck pain among adults. Arthritis Rheum 2007; 57(4): 656-65.
8. Sivasampu S, Yvonne L, Norazida AR, Hwong WY, Goh PP, Hisham AN. National Medical Care Statistics (NMCS), Kuala Lumpur: National Clinical Research Centre 2012. 2014.
9. Nyland LJ, Grimmer KA. Is undergraduate physiotherapy student a risk factor for LBP? A prevalence study of LBP in physiotherapy students. BMC Musculoskelet Disord 2003; 4(22): 1-8.
10. Feldman DE, Shrier I, Rossignol M, Abenhaim L. Risk factors for the development of low back pain in adolescence. Am J Epidemiol 2001: 154(1): 30-6.
11. Bot SD, van der Waal JM, Terwee CB, van der Windt DA, Schellevis FG, Bouter LM, et al. Incidence and prevalence of complaints of the neck and upper extremity in general practice. Annals of the Rheumatic Diseases 2005; 64(1): 118-23.
12. Jordan KP, Kadam UT, Hayward R, Porcheret M, Young C, Croft P. Annual consultation prevalence of regional musculoskeletal problems in primary care: An observational study. BMC Musculoskeletal Disorders 2010; 11: 144.
13. Hoy D, Bain C, Williams G, March L, Brooks P, Blyth F, et al. A systematic review of the global prevalence of low back pain. Arthritis Rheum 2012; 64(6): 2028-37.
14. Walker BF, Muller R, Grant WD. Low back pain in Australian adults: prevalence and associated disability. J Manipulative Physiol Ther 2004; 27(4): 238-44.
15. Sivasampu S, Yvonne L, Norazida AR, Hwong A, Goh PP, Hisham AN. National Medical Care Statistics (NMCS) 2012. Kuala Lumpur: National Clinical Research Centre; 2014.
16. Mohd Nordin AM, Ajit Singh DK, Kanglun L. Low back pain and associated factors among health science undergraduates. Sains Malaysiana 2014; 43(3): 423-8.
17. Leggat PA, Smith DR, Clark MJ. Prevalence and correlates of low back pain among occupational therapy students in Northern Queensland. Can J Occup Ther 2008; 759(1): 35-1.
18. Hoy D, Brooks P, Blyth F, Buchbinder R. The epidemiology of low back pain. J Manip Physiol Ther 2010; 24(6): 769-81.
19. Rubin DI. Epidemiology and risk factors for spine pain. Neurol Clin 2007; 25: 353-71.
20. Sagat P, Bartik P, Gonzalez PP, Tohanean DI, Knjaz D. Impact of COVID-19 quarantine on low back pain intensity, prevalence, and associated risk factors among adult citizens residing in Riyadh (Saudi Arabia): A cross-sectional study. Int J Environ Res Public Health 2020; 17(19): 7302.
21. Torsheim T, Eriksson L, Schnohr CW, Hansen F, Bjarnason T, Valimaa R. Screen-based activities and physical complaints among adolescents from the Nordic countries. BMC Public Health 2010; 10: 324.
22. Mythily S, Qiu S, Winslow M. Prevalence and correlates of excessive Internet use among youth in Singapore. Ann Aca Med Singap 2008; 3791: 9-14.
23. Landmark T, Romundstad P, Borchgrevink PC, Kaasa S, Dale O. Associations between recreational exercise and chronic pain in the general population: evidence from the HUNT 3 study. Pain 2011; 152(10): 2241–7.
24. Landmark T, Romundstad PR, Borchgrevink PC, Kaasa S, Dale O. Longitudinal associations between exercise and pain in the general population – the HUNT pain study. PLoS One 2013; 8(6): e65279.
25. Biddle SJ, Petrolini I, Pearson N. Interventions designed to reduce sedentary behaviours in young people: A review of reviews. Br J Sports Med 2014; 48(3): 182-6.
26. Ahlqwist A, Hagman M, Kjellby-Wendt G, Beckung E. Physical therapy treatment of back complaints on children and adolescents. Spine (Phila Pa 1976) 2008; 33(20): E721-7.