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The Relationship Between Physical Activity and Sociodemographics with Musculoskeletal Disorder among University Students

(Hubungan Antara Aktiviti Fizikal & Sosiodemografi dengan Masalah Muskuloskeletal dalam kalangan Pelajar Universiti)

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ABSTRACT

In 2022, the World Health Organization reported that 1.71 billion people worldwide were affected by musculoskeletal disorders (MSDs), with growing evidence of increased prevalence among college students. This study hypothesized that musculoskeletal risk factors are significantly associated with socio-demographic variables (such as age, gender, and type of academic program) and the level of physical activity among students. To investigate this, a cross-sectional study was conducted with 60 health sciences students. The International Physical Activity Questionnaire (IPAQ) extended version was used to measure physical activity levels, while the Nordic Musculoskeletal Questionnaire (NMQ) captured MSD data.Most participants were undergraduate students (66.7%, n=40), and nearly half relied on public transportation (48.3%, n=29). The most commonly reported MSDs over the past 12 months were shoulder pain (36.7%, n=22), followed by lower back pain (30.2%, n=16) and neck discomfort. Contributing factors may include long clinical training hours, prolonged sitting during classes, extended computer use, and poor posture. Of the variables examined, gender was the only significant predictor of MSDs that limited daily activities. While lower back pain was significantly associated with gender and type of study, it was not significantly predicted by physical activity level, academic program, or mode of transportation. These findings partially support the hypothesis, indicating that while gender and study type play a role, other demographic and lifestyle factors may not be strong predictors of MSD prevalence. The results underscore the need for universities to offer posture education, promote ergonomic practices, and encourage regular breaks to help reduce the risk of MSDs in student populations.

Keywords: Musculoskeletal, physical activity, socio-demography, students

ABSTRAK

Pada tahun 2022, Pertubuhan Kesihatan Sedunia (WHO) melaporkan bahawa 1.71 bilion orang di seluruh dunia mengalami gangguan muskuloskeletal (MSD), dengan bukti yang semakin meningkat menunjukkan bahawa prevalens MSD turut meningkat dalam kalangan pelajar universiti. Kajian ini mengemukakan hipotesis bahawa faktor risiko muskuloskeletal mempunyai hubungan yang signifikan dengan pemboleh ubah sosio-demografi (seperti umur, jantina, dan jenis program pengajian) serta tahap aktiviti fizikal pelajar. Kajian keratan rentas ini melibatkan 60 pelajar sains kesihatan. Soal selidik International Physical Activity Questionnaire (IPAQ) versi lanjutan digunakan untuk menilai tahap aktiviti fizikal, manakala Nordic Musculoskeletal Questionnaire (NMQ) digunakan untuk mendapatkan data berkaitan MSD.Majoriti peserta adalah pelajar prasiswazah (66.7%, n=40), dan hampir separuh menggunakan pengangkutan awam (48.3%, n=29). Masalah MSD yang paling kerap dilaporkan dalam tempoh 12 bulan lalu ialah sakit bahu (36.7%, n=22), diikuti sakit belakang bawah (30.2%, n=16) dan ketegangan leher. Faktor penyumbang termasuk tempoh latihan klinikal yang panjang, duduk terlalu lama semasa kelas, penggunaan komputer yang berpanjangan, serta postur yang tidak betul. Dalam kalangan semua pemboleh ubah yang dikaji, jantina merupakan satu-satunya peramal signifikan bagi MSD yang mengganggu aktiviti harian. Walaupun sakit belakang bawah menunjukkan hubungan signifikan dengan jantina dan jenis program pengajian, ia tidak dipengaruhi secara signifikan oleh tahap aktiviti fizikal, jenis pengangkutan, atau program.Penemuan ini menyokong sebahagian daripada hipotesis, dan mencadangkan keperluan universiti menyediakan pendidikan berkaitan postur, menggalakkan amalan ergonomik, serta menekankan kepentingan rehat semasa tempoh pembelajaran yang panjang bagi mengurangkan risiko MSD dalam kalangan pelajar.

Kata kunci: musculoskeletal, aktiviti fizikal, sosio-demografi, pelajar

INTRODUCTION

The World Health Organisation estimated that in 2022, 1.71 billion people globally had musculoskeletal disorders. Conditions that cause discomfort in the musculoskeletal system are referred to as musculoskeletal disorders (MSDs). The neck, shoulders, lower or upper back, wrists, hips, knees, and feet are just a few of the places where these conditions might cause pain or tension (Agnatha et al., 2022; Hendi et al., 2019). MSDs are defined by the CDC as conditions or injuries that impact the muscles, nerves, tendons, joints, cartilage, and spinal discs. According to Khanom et al. (2020), adolescents who report musculoskeletal pain early in life are more likely to experience chronic musculoskeletal pain as adults.

MSDs are becoming more common among students, and attending college may expose them to distinctive risk factors for musculoskeletal diseases, or MSDs. This is because, especially in the contemporary internet era, university students are often exposed to long amounts of screen time and active lifestyles. They also frequently participate in a variety of activities and endure high levels of stress, both of which can raise the risk of musculoskeletal problems (Parto et al., 2023; Ogunlana et al., 2021). Agnathe et al. (2022) found that 90.3% of students who attended lectures experienced MSDs, whereas 9.7% did not.According to previous study among university student in relation to smart phone usage ,reported about 82.1% at least one of MSD symptom(Hua et al., 2022)

Health workers and health sciences students are likely to experience a number of physical, psychological, and environmental factors that may influence the likelihood of an episode of musculoskeletal disorder (MSD) (Morais et al. 2019; Senarath et al., 2021). Numerous studies have also found that MSDs are significantly more common among dentistry students. In particular, according to Felimban et al. (2021), 91.2% of dentistry students said they had MSD issues in at least one part of their body. Comparably, 73.6% of students studying allied health sciences and 64.8% of students studying healthcare experienced MSDs in one or more body parts (Hendi et al. 2019; Senarath et al. 2021). According to Senarath et al. (2021), compared to non-medical students, students from the University of Peradeniya's Faculty of Allied Health Science experience higher rates of neck discomfort (50.9%) and lower back pain (46.3%). According to a study by Tengku Adilah and associates, MSDs are highly prevalent among undergraduate health science students in public universities in Malaysia. The most commonly reported symptoms within the previous 12 months were shoulder discomfort (50.6%), neck pain (53.6%), and lower back pain (63.3%).

Additionally, the World Health Organisation defines physical activity as any movement of the body that is carried out by the muscles and requires the use of energy; exercise is a type of physical activity that is organised, systematic, repetitive, and intentional; in general, physical activities may include exercise and various other activities that entail bodily movement, such as playing, working, active transportation, household chores, and recreational activities (Muhammad et al. 2021). Frequent exercise has several benefits, particularly for long-term and optimal health (Saat et al., 2022). However, it is crucial to recognise that physical activity might also have a role in MSDs (Fatim et al. 2019). Previous studies have shown a connection between MSDs and moderate physical exercise (Khattak et al., 2022; Hendi et al., 2019). Students studying health sciences who suffer from MSDs may find that their normal activities are affected.

Musculoskeletal conditions, such back discomfort, might restrict a student's everyday activities, including their academic endeavours, per a study by Casas et al. (2016). According to Nur Syafiqah et al. (2021), most people with MSDs experience significant mental and physical difficulties at some point in their lives. The prevalence of MSDs may be impacted by a number of factors, including gender, body mass index (BMI), and working hours (Fatim et al. 2019). Musculoskeletal diseases (MSDs) are prevalent among health science students. Due to the physically demanding nature of their coursework, clinical rotations, and laboratory work, these students are more likely to develop MSDs. Nevertheless, little is known about the extent and nature of this problem, as well as the underlying factors that lead to it, particularly among university student . Therefore, this study's goal is to investigate the relationship between the prevalence of (SDs and variables such as physical activity and sociodemographic, such as gender, academic program, year of study, mode of transportation, and body mass index (BMI), among health science students in Kuala Lumpur. The first specific objective was to determine the level of physical activity and musculoskeletal disorder. Second objective was to determine the association between the level of MSD with sociodemographic factors and third to examine the predictor of MSD

METHODS

Study Design and Study Population

This study evaluates the relationships between

musculoskeletal problems, sociodemographic, and physical activity among full-time university undergraduate and postgraduate students using cross-sectional research design in Universiti Kebangsaan Malaysia located in Jalan Raja Muda Abdul Aziz, Kuala Lumpur . A location in Kuala Lumpur was selected because it is a major education hub in Southeast Asia. Its universities attract students from across Malaysia and other countries. The inclusion criteria were the students who register for semester 2 in session 23/24. Second, the students who was not diagnosed with MSD and mental health problem. The exclusion criteria was student who differ their study for that semester .

Sample Size

A convenience sampling method was employed to determine the sample due to time constraints in recruiting participants, which was n=60 according to G Power. While taking resource availability and logistical limitations into account, this size is thought to be adequate for the study's goals and guarantees a representative cohort of college students.

Data Collection

The International Physical Activity Questionnaire (IPAQ) , long form, and the Nordic Musculoskeletal Questionnaire (NMQ) are used for data collecting The IPAQ consist of 27 items with four domain such as leisure time, work-related, transportation ,domestic and gardening activities (Soo et al. 2015) . Meanwhile for NMQ consist of 40 closed multiple choice about symptoms on the neck, shoulders, upper back, elbows,

TABLE 4.1 Descriptive Analysis of Sociodemographic Factors.

Characteristic		n= 60	
		n	%
Gender	Male	19	31.7
	Female	41	68.3
Education level	Postgraduate	6	10
	Undergraduate	54	90
Year of Study	1st Year	18	30
	2nd Year	8	13.3
	3rd Year	21	35
	4th Year	7	11.7
	Postgraduate	6	10
Programmes Studies	Biomedical Sciences	29	48.3
	Non - Biomedical Sciences	31	51.7
Accommodation	Hostel	17	28.3
	Rental room	30	50
	Family house	13	21.7
Income	< RM5000	36	60
	RM5000 - RM9999	16	26.7
	>RM9999	8	13.3
BMI	Underweight	8	13.3
	Normal	36	60
	Overweight	11	18.3
	Obese	5	8.4
Physical Activity Level	Low	11	18.3
	Moderate	27	45
	High	22	36.7

low back, wrist, hip, knees and ankles (Pugh et al. 2015). The main goals are to classify physical activity and musculoskeletal problems, identify correlations with sociodemographic parameters, and examine the complex link between musculoskeletal disorders and physical activity. The study intends to identify complex relationships between university students' musculoskeletal health and lifestyle factors by utilizing these tried-and-true tools. In the end, the results will provide insightful information that will guide focused tactics to improve the health and well-being of students. All the data was analyzed using SPSS version 25 using the descriptive , Chi Square and Binary Logistic Regression.

RESULTS

Descriptive Analysis of Sociodemographic

The descriptive result of the study is shown in table 4.1. The study involved 60 undergraduate and postgraduate students in university campus (31.4% of male and 68.3% of female). Majority of the participants are undergraduate students (90%). Most of the participants are having normal BMI, followed by overweight, underweight and obese. Most of the participants are third year students (35%), followed by first year (30%) and second year (13.3%).

Category Of Physical Activity & Musculoskeletal Disorder

Table 4.2 illustrates the prevalence of MSD in nine body areas. According to the prevalence of MSD during a 12-month period, participants most frequently reported pain in the neck and lower back (50%) and shoulder (36.7%), respectively. Additionally, the most common body parts for the prevalence of MSD in the recent seven days are the shoulder (20.7%), followed by the lower back (30.2%) and shoulder (30.2%). Additionally, the lower back (15.4%) has the highest reported prevalence of MSD, which prevents individuals from performing their regular tasks, followed by the neck (11.8%) and shoulder (9.8%). In contrast, the majority of them had moderate levels of physical activity (45%), followed by high levels (36.7%) and low levels (18.3%), as shown in table 4.3.

TABLE 4.2 Prevalence of Musculoskeletal Disorder among Health Sciences Students.

Body Parts	n (%)		
	Prevalence of MSD last 12 month, n=60	Prevalence of MSD last 7 day, n=54	Prevalence of MSD prevent participants from doing normal works, n=52
Elbow	3 (5)	1 (1.9)	1 (1.9)
Wrists	14 (23.3)	2 (3.3)	2 (3.8)
Upper Back	18 (30)	6 (13.2)	4 (6.1)
Lower Back	30 (50)	16 (30.2)	8 (15.4)
Hips	12 (20)	4 (9.3)	2 (3.8)
Shoulder	22 (36.7)	11 (20.7)	5 (9.8)
Neck	30 (50)	16 (30.2)	6 (11.8)
Knees	12 (20)	2 (3.3)	1 (1.9)
Ankles/Feet	16 (26.7)	4 (9.3)	3 (5.8)

TABLE 4.3 Physical Activity Level Category among Health Sciences Students.

Physical activity level	MET Scoring Range, minutes	n = 60	
		n	%
Low	0 - 599 minutes	11	18.3
Moderate	600 - 2999 minutes	27	45
High	> 2999 minutes	22	36.7

The Association between the Level of Musculoskeletal Disorder with Sociodemographics.

According to table 4.4, the prevalence of MSD in the lower back during the previous 12 months was found to be related to both gender and type of study,(p=0.012) and (p=0.024), respectively. The percentage of lower back pain was higher among female 61% compare to male 26%. Meanwhile according to type of study postgraduate student (61%) compare to undergraduate(42%) has lowerback pain for the last 12 months.There was significant association between programme with student from biomedical sciences programme 65% compare to other programme 34% experience lower back pain for the last 12 months. There was significant association between type of programe with the risk of lower back pain for the last 12 months(p=0.020). Additionally, there was no significant association between the mode of transportation and the prevalence of MSD in the lower back during the previous 12 months.

TABLE 4.4 Association between prevalence of MSD during the past 12 months and 7 days in lower back and sociodemographic status

Pain during the past 12 months in lower back					
Variables		Yes	No	X^2	p-value
		Frequency, n (%)			
Gender	Male	5 (26)	14 (74)	6.239	0.012*
	Female	25 (61)	16 (39)		
Type of Study	Undergraduate	17 (42)	23 (58)	6.667	0.024*
	Postgraduate	25 (61)	16 (39)		
Study programme	Biomedical science	13 (65)	7 (35)	5.406	0.020*
	Non biomedical science	10 (34)	19 (66)		
Transportation mode	Walking	20 (65)	11 (35)	1.053	0.591
	Public transport	9 (45)	11 (55)		
	Personal vehicle	14 (48)	15 (52)		
Pain of MSD during the past 7 days in lower back					
		Yes	No		
Gender	Male	4 (21)	15 (79)	0.527	0.468
	Female	12 (29)	29 (71)		
Type of study	Undergraduate	8 (20)	32 (80)	9.067	0.007*
	Postgraduate	8 (40)	12 (60)		
Study programme	Biomedical science	5 (17)	24 (83)	2.331	0.127
	Non biomedical science	11 (35)	20 (65)		
Transportation mode	Walking	3 (15	17 (85)	2.860	0.232
	Public transport	8 (28)	21 (72)		
	Personal vehicle	5 (45)	6 (55)		

*p<0.05

Based on table 4.4, only type of study was found to be associated with the prevalence of MSD in the last 7 days in lower back (p=0.007) with postgraduate students has higher prevalence of back pain (40%) compare to undergraduate student (20%) for the past 7 days. . Other sociodemographic are found not associated with the prevalence of MSD in the last 7 days in lower back.

Based on table 4.5, there was no association was found between the prevalence of MSD during the past 12 months and 7 days in neck and all sociodemographic ($p > 0.05$). Furthermore, the highest percentage of pain in neck for the past 12 months was among female with 54% compare to male 42%. Meanwhile postgraduate has higher neck in pain for the last 12 month, with 55% compared to undergraduate 48%. Furthermore, non biomedical science programme has higher percentage (55%) compare to biomedical sciences student (45%) have pain in the neck during the last 12 months. According to type of transportation those who take public transport has higher percentage (62 %) compare to own vehicle(55%) and walking (30%) have pain in the neck during the last 12 months. Additionally, for the percentage of 7 days female(54%) has higher percentage of neck pain compare to male students (42%). Furthermore postgraduate students(55%) has higher percentage compare to undergraduate students(48%) of neck pain for the past 12 months.

TABLE 4.5 Association between prevalence of MSD during the past 12 months and 7 days in neck and sociodemographic status

Pain during the past 12 months in neck					
Variables		Yes	No	X^2	p-value
		Frequency(%)			
Gender	Male	8 (42)	11 (58)	0.693	0.580
	Female	22 (54)	19 (46)		
Type of study	Undergraduate	19 (48)	21 (53)	2.963	0.195
	Postgraduate	11 (55)	9 (45)		
Study programme	Biomedical science	13 (45)	16 (55)	0.601	0.438
	Non biomedical science	17 (55)	14 (45)		
Transportation mode	Walking	6 (30)	14 (70)	4.981	0.083
	Public transport	18 (62)	11 (38)		
	Personal vehicle	6 (55)	5 (45)		
Pain during the past 7 days in neck					
Gender	Male	4 (21)	15 (79)	0.527	0.468
	Female	12 (29)	29 (71)		
Type of study	Undergraduate	7 (18)	33 (83)	4.272	0.060
	Postgraduate	9 (45)	11 (55)		
Study programme	Biomedical science	5 (17)	24 (83)	2.331	0.127
	Non biomedical science	11 (35)	20 (65)		
Transportation mode	Walking	2 (10)	18 (90)	3.802	0.150
	Public transport	11 (10)	18 (90)		
	Personal vehicle	4 (21)	15 (79)		

Based on table 4.6 there was no significant association was found between the prevalence of shoulder pain during the past 12 months and 7 days in shoulder and all sociodemographic ($p > 0.05$). Moreover the highest percentage of shoulder pain for the past 12 months was among female with 44% compare to male 26%. Meanwhile postgraduate has almost similar percentage of MSD, with 40% compared to undergraduate 38%. Furthermore, non biomedical science programme has almost similar percentage (39%) compare to biomedical sciences student (38%) have shoulder pain during the last 12 months. According to type of transportation those who take public transport has lower percentage (25 %) compare to own vehicle(45%) and similar percentage with walking (25%) have MSD during the last 12 months. Additionally, for percentage of pain for the past 7 days for female(54%) has higher percentage of neck pain compare to male students (42%). Furthermore postgraduate students(55%) has higher percentage compare to undergraduate students(48%) of neck pain for the past 12 months.

TABLE 4. 6 Association between prevalence of MSD in shoulder during the past 12 months and 7 days and sociodemographic status

Pain during the past 12 months in shoulder					
Variables		Yes	No	X^2	p-value
		Frequency			
Gender	Male	5 (26)	14 (74)	2.919	0.088
	Female	18 (44)	23 (56)		
Type of study	Undergraduate	15 (38)	25 (63)	0.032	0.195
	Postgraduate	8 (40)	12 (60)		
Study programme	Biomedical science	11 (38)	18 (62)	0.115	0.734
	Non biomedical science	12 (39)	19 (61)		
Transportation mode	Walking	5 (25)	15 (75)	2.004	0.367
	Public transport	13 (25)	16 (75)		
	Personal vehicle	5 (45)	6 (55)		
Pain during the past 7 days in shoulder					
Gender	Male	2 (11)	17 (89)	1.133	0.470
	Female	9 (22)	32 (78)		
Type of study	Undergraduate	5 (13)	35 (88)	0.699	0.590
	Postgraduate	6 (30)	14 (70)		
Study programme	Biomedical science	4 (14)	25 (86)	0.768	0.505
	Non biomedical science	7 (23)	24 (77)		
Transportation mode	Walking	1 (5)	19 (95)	3.628	0.159
	Public transport	8 (5)	21 (95)		
	Personal vehicle	2 (28)	9 (72)		

The Predictor of MSD

Referring to the Table 4.7, variable gender and type of study predicts the low back pain presence for the last 12 months significantly, which prevent university students from doing normal works. The Nagelkerke R^2 for this model was 0.344, indicating 34% of the variation can be explained by this model. The highest Wald test was variable gender(8.367) and type of study(3.944) indicating these variable is important predictor .The

odds ratio showed 12.76 female students most likely to develop lower back pain for the past 12 months compare to male students which prevent them from doing normal work. Furthermore postgraduate students 7.63 times risk of having lower back pain for the past 12 months. Other variables, transportation, physical activity level and BMI category was not significantly predicting the risk of having lower back pain($p>0.05$) . Meanwhile among those who are category overweight were 4.911 times higher have risk of having lower back pain compared to underweight students descriptively however it was not significant($p>0.05$). Furthermore, those who had moderate physical activity were 4.346 times compared to those who had high levels of physical activity have a risk of developing lower back pain descriptively but it was not significant ($p>0.05$).

TABLE 4.7 The predictor for risk of lower back pain using binary logistic regression

Variables	B	S.E.	Sig.	Exp(B)	95% C.I.for EXP(B)	
Gender	2.549	.881	.004*	12.796	2.275	71.981
Programme	-.423	.681	.535	.655	.172	2.490
Type of study	2.032	1.023	.047*	7.633	1.027	56.731
BMI_Category			.292			
Normal	.032	1.369	.981	1.033	.071	15.109
Overweight	1.591	1.270	.210	4.911	.408	59.142
Obese	.570	1.424	.689	1.767	.108	28.799
IPAQ_MET_Score			.301			
Moderate	1.469	.948	.121	4.346	.678	27.863
High	.494	.730	.498	1.639	.392	6.852
Transportation			.281			
Walking	-1.363	1.163	.241	.256	.026	2.500
Public Transport	-1.802	1.138	.113	.165	.018	1.534
Constant	-2.229	1.454				

*$p<0.05$

DISCUSSION

The objective of this research was to investigate into the associations between sociodemographic characteristics, physical activity, and the prevalence of musculoskeletal illnesses. In the past 12 months, half of the undergraduate and graduate students in our study reported having neck and shoulder discomfort, followed by low back pain (LBP). This outcome was in line with earlier studies that employed an identical survey (Isa et al., 2022). The other studies likewise showed that among medical and dentistry students, as well as health sciences students, LBP and neck pain were the most often reported MSD problems (Ladeira et al., 2023; Taha et al., 2023). The length of clinical training, extended computer screen time, extended sitting in a chair during class, and various postures achieved during class or clinical training may all contribute to the high prevalence of neck pain and LBP among health sciences students (Casas S et al. 2016; Isa et al. 2022). Health sciences students may be at risk for MSD due to all of these factors (Basri et al. 2021; Ekechukwu et al. 2020).

Additionally, our study revealed that among undergraduate and graduate students, the prevalence of LBP, neck pain, and shoulder pain was highest during the previous seven days. A similar outcome was shown by a Saudi Arabian study (Hendi et al. 2021). These can be closely linked to the differences in workloads throughout clinical training as well as the everyday usage of computers and smartphones as the primary learning access sources (Dockrell et al. 2015; Felemban et al. 2021). LBP and neck discomfort, which accounted for 15.4 percent and 11.8 percent of the undergraduate and postgraduate students in our study, respectively, prohibited them from doing their regular tasks within the past 12 months. These could be brought on by the dangers of both the workplace and the clinical

training environment. These may result from the risks associated with the clinical training setting as well as the workplace.is one of the risk factors that makes people more susceptible to MSD problems (Ogunlana et al. 2021). According to De Vitta et al. (2020), posture is another factor that may be linked to neck discomfort and LBP. Certain tasks need us to adopt different postures, which further strain our trunks—particularly the neck, upper back, and lower back—and increase our risk of developing discomfort (Wohlmuth-Cohen & León-Avila 2021).

MSD prevalence increased with physical inactivity (Aktürk et al. 2019). In line with earlier research, our study also discovered that undergraduate and graduate students' levels of physical activity were modest (Rajappan et al. 2015). According to Deliens et al. (2015), it is caused by elements including campus walking distance and transit. Conversely, a study found that a low level of physical exercise was linked to an increased incidence of MSDs (Ikenna et al. 2022). Just 18.3% of the undergraduate and graduate students in our survey engaged in low levels of physical activity. This results demonstrates that extended periods of sitting do not explain the student's low level of activity (Matusiak-Wieczorek et al., 2020). In line with other research, our study also revealed that 36.7% of undergraduate and graduate students engaged in high levels of physical exercise (Febiningrum et al. 2021).

Additionally, the findings demonstrated that the prevalence of MSD that hinders people from performing their daily tasks may only be significantly predicted by gender, but not by the prevalence of MSD during the previous seven days or 12 months. The fact that women have less muscle mass and strength than men may be one reason why they are more likely to suffer from MSD. Additionally, a higher frequency of osteoporosis in women may be a contributing factor (Gandolfi et al. 2021). Our study's findings contradict earlier research that indicated gender was a key predictor of MSD prevalence among working individuals (Gandolfi et al. 2021; Oluka et al. 2020). Furthermore, according to three research, the frequency of MSD among dentistry and occupational therapy students is significantly predicted by gender (AlSahiem et al. 2023.

Furthermore, three studies discovered that among dental and occupational therapy students, gender is a significant predictor of the prevalence of MSD (AlSahiem et al. 2023;Felemban et al. 2021; Morabito et al. 2021). According to a study by Morabito et al. (2021), among these earlier studies, female occupational therapy students have higher odds than male students for the prevalence of MSD during the previous seven days and 12 months. Additionally, a study conducted by Felemban et al. (2021) to examine the prevalence and predictors of musculoskeletal pain among Saudi Arabian undergraduate students at a dental school discovered that female undergraduate students are more likely than male undergraduate students to have experienced musculoskeletal pain in the previous 12 months.

Furthermore, our findings showed that gender also strongly predicts the prevalence of MSD in the lower back, with women more likely than men to develop MSD in the lower back. According to Oluka et al. (2020), who looked into the prevalence of work-related musculoskeletal symptoms and risk factors among domestic gas workers and works department employees in Enugu, Nigeria, this result is consistent with their findings that women were a significant predictor of lower back musculoskeletal problems. Our findings, however, vary from those of a prior study that found that women were 4.7 times more likely to experience shoulder discomfort but not low back pain (Yuzugullu 2023). In contrast to the findings of our study, which did not find physical activity to be a significant predictor of the prevalence of MSD in these three body parts, Yuzugullu's (2023) previous study by referring to musculoskeletal disorders in specific body parts also found that the risk of neck, shoulder, and back pain was increased by 2.9 times, 5.6 times, and 3.0 times, respectively, for those who had insufficient physical activity.

In addition to gender, our research revealed that the prevalence of MSD is not significantly predicted by other independent variables, including physical activity, BMI, household income, type of study, transportation, and housing. This contrasts with other earlier research that discovered BMI and physical exercise to be important predictors of MSD. According to earlier research, those who engaged in adequate physical activity had a reduced prevalence of MSD over the previous 12 months than those who did not (Felemban et al. 2021). Besides, a previous study by End et al. (2020) to study the prevalence, correlates and risk factors of musculoskeletal disorders among Nigerian physiotherapy and architecture undergraduates found that BMI was a significant risk factor for MSD among them.

LIMITATION

It is important to recognise a number of limitations in this study on the association between musculoskeletal disorders (MSD), physical activity, and sociodemographic characteristics among undergraduate

and graduate students. First, recall bias may be present due to the use of self-reported data. Furthermore, our study's cross-sectional design makes it difficult to prove causal linkages; therefore, longitudinal research may be required to examine these dynamics in greater detail over time. Furthermore, the results may not be as broadly applicable to a larger population due to the study's concentration on a single academic institution. The robustness of our findings would be improved by more studies with a variety of demographics and objective metrics.

RECOMMENDATION

In order to address the high prevalence of musculoskeletal disorders (MSD) among undergraduate and graduate students, we advise collaborating with on-campus health services to make accessible rehabilitation or physiotherapy services available. Additionally, teaching students about proper posture, desk ergonomics, and MSD prevention strategies would be greatly aided by the organisation of workshops and seminars. Emphasizing the significance of breaks during extended study sessions is paramount, and specific stretching exercises targeting the neck, shoulders, and lower back should be recommended to alleviate tension. These proactive measures not only contribute to the overall well-being of students but also empower them with practical strategies to mitigate the impact of MSD on their academic and daily lives.

CONCLUSION

In university students,MSD usually affect the neck, shoulders, and lower back. The findings showed that gender, type of study, and study program had a substantial association with lower back MSD. However, there was no significant association between the type of program, transportation, and physical activity and the risk of developing lower back pain . Interestingly, the two most important predictors of MSD pain in lower back pain among students were gender and different level of academic study. This suggested that a health promotion was required to motivate students to engage in back-relieving exercises, change their sitting position to avoid back pain, and engage in other leisure activities, particularly for female and postgraduate students.

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REFERENCES

A. & Ramos, W. 2020. Neck pain and factors associated in University Students: a cross sectional study. *Ciência em Movimento* 22(43): 89-101.

Agatha, S., Sayu Aryantari Putri Thanaya, Luh & Made. 2022. Overview of Musculoskeletal Disorders in Undergraduate Students. *Physical Therapy Journal of Indonesia 3*(2): 49–53.

Aktürk, S., Büyükavcı, R. & Aktürk, Ü. 2019. Relationship between Musculoskeletal Disorders and Physical Inactivity in Adolescents. *Journal of Public Health* 27: 49-56.

Alangari, A. A., Almutairi, M. M., Alrrajeh, A. M., Aleidi, M. A., Alqarni, M. A., Almeneif, H. A., Alolaywi, H. K., & Almuklass, A. M. 2022. The Relation Between Body Mass Index and Musculoskeletal Injury. *Cureus* 14(9).

AlSahiem, J., Alghamdi, S., AlQahtani, R., Bin-Jardan, L., AlMadani, D., Farooqi, F.A. & Gaffar, B. 2023. Musculoskeletal Disorders among Dental Students: A Survey from Saudi Arabia. *BMC Oral Health* 23(1).

Basri, N. F., Masuri, M. G., Danis, A., Isa, S. N. I., Abd Aziz, N. A. & Isa, K. a. M. 2021. Prevalence of Low Back Pain with Its Associated Risk Factors among Health Science Students. *Healthscope: The Official Research Book of Faculty of Health Sciences, UiTM* 4(1): 51-59.

Bruna Xavier Morais, de, G., Andolhe, R., Isabel & Laurelize Pereira Rocha. 2019. Musculoskeletal Pain in Undergraduate Health Students: Prevalence and Associated Factors. *Revista Da Escola de Enfermagem Da Usp*, 53.

Casas S, A. S., Patiño S, M. S. & Camargo L, D. M. 2016. Association between the Sitting Posture and Back Pain in College Students. *Revista de la Universidad Industrial de Santnader. Salud* 48(4): 446-454.

CDC. 2020. *Work-Related Musculoskeletal Disorders & Ergonomic.* Center For Disease Control And Prevention.

Deliens, T., Deforche, B., De Bourdeaudhuij, I. & Clarys, P. 2015. Determinants of physical Activity and Sedentary Behaviour in University Students: A Qualitative Study Using Focus Group Discussions. *BMC public health* 15(1): 1-9.

De Vitta, A., Candido, J. P., Bento, T., Cornelio, G. P.,

De Oliveira Perrucini, P., Fernandes, J. a.

Dockrell, S., Bennett, K. & Culleton-Quinn, E. 2015. Computer Use and Musculoskeletal Symptoms Among Undergraduate University Students. *Computers & Education* 85: 102-109.

Ekechukwu, E., Aguwa, E., Okeke, T., Iroezindu, I., Onyia, S., Abaraogu, D., Ekwo, A., Ohiagu, C., Ekechukwu, N. & Mgbeojedo, U. 2020. Prevalence, Correlates and Risk Factors of Musculoskeletal Disorders Among Nigerian Physiotherapy and Architecture Undergraduates. *Journal of the Nigeria Society of Physiotherapy* 19(1): 8-18.

F. 2022. Relationship between the Development of Musculoskeletal Disorders, Physical Activity Level, and Academic Stress among Undergraduates Students of University of Nigeria. *Journal of Education and Health Promotion* 11:

Fatim Tahirah Mirza, Awatif Syazani Roslan, & Ain Saiful Bahri. 2019. Work-Related Musculoskeletal Disorders and Its Association with Physical Fitness among Physiotherapy Students Attending Public Universities In Malaysia. *Healthscope: The Official Research Book of Faculty of Health Sciences, UiTM* 2.

Febiningrum, F., Ghozali, D. A., Munawaroh, S. & Hastami, Y. 2021. Physical Activity and Low Back Pain in Medical Student. *Ahmad Dahlan Medical Journal* 2(2): 58-66.

Felemban, R.A., Sofi, R.A., Alhebshi, S.A., Alharbi, S.G., Farsi, N.J., Abduljabbar, F.H. & Farsi,

Gandolfi, M.G., Zamparini, F., Spinelli, A., Risi, A. & Prati, C. 2021. Musculoskeletal Disorders among Italian Dentists and Dental Hygienists. *International Journal of Environmental Research and Public Health* 18(5): 1–20.

Hendi, O. M., Abdulaziz, A. A., Althaqafi, A. M., Hindi, A. M., Khan, S. & Atalla, A. A. 2019. Prevalence of Musculoskeletal Disorders and Its Correlation to Physical Activity among Health Specialty Students. *International Journal of Preventive Medicine* 10(1): 48–48.

Hendi, O. M., Alturkistani, L. H., Bajaber, A. S., Alhamoud, M. A. & Mahmoud Mahfouz, M. E. 2021. Prevalence of Musculoskeletal Disorder and its Relation to Stress Among Medical Student at Taif University, Saudi Arabia. *Int J Prev Med* 12: 98.

Hua, B. H., Sugumaran, S. V., Faryza, E., Atiqah, N., Jasvindar, K., Kabir, M. S., ... & Nazmul, M. H. (2022). Prevalence of musculoskeletal disorders (MSD) and smartphone addictions among university students in Malaysia. *International Journal of Health Sciences*, 1075-88.

Ikenna, U. C., Nwobodo, L. N., Ezeukwu, A. O., Ilo, I. J., Ede, S. S., Okemuo, A. J. & Okoh, C.

Isa, S. N. I., Kamalruzaman, N. S. A., Sabri, T. a. T. & Zamri, E. N. 2022. Associated Factors of Lower Back and Neck Pain among Health Sciences Undergraduate Students in a Public University in Malaysia. *Malaysian Journal of Medicine and Health Sciences* 18(8): 247-254.

J.M.A. 2021. Prevalence and Predictors of Musculoskeletal Pain among Undergraduate Students at a Dental School in Saudi Arabia. *Clinical, Cosmetic and Investigational Dentistry* 13: 39–46.

Khanom, S., McDonagh, J. E., Briggs, M., Bakir, E. & McBeth, J. 2020. Adolescents' Experiences of Fluctuating Pain in Musculoskeletal Disorders: A Qualitative Systematic Review and Thematic Synthesis. *BMC Musculoskeletal Disorders* 21(1).

Khattak, S. S., Khan, K., Mazhar, S., Marghalara, Bushra & Rahman, S. 2022. Association of Physical Activity with Musculoskeletal Discomfort among Final Year DPT Students in Peshawar. *Journal Riphah College of Rehabilitation Science* 10(2): 105-109.

Ladeira, B. M., Modena, A. L., Castro Carletti, E. M. D., Bigaton, D. R., Pelai, E. B. & Mescollotto, F. F. 2023. Pain, Smartphone Overuse and Stress in Physiotherapy University Students: An Observational Cross-Sectional Study. *Journal of Bodywork and Movement Therapies* 34: 104-109.

Matusiak-Wieczorek, E., Lipert, A., Kochan, E. & Jegier, A. 2020. The Time Spent Sitting Does Not Always Mean A Low Level of Physical Activity. BMC Public Health 20(1): 317.

Morabito, J., Penkala, S. & Coxon, K. 2021. Workplace musculoskeletal problems in occupational therapy students. *BMC Public Health* 21(1).

Muhammad, K. C. H., Abdullah, F., Mohd Khairul, Z. H. F. & Farah Ilyani, C. F. 2021. Does Physical Activity and Body Weight Status Determine Musculoskeletal Health Among Adolescents in Malaysia? *Enfermería Clínica* 31: S247–S251.

Nur Syafiqah, A. K., Tengku Adillah, T. S. & Siti Nor, I. I. 2021. Musculoskeletal disorders and quality of life among undergraduate health sciences students: A cross-sectional study. *Healthscope: The Official Research Book of Faculty of Health Sciences, UiTM* 4(1):99–105.

Ogunlana, M. O., Govender, P. & Oyewole, O. O. 2021. Prevalence and Patterns of Musculoskeletal Pain Among Undergraduate Students of Occupational Therapy and Physiotherapy in a South African

University. *Hong Kong Physiotherapy Journal: Official Publication of The Hong Kong Physiotherapy Association Limited* 41(1): 35–43.

Oluka, C.D., Obidike, E., Ezeukwu, A.O., Onyeso, O.K. & Ekechukwu, E.N.D. 2020. Prevalence of Work-Related Musculoskeletal Symptoms and Associated Risk Factors among Domestic Gas Workers And Staff of Works Department in Enugu, Nigeria: A cross-sectional study. *BMC Musculoskeletal Disorders* 21(1).

Onyemaechi, N. O., Anyanwu, G. E., Obikili, E. N., Onwuasoigwe, O., & Nwankwo, O. E. 2016. Impact of Overweight and Obesity on the Musculoskeletal System using Lumbosacral Angles. *Patient Preference And Adherence* 10: 291–296.

Parto, D. N., Arnold, Y. L., Wong, & Macedo, L. 2023. Prevalence of Musculoskeletal Disorders and Associated Risk Factors in Canadian University Students. *BMC Musculoskeletal Disorders* 24(1).

Pugh, J. D., Gelder, L., Williams, A. M., Twigg, D. E., Wilkinson, A. M., & Blazevich, A. J. (2015). Validity and reliability of an online extended version of the Nordic Musculoskeletal Questionnaire (NMQ-E2) to measure nurses' fitness. *Journal of clinical nursing*, *24*(23-24), 3550-3563.

Rajappan, R., Selvaganapathy, K. & Liew, L. 2015. Physical Activity Level among University Students: A Cross Sectional Survey. *Int. J. Physiother. Res* 3: 1336-1343.

Saat, N. Z. M., Siti Aishah Hanawi, Mohamad, F., Hazlenah Hanafiah & Anis Afiqah Zuha. 2022. Relationship Between Physical Activity and Musculoskeletal Disorders Among Low Income Housewives In Kuala Lumpur: A Cross Sectional Study. *PLOS ONE* 17(10): e0274305–e0274305.

Senarath, M. K. I. D., Thalwaththe, S. T. R. D. & Tennakoon, S. U. B. 2021. Prevalence of Selected Musculoskeletal Disorders among the Students of Faculty of Allied Health Sciences, University of Peradeniya. *Journal of Musculoskeletal Disorders and Treatment* 7(2).

Soo, K. L., Wan Abdul Manan, W. M., & Wan Suriati, W. N. (2015). The Bahasa Melayu version of the Global Physical Activity Questionnaire: reliability and validity study in Malaysia. *Asia Pacific Journal of Public Health*, *27*(2), NP184-NP193.

Taha, Y. A., Al Swaidan, H. A., Alyami, H. S., Alwadany, M. M., Al-Swaidan, M. H., Alabbas,

Tengku Adilah T. S., Siti Nor, I. I., Nur Syafiqah, A. K. & Eva, N. Z. 2023. Relationship Between Musculoskeletal Disorders and Psychological Distress Among Health Sciences Undergraduate Students In Selangor. *Malaysian Journal of Public Health Medicine* 23(1): 57-64.

WHO. 2022. . *Musculoskeletal health*. World Health Organization.

Wohlmuth-Cohen, G. & León-Avila, F. 2021. Musculoskeletal Pain an College Students: A Systematic Review. *Proceedings of Scientific Research Universidad Anáhuac. Multidisciplinary Journal of Healthcare* 1(2): 31-45.

Y. H., Dhaen, H. M. & Faidhi, A. A. 2023. The Prevalence of Low Back Pain Among Medical Students: A Cross-Sectional Study From Saudi Arabia. *Cureus* 15(5): e38997.

Yuzugullu, D. 2023. Musculoskeletal Disorders and Relationship with Physical Activity in Office Workers

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