

Full Length Research Paper

Back and upper body musculoskeletal pain and associated factors among medicine and nursing practicing students at university of Gondar, Ethiopia

Getasew Yirdaw¹, Yonas Lamore^{1*}, Abate Lette² and Sintayehu Daba³

¹Department of Environmental Health, Faculty of Health Science, Debre Markos University, Debre Markos, Ethiopia.

²Department of Public Health, Faculty of Health Science, Madda Walabu University, Bale Goba, Ethiopia.

³Department of Environmental and Occupational Health and Safety, Faculty of Health Science, University of Gondar, Gondar, Ethiopia.

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Musculoskeletal pain are common problems for nursing and medicine students especially in developing countries. The study aimed to assess the prevalence and associated factors of back and upper body musculoskeletal pain among nursing and medicine students at the University of Gondar. Institution based cross-sectional study was conducted. Stratified simple random sampling technique and structured self-administered questionnaires were used for data collection. All questionnaires were entered into EPI™ version-7 then exported to SPSS™ version-20. Bivariate and multivariate logistic regressions were employed to ensure further significance with subsequent use of odds ratio to show the strength of the association with 95% (CIs). Magnitude of musculoskeletal pain in different body parts was 54% back pain and 36.7% neck pain. Sex difference (AOR: 0.607, 95% CI [0.062, 0.935]), alcohol consumption (AOR: 1.821, 95% CI [1.002, 4.130]), and sufficient rest break (AOR: 0.494, 95% CI [0.044, 4.202]) has significant association to back pain. Also, department (AOR: 3.399, 95% CI [1.340, 3.418]), year of study (AOR: 1.912, 95% CI [1.001, 5.349]) and sleep hours per day (AOR: 1.670, 95% CI [1.507, 4.801]) have significantly associated with neck pain. The overall magnitude of back pain and neck pain in medicine and nursing students were high. Therefore, interventions on organizational factors as well as personal factors should be done to reduce the burden of lower back and upper body musculoskeletal disorders.

Key words: Back pain, neck pain, musculoskeletal pain, upper body, university students.

INTRODUCTION

Currently musculoskeletal pain is the major morbidity causing element across the world. Work-related musculoskeletal pain (MSP) has been described as one of the occupational hazards and it has significant global health problems (Lette et al., 2018; Bernal et al., 2015).

According to the United States (US) Bureau of Labor Statistics (BLS), suffering and pain is experienced in addition to economic burdens incurred due to this problem (Castro, 2006). Work-related MSP affects workers' quality of life and capacity of productive

*Corresponding author. E-mail: yonas384@gmail.com.

(Hagberg et al., 2012; Dorman, 2012). Across the employees the cost of occupational work-related MSP, is also important for employers and societies (Amin et al., 2014). In developed countries about 2% of the gross domestic income is gone for the expenditure of work-related musculoskeletal pain (MSP) not calculating the productivity losses and social costs. According to global bank (GB) estimation, MSP has been the case for million days' work absenteeism due to sickness annually (Linaker et al., 2011; Lette et al., 2019) and it is one of the major cause for hospital nursing practices.

Comparatively nurses showed 30% more sickness absenteeism than other occupants (Abedini et al., 2015). Studies indicated that because of work-related MSP nurses are going to leave their profession, that is why the current profession shortage across the world worldwide (Trinkoff et al., 2003; Strong et al., 1990; Mehrdad et al., 2010; Taylor et al., 2007; Lette et al., 2019). Studies indicated that health professional affected about 4.5 times more than other engineering and manufacturing field professionals by work-related musculoskeletal pain (MSP) (Mehrdad et al., 2010; Kilbom, 1998; Hinmikaiye et al., 2012). The annual incidence of work-related musculoskeletal pain (MSP) among United Kingdom nurses were ranges from 40-85% (Chetty, 2010). The problem is also high among U.S nursing population as 2011 survey (Labriola, 2008). Studies from Iran showed that, the lower back pain is the most common work-related musculoskeletal pain (MSP) among nurses with a one year prevalence rete of 30-62% (Trinkoff et al., 1990; Mehrdad et al., 2010; Karahan et al., 2009). Neck and shoulder prevalence ranged from 36-54% cited as common cases in nurses and varies 46-88% for hospital nurses (Amin et al., 2014; Trinkoff et al., 2003; Smith et al., 2006; Luxembourg, 2004; Mehrdad et al., 2010; Nyland and Grimmer, 2003).

Sociodemographic, psychosocial and patient positions like sleeping and siting conditions have an association along with nurses' activities to develop musculoskeletal pain (Lette et al., 2018; Bernal et al., 2015; Qin et al., 2014; Choobineh et al., 2006; 24. Brink, 2008; Lee et al., 2013; Dawson et al., 2009; Strong et al., 1990; Swain et al., 2003; Oosthuizen and Ehlers, 2007; Schultz et al., 2005; Yelin et al., 1986; Karwowski and Marras, 2003; Mody and Woolf, 2003).

In Ethiopia, very little study has been done on work-related MSP specifically among nurses and medicine practicing students. The objective of this study was to assess back and upper body musculoskeletal pain among health science practicing students at GC campus.

MATERIALS AND METHODS

Study setup

An institutional based cross sectional study was employed from April to May, 2017. The University of Gondar is very senior in the country. It had about 43,000 students in five campuses named

as Teddy, Maraky, Fasil, Melese zenawe and GC campuses which are found in Gondar town. The town far 725 km from capital of the country. GC alone encompasses about 6888 medical and health science students at 12 different department. About 2,193 were medicine and nursing students.

Sample size determination

Single population proportion formula was used to determine sample size. Assuming 50% proportion since there was no similar study conducted across the country. 95% of confidence interval and 5% of marginal error were used by considering 10% for non-response rate to get a total sample size of 422.

Sampling techniques

A stratified sampling technique was used for department selection. The participants were stratified based on their respective departments and year of study. Then, simple random sampling, lottery method was used to select respondents and allocating sampling proportional to the total population of each stratum was made.

Data collection tools and procedures

Pre-tested and structured questionnaire was used to collect data through self-administered method. Two days training was given for data collectors and supervisors before the actual data collection.

Data quality control

The data quality was assured by proper design and 5% non-participant pre-test. Training was given for data collectors and supervisors before the actual data collection. Every day after data collection, there was questionnaire review and completeness check by supervisors and principal investigator. Necessary feedback would be offered to data collectors in the next morning. For error control 10% of the questionnaire would be double entered into the software during data analysis.

Data processing and analysis

Visually checked questionnaire was coded and entered into Epi-info™ version7 before exporting to SPSS™ version 20 software for analysis. The data was analyzed using logistic regression to determine the effect of various independent factors. The results was presented using descriptive statics. The degree association of variables was assessed using odds ratio of 95% confidence interval.

Operational definitions

Upper body musculoskeletal pain

Self-reported musculoskeletal symptoms in the neck, shoulders, elbows, and hands or wrists were defined by aches, disorder, or discomfort during the 12 month preceding completion of the questionnaire.

Back musculoskeletal pain

Self-reported musculoskeletal symptoms in the lower and upper

back were defined by aches, disorder, or discomfort during the 12 month preceding completion of the questionnaire.

Body mass index

Weight in kilograms divided by the square of the height in meters (kg/m^2). Underweight= BMI <18.50, Normal range= BMI b/n 18.50-24.99, Overweight = BMI b/n 25.00-29.99, and Obese= BMI =30.00.

Satisfaction

A score measured using the generic satisfaction scale as yes (26 - 45) and no (26 or less).

Stress

A score measured using the stress scale as yes (24 to 40) and no (lower than or equal 23).

Health and safety training

A student who has got any kind of training in one year period through any kind of media about health and safety rule implemented in the campus.

Cigarette smoking

It is a practice of smoking cigarette by students for at least one sticks of cigarette per day.

Alcohol drinking

It is a consumption of any kind of alcohol by students at least for two times per week for different purpose.

Physical exercise

Performing any kinds of physical exercise at least two times per week and for 30 min.

Ethical consideration

An ethical clearance letter was obtained from Ethical Committee of the University of Gondar College of Medicine and Health Science. Participants gave consent before data collection. The purpose of the study was clearly explained for the participants. Anonymous questionnaires were used to assure the confidentiality of the information obtained from participants. The consent form, focus group confidentiality binding form information sheet and questionnaires were available in English. Participants were also informed to their rights to withdraw from the study at any stage without prejudice.

RESULTS

From the total 422 distributed questionnaires 100% response rate was returned.

Socio-demographic characteristics of the study participants

The majority 270 (64.0%) were males. The mean age with standard deviation of the respondents was 23.15 ± 2.146 years and the age of the study participants range from 19 to 30 years. Among 422 respondents, 50 (11.8%) were nurses and 372 (88.2%) respondents were medicine students. Regarding to year of study, one thirds 122(28.8%) of the students were 3rd years (Table 1).

Environmental factors of the study participant

About one fourths 96(22.7%) of the study participants worked in demonstration/pre-clinical attachment. The majority 106 (74.88) of the students practiced for more than or equal to 20 h per week in average. About forty percent 161(38.3%) of the respondents used the chair which have arm rest and back support. Regarding the sitting position, 180(42.7%) of the students were sitting in a constant position for more than 2 h (Table 2).

Behavioral factors of the study participant

About 144(34.1%) had a habit of doing physical exercise, 330 (78.2) were not smokers, 104(24.6%) had chewing behavior and 138(32.7%) consume alcohol. Around 78(18.5%) were reading 7 h per day, and 226(53.6%) were reading for more than 2 h continuously without a break. From the total respondents, the majority 405(96%) have a stress. Also more than one thirds 145(34.4%) of the respondents are unsatisfied (Table 3). About half 205(48.6%) of the study participants were read more than 6 times per week. One thirds 133(31.5%) of the students also read for 3 - 6 times per week (Figure 1).

Back and upper body musculoskeletal pain symptoms

Study finding indicated that 228 (54%) of the participants have been encountered by back pain, 155(36.7%) neck pain and 52(12.3%) shoulder pain in the last 12 months (Table 4).

Factors associated with back and upper body musculoskeletal pain

The multivariable logistic regression analysis determined sex, alcohol consumption and sufficient rest break were significantly associated with back pain. Regarding neck pain department, year of study and sleeping hours per day were showed significant association. Male students were 0.607 (AOR: 0.607, 95% CI: 0.062, 0.935) times

Table 1. Socio-demographic characteristics of the study participants in Gondar University, GC campus nursing and medicine students, Northwest Ethiopia, 2017.

Variable	Frequency	Percentage
Sex		
Male	270	64.0
Female	152	36.0
Age		
18-24	310	73.4
25-29	110	26.1
>30	2	0.5
Religion		
Orthodox	270	64.0
Muslim	45	10.7
Protestant	83	19.7
Catholic	17	4.2
Others	7	1.6
Department		
Medicine	372	88.2
Nursing	50	11.8
Year of study		
3 rd year	122	28.8
4 th year	118	28.0
5 th year	92	21.8
6 th year	90	21.3

Others (religion) are: Waqafana-2, Agnotism-2, Hawariate-3 and Adventists-1.

Table 2. Environmental factors of the study participants in Gondar University, GC campus nursing and medicine students, Northwest Ethiopia, 2017.

Variable	Frequency	Percent
Primary practice/attachment area		
Many different working areas	29	6.9
Medicine/non-surgical	62	14.7
Surgery	35	8.3
Obstetrics and gynecology	78	18.4
Pediatrics	51	12.1
Emergency	42	10
Radiology	18	4.3
Demonstration/pre-clinical attachment	96	22.7
Others	11	2.6
Length of time that you practiced in your current attachment area		
≤2 months	223	52.84
>2 months	199	47.16
Average hours you practiced per week		
≤20 h	106	74.88
>20 h	316	25.12

Table 2. Contd.

Design of chair		
With arm rest and back support	161	38.3
With arm rest but have no back support	56	13.3
With back support but not have arm rest	122	28.9
No arm rest and back support	83	19.7
Sitting position		
Constant position for more than 2 h	180	42.7
Change sitting position by 2 h	88	20.9
Frequently change sitting position	154	36.5

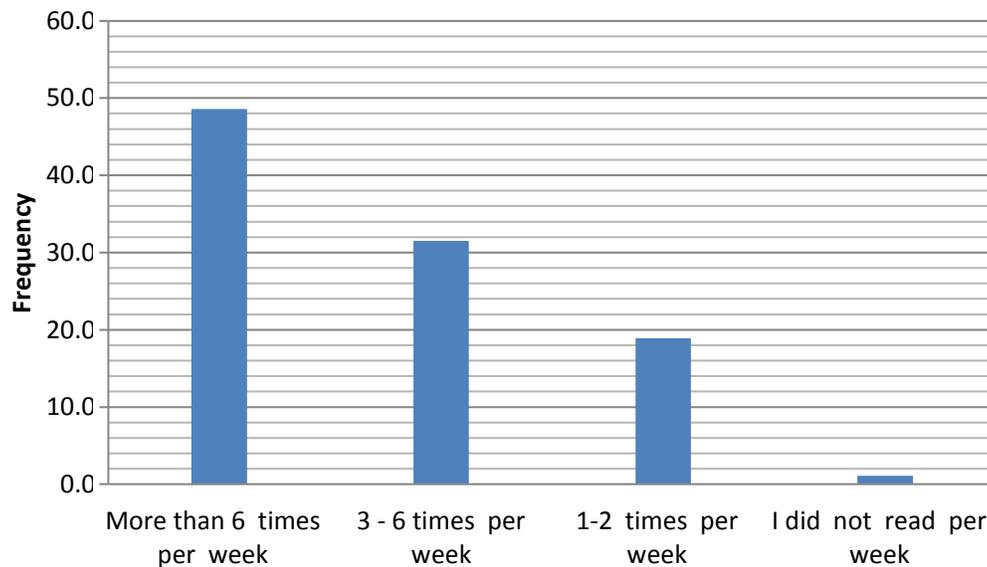
Table 3. Behavioral factors of the study participants in Gondar University, GC campus nursing and medicine students, Northwest Ethiopia, 2017.

Variable	Frequency	Percentage
Health and safety training		
Yes	7	1.7
No	415	98.3
Habit of doing physical exercise		
Once per week	29	20.1
Two times per week	72	50.0
Three times per week	43	29.9
Every day	0	0
Smoking behavior		
Never	330	78.2
Past smoker	34	8.0
Current smoker	58	13.7
Khat chewing behavior		
Yes	104	24.6
No	318	75.4
Alcohol consumption habit		
Yes	138	32.7
No	284	67.3
How long you read per day		
≤4 h	108	25.6
5-6 h	236	55.9
≤7 h	78	18.5
How long you read		
Continuously without a break	0	0
≤2 h	196	46.4
>2 h	226	53.6
Stress		
No stress	172	40.8
Stressed	250	59.2

Table 3. Contd.

Satisfaction		
Unsatisfied	145	34.4
Satisfied	277	65.6

Others (primary practice area): OPD-11.

**Figure 1.** Frequency of time which the students read per week.

less likely develop back pain than female students. Also a student who have consumed alcohol 1.821(AOR: 1.821, 95% CI: 1.002, 4.130) times more likely affected with back pain compared with their counterparts. The students who have a sufficient rest break were 0.494 (AOR: 0.494, 95% CI: 0.044, 4.202) times less likely develop back pain compared with those who did not take sufficient rest break.

Medicine students were 3.399 (AOR: 3.399, 95% CI: 1.340, 3.418) times more likely developed neck pain than nursing students. Participants who sleep less than or equal to 7 h per day were 1.670 (AOR: 1.670, 95% CI: 1.507, 4.801) times more likely affected with neck pain than who sleep more than 7 h per day. Third year students were 1.912 (AOR: 1.912, 95% CI: 1.001, 5.349) times more likely affected with neck pain compared with six year (Table 5).

DISCUSSION

In this study the magnitude of back pain among medicine and nursing student were found to be 54% which is comparable with findings has been done at University of

Salzburg, Austria (Moroder et al., 2011). However, the overall magnitude of back pain in this study was higher when compare with other studies between 30 to 48% (Mustafa et al., 2013; Issa et al., 2016; Nupur et al., 2017; Kennedy et al., 2008).

The result might be generated due organizations infrastructure and commitment. Sex difference significantly associated with back pain. This finding agrees with a research done in Riyadh, Saudi Arabia (Mustafa et al., 2013). In our study, age is not associated with back pain, contrary, a study make in Malaysia among under graduate health science students shows significant association between age and back pain (Mustafa et al., 2013). Also a study done at medical college of Delhi in India, found that history of systemic illness had significant association with the magnitude of back pain (Nupur et al., 2017) however, in our study it is not associated. Reports across France explain that moderate alcohol consumption has a positive effect on the development of work-related musculoskeletal pain (MSP); whilst excessive alcohol consumption may have impact on fine-motor skills and decrease body's ability to fight repetitive strains. This result is in line with other studies that alcohol consumers more likely develop back

Table 4. Back and upper body musculoskeletal pain symptoms among nursing and medicine students in Gondar University GC Campus, Northwest Ethiopia, 2017.

Variable	Frequency	Percent
Do you have back pain?		
Yes	228	54.0
No	194	46.0
Total length of time that you have had back trouble during the last 12 months		
1-7 days	144	63.2
8-30 days	50	21.9
≥ 30 days	26	11.4
Every days	8	3.5
Total length of that back trouble has prevented you from doing your normal work		
0 day	83	36.4
1-7 days	127	55.7
8-30 days	11	4.8
≥30 days	7	3.1
Do you have neck pain?		
Yes	155	36.7
No		63.3
Total length of time that you have had neck trouble in the last 12 month		
1-7 days	90	58.1
8-30 days	51	32.9
≥30 days	9	5.8
Every day	5	3.2
Total length of time that neck trouble has prevented you from doing your normal work		
0 day	52	33.5
1-7 days	96	61.9
8-30 days	3	1.9
>=30 days	4	2.6
Do you have shoulder pain?		
Yes	52	12.3
No	370	87.7
Total length of time that you have had shoulder trouble in the last 12 month		
1-7 days	37	71.2
8-30 days	9	17.3
≥30 days	4	7.7
Every day	2	3.8
Total length of time that shoulder trouble has prevented you from doing your normal work		
0 day	28	53.8
1-7 days	22	42.3
8-30 days	0	0
≥30 days	2	3.9

pain than who do not consume (Bernal et al.,2015). Another important finding of this study is the association between sufficient rest break and back pain. Students who take sufficient rest break were 0.494 times less likely

affected with back pain compared with their counterparts. A study reported from Nigeria explains that inadequate rest identified as a factor for back pain (Muhammed et al., 2015).

Table 5. Multivariable logistic regression among nursing and medicine students in Gondar University GC campus, Northwest Ethiopia, 2017.

Variable	Back and neck pain		COR(95%CI)	AOR(95%CI)
	Yes	No		
Sex^{BP}				
Male	163	107	0.639(0.262,0.952)	0.607 (0.062, 0.935)
Female	65	87	1	1
Alcohol consumption^{BP}				
Yes	89	49	1.759(1.155, 2.679)	1.821(1.002, 4.130)
No	143	145	1	1
Sufficient rest break^{BP}				
Yes	10	20	0.462(0.011,10.416)	0.494(0.044, 4.202)
No	87	39	1	1
Year of study^{NP}				
3 rd year	58	64	1.491(1.854, 2.643)	1.912(1.001, 5.349)
4 th year	52	66	1.313(0.724, 2.247)	0.652(0.011, 3.333)
5 th year	11	81	0.224(0.153, 0.447)	0.284(0.611, 1.983)
6 th year	34	56	1	1
Department^{NP}				
Medicine	147	225	3.43(1.06,5.75)	3.399(1.340, 3.418)
Nursing	8	42	1	1
Sleeping hours per day^{NP}				
<= 7 h	126	187	1.64(0.192,0.909)	1.670(1.507, 4.801)
>7 h	29	80	1	1

BP: Back Pain; NP: Neck Pain. AOR: adjusted for age, religion, history of alcohol consumption, time read per week, rest break in class/clinical attachment, design of the clinical attachment/class schedule, design of chair, sitting position, health and safety training, average courses taken, habit of doing physical exercise, smoking, chat chewing behavior, and history of systemic illness.

The prevalence of neck pain among medicine and nursing students were 36.7%. Department, year of study and sleeping hour per day were significantly associated with neck pain. The finding is in line with a study done in Iran among nurse (36- 54%) (Trinkoff et al., 2003). However, the overall prevalence of neck pain in this study is higher when compared with the study in Ghana (Moroder et al., 2011), Turkey (Bilge et al., 2014) and Norway (Hogg-Johnson et al., 2009). The magnitude of neck pain is lower than in New Zealand (57%), China (47.8%) and Saudi Arabia (55%) (Hogg-Johnson et al., 2009; Samotoi et al., 2008; Al Wazzan et al., 2001) studies. The observed variations could in part be due to differences in population (race and ethnicity), socio-economic status and availability of infrastructures, study design and sample size, and predisposing factors.

Campus stay year had significant associated with neck pain. This finding is in line with a study done in Malaysia (Muhammed et al., 2015). A study at Washington

University (USA) on medicine and health science students showed department as associated factor with neck pain. This is in line with our study result, medicine students were 3.399 times more likely affected with neck pain than nursing student (Deyo et al., 1998).

Conclusion

Findings show that the magnitude of back and neck pain in medicine and nursing students were high. High alcohol consumption and insufficient rest break can raise the back pain. Also department, year of study and sleeping hour were significantly associated with neck pain. Therefore, interventions of organizational factors like the quality of services given by the institution and design of the teaching and learning systems, personal factors like alcohol drinking behavior and reading style should be done on the campus to improve the health and wellbeing

of the students.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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