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PREVALENCE AND ASSOCIATED FACTORS OF LOW BACK PAIN AMONG SCHOOL TEACHERS IN MEKELLE CITY, NORTHERN ETHIOPIA, 2016

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ABSTRACT

Background: School teachers are among the occupational groups who are affected with low back pain. The Global Burden of Disease (GBD, 2010) estimated that low back pain is amongst the top ten disability-adjusted life years (DALYs) causing diseases and injuries. A systematic review studies suggested that the prevalence of low back pain among teaching staff ranges between 39% and 95%. Therefore, the aim of this study would be to assess the prevalence and associated factors of low back pain on school teachers in Mekelle City. **Methods:** Institution based cross-sectional study was conducted from March 5-April 30/2017. A total of 421 teachers were involved in the study. Simple random sampling technique was used to select respondents and all schools were included in the study. **Results:** The twelve month self-reported prevalence of low back pain among teachers was 223(54.9%). Female sex (AOR = 1.833, 95 % CI: 1.172, 2.868), smoking habit (AOR = 5.452, 95% CI: 1.774, 16.753), doing regular physical exercise (AOR = 0.486, 95 % CI: 0.309,0 .767), and sleep disturbance (AOR = 3.235, 95 % CI: 1.319, 7.931) were among factors which showed significance association with low back pain. **Conclusion:** This study has shown that prevalence of low back pain was high among school teachers. Being female, older age, smoking habit, no physical exercise, and sleep disturbance were the factors associated with low back pain. Hence, undertaking regular physical exercise, avoiding smoking habit and having enough time to sleep could minimize developing low back pain among teachers.

KEYWORDS: Low back pain, musculoskeletal disorders, associated factors, teachers, Mekelle, Ethiopia.

INTRODUCTION

Low back pain (LBP) is defined as pain and discomfort below the costal margin and above the inferior gluteus folds, with or without referred leg pain. The pain may begin suddenly or develop gradually.[1] LBP is one of the common musculoskeletal disorders (MSD) affecting many people worldwide and it is one of the most common and most expensive occupational health problems in both developed and developing countries.[2, 3] The Global Burden of Disease (GBD, 2010) estimated that LBP is amongst the top ten disability-adjusted life years (DALYs) causing diseases and injuries. It is the leading cause of activity limitation and work absence globally and it causes an enormous economic burden on individuals, industry and government at large.[4]

A systematic review conducted among teaching staffs suggested that, the prevalence of self-reported MSD was ranges between 39% and 95%. This study suggested that school teachers are at high risk of developing MSD.[5] Until recently it was largely thought of as a problem confined to western countries but research performed during the last decade clearly showed that LBP is also a major problem in low and middle-income countries.[4] Work related LBP is associated with exposure to ergonomic stressors at work, and it has been estimated that occupational exposures accounted for 37% of the global burden of disease from LBP. [6] LBP signifies not only poor quality of life of individuals, but also decreasing labour productivity due to off-work, absenteeism and early retirement. Additionally, escalating medical costs are associated with LBP.[7] The lifetime prevalence of non-specific LBP is estimated at 60-70% in industrialized countries.[8]

Several work-related factors have been correlated with to the development of LBP in the teaching profession. These factors include high working conditions, such as heavy physical work, awkward static and dynamic working postures, length of employment, excessive pap work, class preparation and student's, excessive demands from the colleagues and supervisors. Psychosocial factors also has implicated as risk factors for LBP. Socio-demographic factors, such as age, sex, lifestyle

factors, such as smoking and physical conditioning are other associated factors for LBP.[5,9,10,11,12]

Even though LBP is common work related problem, there is little information and emphasis given to LBP in Ethiopia school teachers. Hence, this study will offer valuable information for decision makers, health care planners and medical practitioners for promoting a better health, quality of life and prevention of disability which could reduce increased sick leaves or early retirement of teachers. Moreover, this study will also help teachers in the study area understand their health seeking behavior and how they can play their role in mitigating the low back pain. Therefore, the aim of this study would be to assess the prevalence and associated factors of low back pain on school teachers in the study area.

METHODS AND MATERIALS

The study was conducted at Mekelle; the capital city of Tigray National Regional State schools. Mekelle city is located in the Northern part of Ethiopia; 783 kilometers from Addis Ababa the capital city of Ethiopia. According to the 2007 Central Statistical Agency census report, it has a population size of 215,914 and more than half of them (110,989) are females. [13] Overall there are 88 kindergartens, 86 elementary and 24 secondary schools with a total number of 3024 teachers working there. An institutional based cross-sectional study was conducted from March 5-April 30/2016.

Population and Sampling Procedures

The source population was all teachers who teach in Mekelle city irrespective of the type of school they teach and study population was all teachers who taught in these schools during the study period. Teachers who had work experience below one year, pregnant women, and Teachers with known cause of LBP were excluded from this study. A single population formula($n=z\alpha^2/(p)(1-p)/d^2$) was used to estimate the sample size based on the following assumptions: proportion of Teachers with LBP from previous study was 53.8%[14], 95% level of confidence, 5% margin of error and expected non response rate was 10%. Therefore, the total sample size was 421 participants. There were 88 kindergartens, 86 elementary and 24 secondary schools with a total number of 3024 teachers and all schools were involved in the study. Then, probability to proportional size (PPS) allocation techniques was used to allocate sample sizes to each school based on their number of teachers. Simple random sampling was used to select the study participants from each school. LBP was operationally defined as experience of aching, burning, stabbing, sharp or dull, well defined, or vague with intensity ranging from mild to severe type of pain at the lower back and a respondent was considered having LBP if he/she had any one of these symptoms.

Data Collection Toll and Procedures

Questionnaire was adapted from Standardized Nordic Questionnaire (SNQ).[15] The questionnaire was originally prepared in English language and translated to the local language Tigrigna and back to English for its consistency. Data was collected using self-administered questionnaire by three trained physiotherapist after they had 2 days training. The validity and reliability of the instrument was checked through pretest among 21 respondents (5%) of the total sample size in Wukro town outside Mekelle. Regular supervision was made daily by supervisors and the principal investigator. Ethical clearance was obtained from the ethical review board University of Gondar, College of Medicine and Health Sciences. Then, a support letter was obtained from Mekelle City Education Bureau to respective schools. Informed written consent was obtained from study participants after explaining the purpose and importance of the study. Confidentiality was assured by excluding respondent's name. Teachers who had severed chronic LBP were advised to visit physiotherapy department as soon as possible. Data were cleaned and entered in to EPI Info 7 and exported to SPSS version 20 software for further analysis. Descriptive Stastics was presented in the form of frequency, tables, graphs, percentages, means and standard deviation. Variables found to have association with the outcome variable in bivariate analysis were entered in to multivariable logistic regression for controlling the possible effect of confounders. Variables which had significant association were identified on the basis of OR, with 95% CI and 0.05 *p-values*.

RESULTS

Socio-demographic Characteristics of Teachers

A total of 421 questionnaires were distributed to Teachers from whom, 406 were returned with a response rate of 96.4%. Of this respondents, 207 (51%) of them were males. The mean age of the respondents was 36.9 (SD±10.4) years with age ranging from 20-64 years old. Majority of the respondents, 350(86.2%) were orthodox followers followed by Muslim 30 (7.4%). The median monthly was 3445 Ethiopian Birr. Body mass index (BMI) of most respondents, 294 (72.4%) was within the normal range (**Table 1**).

Table 1: Socio-demographic characteristics of teachers in Mekelle city, May, 2016, (n = 406).

Variables	Frequency	Percent (%)
Age		
< 30	116	28.6
30-40	135	33.3
>40	155	38.2
Marital status		
Single	135	33.3

Married	211	52.0
Divorced	27	6.7
Widowed	10	2.5
Separated	14	3.4
Co-habited	9	2.2
Religion		
Orthodox	350	86.2
Muslim	30	7.4
Protestant	18	4.4
Catholic	8	2.0
Educational level		
Certificate	48	11.8
Diploma	191	47.0
BSc, degree	155	38.2
Master	12	3.0
Institution		
Kindergarten	48	11.8
Elementary	236	58.1
Secondary	122	30.0
Work experience in years		
< 10	160	39.4
≥ 10	246	60.6
Monthly salary in ETB		
≤ 1400	34	8.4
1401-2300	41	10.1
2351-3550	140	34.5
3551-5000	187	46.1
>5000	4	1.0
BMI		
Underweight	64	15.8
Normal range	294	72.4
Overweight	44	10.8
Obese	4	1.0

Prevalence of Low Back Pain among Teachers

The twelve month self reported prevalence of LBP among Teachers was 223(54.9%) with 95% CI: 50.2%, 59.6%. The prevalence was 71 (58.2%) among secondary school Teachers, 131(55.5%) among elementary school and 21 (43.8%) among Kindergarten Teachers. Out of the respondents who reported LBP in the last twelve months majority, 171(76.8%) were not seen by a doctor or Physiotherapist (**Table 2**).

Table 2: Prevalence and characteristics of LBP among teachers in Mekelle city, May, 2016, (n = 223).

Variables	Frequency	Percent (%)
LBP prevented work activity at home or away from home		
Yes	163	73.2
No	60	26.8
LBP prevented leisure activity at home or away from home		
Yes	61	27.2
No	162	72.8
LBP in the last seven days		
Yes	102	46.0
No	121	54.0
Feel LBP during standing		
Yes	181	80.8
No	42	19.2
Feel LBP during sitting		
Yes	54	24.1
No	169	75.9
Feel LBP during sleeping		

Yes	37	16.1
No	186	83.9
Feel LBP during walking		
Yes	21	9.4
No	202	90.6
Feel LBP during doing physical exercise		
Yes	8	3.6
No	215	96.4
Feel LBP during forward bending		
Yes	198	88.4
No	25	11.4
Feel LBP during backward bending		
Yes	9	4.0
No	214	96.0

From this study we had found that many respondents who had LBP prevented from their work for a number of days due to the LBP **(Figure 1)**.

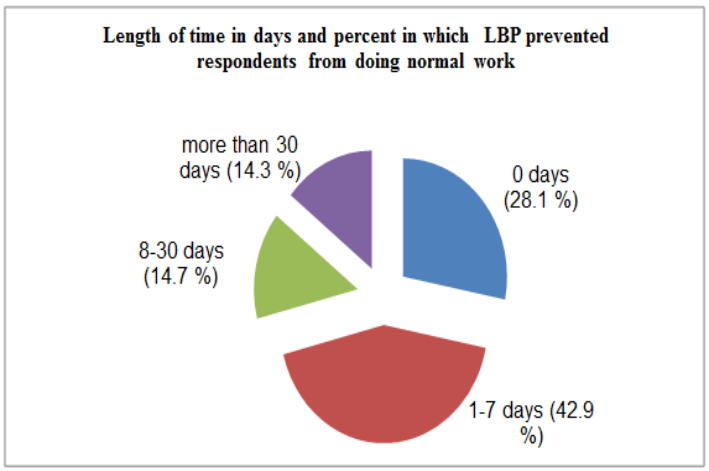

Figure 1: Distribution of respondents by length of time in days that LBP prevented them from doing normal work during the last 12 months among school teachers 2016.

Behavioral Characteristics of Teachers

Of 406 respondents, 32 (7.9%) had smoking experience and 116(28.5%) had a sleeping disorder. The mean sleeping time of the respondents was 7.4(SD± 1.27) hours and 222(54.7%) respondents had less than 8 sleeping hours per day. Among the 149 respondents who had experience of physical exercise, 141 (70.5%) of them had doing physical exercise less than five hours per a week. The mean hours of physical exercise was 4.9 (SD±3.2) hours per a week.

Working environment Characteristics of Teachers

Nearly all respondents, 397(97.8%) had experience of long time standing more than an hour without break. The mean standing hours per a week was 18.3(SD±5.1) hours. More than half of respondents, 231(56.9%) had experience of long time sitting more than an hour without break. The mean sitting hours per a week was 13.7(SD±3.9) hours. Of the respondents, 215 (53%) responded that the chairs and tables the used are suited per their height **(Table 3).**

Table 3: Working condition of teachers in Mekelle city, May, 2016, (n = 406)

Variables	Frequency	Percent (%)
Have office to stay		
Yes	373	91.9
No	33	8.1
Office contains chairs and tables		
Yes	373	91.9
No	33	8.1
Type of teaching aid		
Chalk and board only	298	73.4
Flip chart	101	24.9
Overhead projector	3	0.7

Lap top and LCD	4	1.0
Total teaching hours per week		
<30	83	20.4
30-40	293	72.2
>40	30	7.4

Psychosocial characteristics of Teachers

Out of 406 respondents, 237(58.4%) felt happy at work while 201(49.5%) responded that they got angry at others more often than usual. For example, 47(23.2%) respondents got angry at family, 60(29.9%) at colleagues and 94 (46.9) at boss. More than three fourth, 309 (76.1%) of respondents had good relationship with their boss.

Co-Morbidity Characteristics of Teachers

Out of the 406 respondents, 88(21.7%) of them had recurrent severe headache, 20(4.9%) had asthmatic problem. Among the respondents with severe headache, 50 (56.8 %) of them felt LBP during headache. Out of 20 (4.9%) respondents with asthma 8 (40 %) responded that they felt LBP during asthmatic problem.

Factors Associated with LBP

Sex, age, Work experience, smoking habit, experience of doing physical exercise, and sleep disturbance were significantly associated with LBP in bivariate logistic regression analysis. When these variables were entered in to the multivariable logistic regression analysis, LBP was significantly associated with sex, age, smoking habit, doing physical exercise, and sleep disturbance (**Table 4**).

Table 4: Factors associated with LBP among school teachers in Mekelle city 2016, Mekelle, Ethiopia, (n = 406)

Variables	LBP		Crude OR (95% CI)	Adjusted OR (95% CI)
	No, n	Yes, n		
Sex				
Male	107	100	1	1
Female	76	123	1.732 (1.167, 2.571)	1.833 (1.172, 2.868)*
Age				
<30	74	42	1	1
30-40	57	78	2.411 (1.448, 4.015)	2.023 (1.068, 3.833)*
>40	52	103	3.490 (2.107, 5.780)	2.343 (1.021, 5.379)*
Work experience				
< 10	96	69	1	1
≥ 10	87	154	2.463 (1.641, 3.696)	1.286 (0.651, 2.539)
smoking habit				
Yes	4	28	6.426 (2.210,18.679)	5.452 (1.774, 16.753)*
No	179	195	1	1
Physical exercise				
Yes	88	61	0.406 (0.269, .615)	0.486 (0.309, 0.767) *
No	95	162	1	1
sleep disturbance				
Yes	7	28	3.610 (1.539, 8.472)	3.235 (1.319, 7.931)*
No	176	195	1	1

*Significantly associated at P < 0.05

DISCUSSION

This study estimated the 12-month prevalence of LBP among school teachers in Mekelle city. This study found that, 223(54.9%) Teachers had LBP. This finding was in line with the studies conducted in Gondar town, Ethiopia, and Botswana, where (53.8%) and (55.7 %) of respondents had LBP respectively.[14,16] However, our finding is higher as compared to a study conducted in Nagoya, Japan, where (40.7%)[17] and in China (45.6%),[18] school teachers had LBP. This might be due to the facility provision and awareness difference, for self-prevention strategy of LBP between Ethiopia and other mentioned countries.

Females reported a significantly higher prevalence of LBP (61.8%) than males (48.3%) in this study. Females were 1.8 times more likely to experience LBP as compared to males (AOR = 1.833, 95% CI: 1.172, 2.868). This finding is found to be consistent with previous studies conducted on school teachers in Gondar, Ethiopia[14], and Botswana.[16] The possible reason could be that history of previous pregnancy and the involvement in household activities more often than males might have contributed for relatively higher prevalence. Another reason could be that male teachers (67.9%) were involved in more regular physical exercise than females (32.9 %).

In this study, increasing age increases the odds of developing LBP. Teachers who in the age range 30 and 40 years were 2 times more likely to report LBP as compared to those who were younger than 30 years old (AOR = 2.023, 95 % CI: 1.068, 3.833); while teachers who were above 40 years were 2.34 times more likely to report LBP as compared to those who were younger than 30 years (AOR = 2.343, 95 % CI: 1.021, 5.379). This result is consistent with a study conducted in Gondar, Ethiopia.[14] In addition, increasing age was found to increase the odds of developing LBP in a study conducted in Botswana.[16] Similarly, in a study carried out in Slovenia among school teachers, where increasing age was found to increase the odds of LBP.[12] One of the possible reasons for the difference between older age teachers and younger ones could be that as people get older, weakness of muscles in the lower back could happen and the intervertebral discs may not tolerate injuries. A previous study suggested that a likely reason for the higher prevalence of LBP among older teachers was that, as people get older gradual decline in muscle mass and loss of connective tissue elasticity as well as depletion of the cartilage between joints occurs.[19]

In this study, smoking habit was significantly associated with LBP among school teachers. Teachers who had smoking habit were 5.4 times more likely to report LBP as compared to non smokers (AOR = 5.452, 95% CI: 1.774, 16.753). This result was consistent with the study carried out in Gondar, Ethiopia.[14] A previous study suggested that the likely reason for the difference between smokers and non smokers might be smoking damages tissues in the lower back and elsewhere in the body by slowing down circulation and reducing the flow of nutrients to joints and muscles.[20]

Experience of doing regular exercise was the other factor which was associated with LBP in this study. Teachers who had experience of doing regular physical exercise were less likely less likely by 50% to report LBP as compared to those who did not have (AOR = 0.486, 95 % CI: 0.309,0 .767). Similar finding has been found in a study conducted on school teachers in Gondar, Ethiopia.[14] The result was also in line with a study carried out in Botswana.[16] One of the possible reasons for the difference physical exercise may strengthens muscles of the lower back (LB) thereby preventing injury. Another reason could be exercise increases blood flow to the spine, which supplies healing nutrients to the structure of the LB.

Moreover, this study showed that sleep disturbance was significantly associated with LBP. Teachers who had sleep disturbance were 3.2 times more likely to experience LBP as compared to those had not (AOR = 3.235, 95 % CI: 1.319, 7.931). This result was consistent with the study conducted in Gondar, Ethiopia.[14] The possible reason for the difference could be those who got disturbance during sleeping time lack complete rest when falling asleep.

LIMITATION OF THE STUDY

There might have been possibility of recall bias which could lead to over or underestimation. The presence of LBP depends solely upon the subjective self report of the respondents and not based upon an objective clinical diagnosis.

CONCLUSION

This study has shown that prevalence of LBP is high among school teachers. Teachers have been prevented from doing their normal work at home or away from home due to LBP in the last 12 months. Being female, older age, smoking habit, doing physical exercise, and sleep disturbance were the factors associated with LBP. Hence, undertaking regular physical exercise, avoiding smoking habits and having enough time to sleep minimizes developing low back pain among teachers.

Recommendation

To help reduce the prevalence of LBP among Mekelle city school teachers, the regional health bureau and educational office of Mekelle city in collaboration with physiotherapy professionals need to give a greater emphasis on self preventive strategies such as work ergonometric so as to minimize absenteeism and sick leaves keeping teachers productive. Educational bureau should give emphasis in constructing centers for physical exercise in schools. A strong link is recommended to be created between school teachers and physiotherapy department to increase the awareness and provision of physiotherapy treatment. Further longitudinal study is required to carry out for this common problem. Teachers are recommended to undertake regular physical exercise, avoid smoking habit, and get enough time to sleep in order to reduce the risk of developing LBP.

COMPETING INTERESTS

The authors declared that there is no conflict of interest.

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