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Prevalence of Low-Back Pain and Associated Factors among Public Office Workers in Dangla District, Awi Zone, Northwest Ethiopia: A Cross-Sectional Study

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Abstract

Background: Low back pain is one of the most common work-related health problems among public office workers, but data are limited. This study aimed to assess the prevalence and factors affected low back pain among public office workers.

Methods: Institutional-based cross-sectional study was conducted from March to May 2021. The data was collected using self-administered standardized Nordic musculoskeletal Questionnaires. Epi Info version 4.6 and Stata version 16 were used for data entry and analysis. Bivariable and multivariable logistic regression analyses were done to identify factors associated with low back pain.

Result: In this study, one-year and one week prevalence of low back pain among public office workers were 34.56% (95% CI: 30.73-38.37) and 22.87% (95% CI: 19.54-24.37) respectively. Higher age (AOR=3.18, 95% CI: 1.8-5.62), higher work experience (AOR=2.26, 95% CI: 1.36-3.77), lack of physical exercise (AOR=8.85, 95% CI: 4.36-17.9) and use computer frequently (AOR=0.62, 95% CI: 0.41-0.94) were significantly associated with low back pain among public office workers.

Conclusion: The prevalence of low-back pain among public office workers was relatively low as compared to other studies. Higher age, more work experience, lack of physical exercise and use of computer frequently were significantly associated with low back pain. Therefore, workplace health and safety awareness training are recommended to minimize the burden of low back pain among public office workers.

Keywords: MSDS; Associated factor; Public office workers; Magnitude

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Abbreviations

AOR: Adjusted Odds Ratio; BMI: Body Mass Index; ETB: Ethiopian Birr; LBP: Low-Back Pain: NOSQ: Nordic Occupational Structured Questioner; OR: Odds Ratio; OSH: Occupational Health and Safety; USA: United States of America; VAS: Visual Analogue Scale

Introduction

Low back pain is among the top ten diseases and the six most important contributors to the global diseases burden and injuries, which accounts the highest disability-adjusted life years worldwide [1,2]. It may be acute (less than six weeks), sub-acute (between six and three months) and chronic (lasts more than three months to occur) [3]. It can cause activity limitation across the world, imposing a high economic burden on individual, family, community, industries and governments [4]. Due to low back pain more than one hundred million working days are lost per year and the estimated cost is above 100 billion dollars per year in USA [5,6]. In Canada, the healthcare costs of LBP ranges from six to twelve billion dollars annually [7].

LBP is the fifth most main reason in the USA that visit a physician [8], and a study shown that the life-time magnitude of LBP in developed nations was reported to be up to 85% [9]. Worldwide public office workers have estimated LBP with the magnitude of 33% in their living experiences [10]. Based on a study, low back pain ranked highest in terms of disability, yearly lived disability and sixth in terms of over-all burden-of-disability-adjusted life years [11]. Public office workers have experienced poor sitting condition over a period of time that adapt poor body posture and generates musculoskeletal disorder that can impact on quality of life [12,13]. Low back pain causes restriction

on usual activity and inability to work [14], and this affects economic burden of poor nations like Africa mostly restricted to health care funds for epidemics [9,15].

Prevalence of Law Back Pain (LBP) among public office workers were reported from different countries such as Lithuanian, 56.1% [9], Germany, 60% [16], South Brazil 50.2% [17], Finland 34% [18], Netherlands 34% [19], Greek 37.8% [10], New Zealand 45% [20], Malaysia 69.7% [21], Iran 60% [22], Kuwait 51% [23], and Africa, 14% to 72% [24], and South Ethiopia, 38.4% [25]. Based on different studies, there are a number of risk factors that related with low back pain like age [25-29], sex [20,30,31], BMI, educational level and marital status [31-34], working condition factor such as sitting posture, rest break, hours of sitting and frequent use of computer [10,25,31,35,36], work experience [36-38], stress [25,32,39,40], physical exercise [35,41,42], smoking [25,41,43,44], chat chewing and drinking alcohol [25,27,28,36].

In Ethiopia, Public office workers are one of the major government workforces that engage in unsafe work places and their health and safety status determines the overall productivity in the country [45,46]. But there is limited evidence regarding magnitude of low-back pain among public office workers and limited attempts have been made to investigate the prevalence and its associated factors [25,47]. Therefore, this study aimed to assess the prevalence and factors associated with low-back pain among public office workers in Dangla District, Awi zone, Amhara Region, Northwest Ethiopia.

Method and Materials

Study setting, design and period

An institutional-based cross-sectional study was conducted in Dangla District from March to May, 2021. Dangla is one of the administrative towns in Awi zone in Amhara Regional State, and 480 km from northwest of Addis Ababa. Based on report of Dangla district communication affairs bureau, the total population of the district is estimated to be 76,820, (39,251 men and 37,569 women). Based on Dangla District communication affairs bureau 2021 annual report, the district has a total of 950 public office workers (Figure 1).

Source and study population

All public office workers in Dangla district were the source population and workers like pregnant women, workers on annual leave, maternity leave, workers with car accident were excluded and workers who had involved in office work for at least one year were included in the study.

Sample size and sampling procedure

The sample size was calculated for both the first and second objectives using a single proportion formula and Open EPI info version 7 respectively. Assumptions for the first objective was 38.4% (low back pain among public office workers in South Ethiopia [25], 95% CI (Za1/2=1.96) and 4% (d=0.04) margin of error, and for second objective 95% CI, and power 80%, Odds Ratio 1:1 and factors from the previous study that had strong significant relation with low back pain [25]. After adding 10% a non-response rate the final sample size for first and second objective was 621 and 277 respectively. The sample size for first objective was higher and it is representative for both objectives. Simple random sampling technique using a lottery method was used to draw 621 study participants.

Operational definition

Low back pain: A perceived self-reported pain or discomfort, localized between coastal margin and above the inferior gluteal folds which has lasted for days or weeks during the last 12 months [48].

Public office worker: Public office worker was including workers who works in the office for 8 h per day in sitting without any shift work such as finance, trade, industry and investment, culture and tourism, sport, labor and social, revenue, enterprise, women and child, and land administration office other than hospital staffs, school teachers, taxi drivers, bankers, armed force workers and industrial workers.

Body mass index: Is the body weight in kilograms divided by the value of the body height in meter squared (kg/m^2) [49]. Underweight = BMI<18.50, Overweight/Obese = BMI ≥ 25.00

Job stress: A score measured using the generic job stress scale as Yes 21 and above and No lower than or equal 20 [50].

Job satisfaction: A score measured using the generic job satisfaction scale as Yes 32 and above and No below 32 [51].

Cigarette Smoking: It is practice of smoking cigarette by public office workers for at least one sticks of cigarette per day [49].

Sitting normally: Defined that the key parts of the person's body are correctly aligned and supported by the amounts of muscle and tension [52].

Sitting abnormally: Supporting the feet sitting in a position that does not fully support the back, especially lower back [53].

Sitting long period: Defined as sitting for a long time in one position or sitting for an extended period without taking a break [54].

Standing long period: Defined as standing for long period of time without being able to walk or sit during the work shift [55].

Data collection procedure

To test the reliability of the questionnaire pre-test was conducted on 5% of the total study participants in Dangla town not included in the final data collection process. After pre-test, a few modifications such as minimizing the number of questions, and some misinterpretations and ambiguities where words were corrected. Data was collected by 3 diploma nurse professionals through self-administered questionnaire. Principal investigator and supervisor were assigned to follow day today data collection processes.

Data collection tools

Data was collected using and adapted Standardized Nordic Questionnaires (NOSQ) for the analysis of musculoskeletal symptoms for low back pain [56]. The questioner has four components: Sociodemographic characteristics, working condition, behavioral and psychosocial factors. The questionnaire was prepared in English version and translated to the local Amharic language, then back to English to check its consistency. Perceived job satisfaction was assess using 10-items generic job satisfaction scale questioners with 5 Likert scale responses (very dissatisfied = 1, Dissatisfied = 2, neutral = 3, satisfied = 4, and very satisfied = 5), and dichotomized into dissatisfied (total score less than 32 = 1) and satisfied (total score 32 and above = 2) (55) with their current jobs. Perceived job-related stress was assess using 8-items generic job stress scale questioners with 5- Likert scale responses (never = 1, rarely = 2, sometimes = 3, often = 4, and very often = 5) and final score was dichotomized into less than 21 = 1 (not stressed) and a score of 21 and more = 2 (stressed) [50].

The severity of pain was assessed using visual analogue scale (0-10 in cm). For each questions the severity of pain out of 10% was

categorized in to 0-0.5 = no pain, 1-4.5 = mild pain, 4.5-7.5 = moderate pain, 7.5-10 = severe pain [57], where as to measure the severity of one year and one week pain out of 100%, was often categorized into, no pain = 0-4, mild pain = 5-44, moderate pain = 45-74 severe pain = 75-100 [58].

Data quality control

To assure the quality of data careful design, translation, and retranslation of the questionnaire, and Pre-tests on 5% of the sample from other site were done and accordingly some correction was performed. Two-day training was also given for data collectors. Proper categorization and coding of the data were also done.

Data management and analysis

The completed data were entered into EPI info version 4.6 software and exported to SPSS version 25 for further analysis. The descriptive statistics was computed. Bivariate and multivariable regression analyses were used to identify the factors associated with low back pain. Independent variables that had p-value less than 0.2 in bivariable regression analysis were exported into multivariable logistic regression analysis to control potential confounder variables. The reliability of Nordic Questionnaires was assess using Cronbach's alpha and was found = 0.77, and job satisfaction and stress scale questionnaires was found 0.81 and 0.54 respectively. The model fitness value was 0.97. P-value less than 0.05 and adjusted odds ratio with 95% CI were used to declare the presence and the strength of association respectively.

Results

Sociodemographic characteristics of study participants

From a total of 621 eligible public office workers, 599 respondents with a response rate of 96.5% were fully participated. More than half (56.26%) of respondents were males. The mean age of the study participants was 34 with inter quartile range of 29 to 41. The majority (89.15%) of study participants were orthodox Christian followers. Regarding educational level of respondent above three-fourth (77.96%) of respondents were degree and above (Table 1).

Behavioral factors of public office workers

The majority (92.82% and 89.82%) and more than two-thirds (68.78%) of respondents were never khat chewers, never cigarette smokers, and never alcoholics respectively. Moreover three-quarters of the individuals (78.80%) did not engage in any type of physical activity (Table 2).

Psychosocial characteristics of public office workers

Based on this study, from the total of study participants 21.04% and 40.96%, respondents, have experienced stress and satisfied with their jobs respectively (Figure 2).

Prevalence of low-back pain in public office workers

Based on this study, the past one year and one week magnitude of low-back pain among public office workers were 34.56% (95% CI: 30.73-38.37) and 22.87% (95% CI: 19.54-24.37) respectively. Due to low back pain about 28.12% and 35.27% of the study participants have been hospitalized and changed their jobs or duties respectively (Table 3).

Factors associated with LBP among public office workers

In bi-variable binary logistic regression analysis, Age, khat chewing, drinking habit, physical exercise, work experience, using a computer, awareness of the sitting condition, rest break, bending or twisting awkward posture, and occupational health and safety related training were eligible for multi-variable binary logistic regression (p-value ≤ 0.20). But after controlling all confounding variables in a multivariable binary logistic regression analysis, age, physical activity, work experience, and frequent use of computer among public office workers were found significantly with low back pain.

The odds of experiencing low-back pain in the age of greater than 30 years were about three times more likely when compared to those

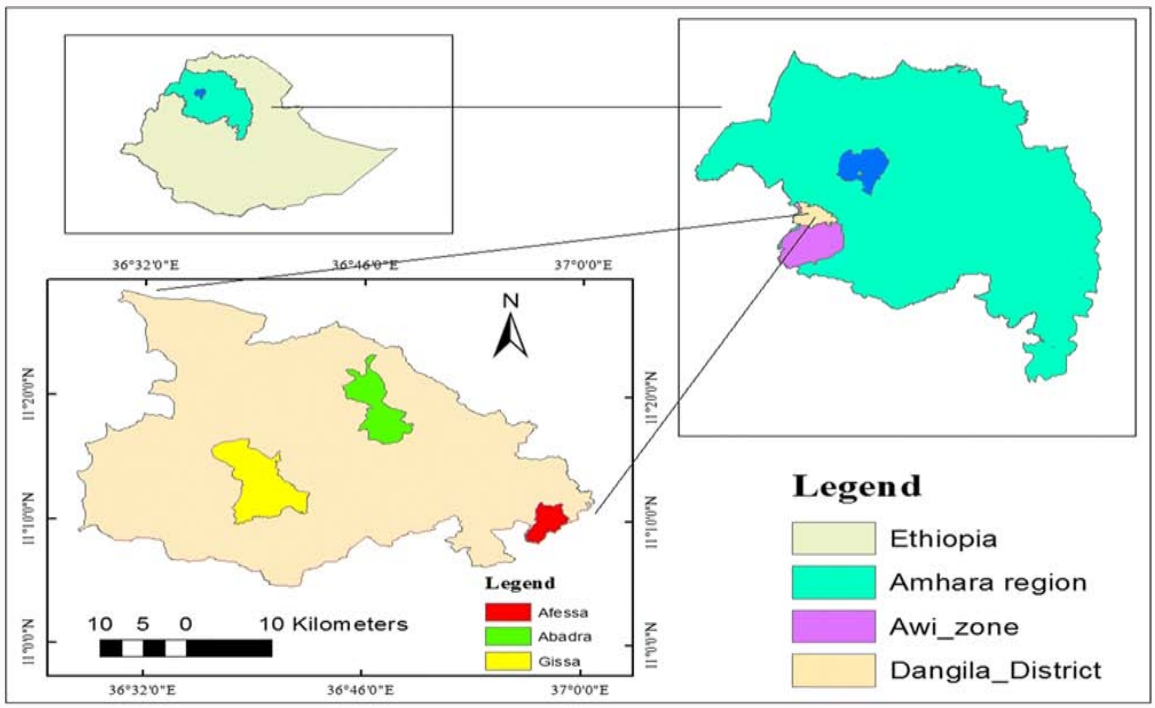

Figure 1: Map of the study area of Dangla District, Awi, zone, Amhara region, Ethiopia (Encarta, 2009).

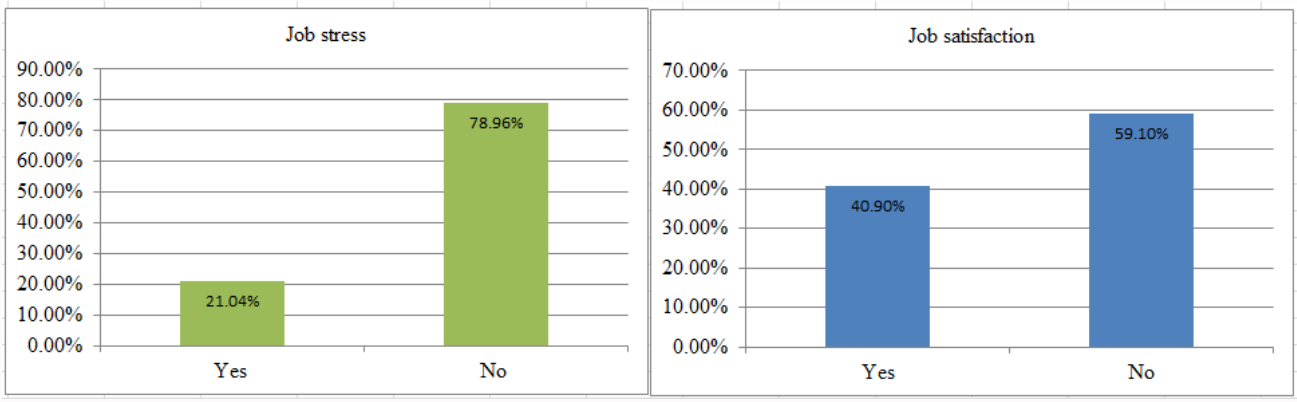

Figure 2: Level of Stress and job satisfaction of public office workers (n=599), 2021.

Table 1: Sociodemographic characteristics of participants in Dangla District, Awi Zone, Northwest Ethiopia, (n=599), 2021.

Variables	Categories	Frequency (N=599)	Percent (%)
Gender	Male	337	56.26
	Female	262	43.74
Age	<30	224	37.4
	≥ 30	375	62.6
Religion	Christian orthodox	534	89.15
	Muslim	35	5.84
	Protestant	30	5.01
Marital status	Single	189	31.55
	Married	410	68.45
Educational level	Diploma and below	132	22.04
	Degree and above	467	77.96
Monthly salary (ETB)	<=5000	192	32.05
	>5000	407	67.95
Body Mass index	Underweight	58	9.68
	Normal	449	74.96
	Overweight	92	15.36

Table 2: Behavioral factors of participants in Dangla District, Awi Zone, Northwest Ethiopia, (n=599), 2021.

Variables	Categories	Frequency (N=599)	Percent (%)
Drinking habit	Former drinker	42	7.01
	Current drinker	145	24.21
	Never drinker	412	68.78
Smoking habit	Former smoker	61	10.18
	Never smoker	538	89.82
Khat chewing habit	Former chewer	43	7.18
	Never chewer	556	92.82
Physical exercise	Yes	127	21.2
	No	472	78.8

workers in age less than 30 years (AOR=3.18: 95% CI: 1.80-5.62). The odds of experiencing low-back pain in workers with sedentary life were 8.85 times heightened when compared to workers that done a regular physical exercise (AOR=8.85, 95% CI: (4.36-17.9). The odds of having low-back pain among public office workers were two times more likely in workers more than 10 years' work experience when compared to their counterparts (AOR=2.26; 95% CI: 1.36-3.77). The study participants who did not use computer frequently were 38% less likely to develop low-back pain as compared with those who use computer frequently (AOR=0.62, 95% CI: (0.41-0.94) (Table 4).

Discussion

This study is the first attempt to asses' prevalence of low back pain among public office workers in Ethiopia. In this study, the past one-year prevalence of low-back pain was 34.56% (95% CI: 30.7-38.37). This finding is consistent with the studies done in Finland 34% [18], Netherlands 34% [19], Greek, 37.8% [10], South Africa, 37% [24,59], Nigeria 38.4% [60], and South Ethiopia 38.4% [25]. The possible reason for this similarity might be due to the similarity of public office work occupation across the countries. On the other hand, this finding was lower than the studies conducted in Lithuanian 56.1% [9], Kigali-Rwanda 45.8% [61,62], Germany 60% [63], South Brazil 50.2% [17], New Zealand's 45% [20], Malaysia 69.7% [21], Iran 60% [22] and Kuwait 51% [23]. This variation could be due to the differences in working environment, work experience, over load or under load of assigned task and the measurement tools used.

Regarding assessments of factors association with low back pain among public office workers, age, Physical exercise, work experience, and frequent use of computer were significantly associated with low back pain among public office workers. In this study, the odds of developing low back pain among public office workers were higher in workers greater than 30 years as compared to those who are at the age of less than 30 years. This finding is similar with studies conducted in Gondar beauty salon worker [27], and Adama [28], school teachers in Mekelle, Adiss Ababa and Gondar [29,41,42]. This similarity might be due to the fact that biological (functional structure of the human body) particularly those related to supportive structures like, muscles, joints, ligaments and tendons would tend to degenerate as age increases [2].

In this study, the odds of developing low back pain were higher in workers with sedentary life compared to those who had done a regular physical exercise. This finding is consistent with a study done in South Ethiopia [25], Mekelle and Gondar [40,64], and Addis Ababa [36]. The possible reason for this might be lack of physical activity, could be a risk factor for the development of chronic low back pain [3]. But this finding contradicts the finding among teachers

Table 3: Prevalence of low-back pain among public office workers (n=599), 2021.

Variables	Categories	Frequency (n=599)	Percent (%)
Pain within the last 7 days	Yes	137	22.87
	No	462	77.13
Pain during the past 12 months	Yes	207	34.56
	No	392	65.44
Hospitalized(n=207)	Yes	52	28.12
	No	155	74.88
Changing jobs(n=207)	Yes	73	35.27
	No	134	64.73
Duration of pain(n=207)	Less than 7 days	94	45.41
	1 month	17	8.21
	>1 month	57	27.54
	Every day	39	18.84
Reduced work activity (n=207)	Yes	114	55.07
	No	93	44.93
Leisure activity (n=207)	Yes	62	29.95
	No	145	70.05
Pain prevents work in 12 months (=207)	0 days	82	39.61
	1-7 days	80	38.65
	8-30 days	24	11.59
	More than 30days	21	10.14
Hospitalization (n=207)	Yes	52	28.12
	No	155	74.88

Table 4: Multivariable regression and factors associated with low-back pain among public office worker, (n=599), 2021.

Variables	Categories	Low back pain		COR	AOR
		Yes	No		
Age	<30	35	189	1	1
	≥ 30	172	203	4.57 (3.02 -6.92)	**3.18 (1.8-5.62)***
Drinking habit	Former drinker	21	21	1	1
	Current drinker	45	100	0.45 (0.22 -0.90)	0.56 (0.25-1.26)
	Never drinker	141	271	0.52 (0.27-0 .98)	0.67 (0.32-1.42)
khat chewing habit	Former chewer	20	23	1	1
	Never chewer	187	369	0.58 (0.31-1.08)	0.56 (0.26-1.19)
Physical exercise	Yes	11	116	1	1
	No	196	276	7.48 (3.9-14.2)	**8.85 (4.36- 17.9)***
Work experience	<10	75	271	1	1
	>10	132	121	3.94 (2.76-5.62)	**2.26 (1.36-3.77)***
Frequent use of Computer	Yes	123	210	1	1
	No	84	182	0.78 (0.56-1.10)	**0.62 (0.41-0.94)***
Awareness on sitting condition	Good	105	231	1	1
	Poor	102	161	1.39 (0.99-1.95)	1.13 (0.74-1.71)
Take rest break	Yes	62	145	1	1
	No	145	247	1.37 (0.95-1.97)	1.19 (0.77-1.84)
Bending or twisting awkward posture	Yes	73	111	1	1
	No	134	281	0.72 (0.50-1.03)	0.84 (0.54-1.31)
OSH related Training	yes	25	69	1	1
	No	182	323	1.55 (0.95-2.54)	1.22 (0.67-2.24)

AOR: Adjusted Odds Ratio; COR: Crud Odds Ratio; p ≤ 0.2, *p ≤ 0.05, 1 = Reference category

in Mekelle and Gondar [41,42]. This might be due to difference in doing regular physical exercise in one group from other groups.

In this study, public office workers who had not used computer frequently were less likely to have low back pain as compared to those who used computer frequently during their working time. This finding is consistent with the studies done in southern Ethiopia [25] and Finland [4]. The possible reason for this could be due to sitting long period of time due to the nature of the job and due to incorrect sitting posture during using computer and puts more pressure on spinal disks. The other factor that had associated with low back pain was work experience and workers with greater than 10 years of work experience were more likely to have low back pain compared to those workers with less than 10 years of worker experience. This finding is consistent with a study done in Mekelle [41], and Addis Ababa [36]. The possible reason could be the effect of aging or cumulative effect of work load on the musculoskeletal system through years of employment service. Another possible reason could be workers with longer duration of employment might neglect the possible protection mechanism of potential health and safety risk factors at

their work place relying on the length of employment or work place adaptation. The other possible reason for this could be as the length of employment (work experience) increases at the same time age increases due to this weakness of muscles, joints and ligaments in the lower back could happen.

Limitation of the Study

Subjective self-report of the respondents and limited access of reference literature on similar areas of study for comparison.

Conclusion

The prevalence of low-back pain among public office workers was relatively low as compared to other studies. Age, work experience, physical exercise and use of computer were significantly associated with low back pain among public office workers. Therefore, workplace health and safety awareness training are recommended to minimize the burden of low back pain.

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