

Annual Prevalence of Self-Reported Work Related Musculoskeletal Disorders and Associated Factors among Nurses Working at Gondar Town Governmental Health Institutions, Northwest Ethiopia

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Abstract

Introduction: Work related musculoskeletal disorders are growing problems among nurses in many developing countries. There is little evidence on this problem and associated factors among nurses in Ethiopia.

Objective: To assess annual prevalence of self-reported work related musculoskeletal disorders and associated factors among nurses at Gondar town governmental health institutions.

Methods: Institution based cross-sectional study was conducted from February to June, 2013 at Gondar town. Data were collected using structured questionnaire guided interview and taking physical measurement. Categorical data were compared using a chi-square test. Logistic regression analysis was used to assess the association of variables, and multivariate logistic regression analysis was applied to eliminate the third variables.

Result: Overall annual prevalence of self-reported work related musculoskeletal disorders was 57.1%. Multivariate logistic regression analysis showed professional experience (AOR=2.4: 95%CI (1.41, 4.19)) and body mass index (AOR=3.52: 95%CI (1.02, 12.04)) were significantly associated with the dependent variable.

Conclusion: Self-reported work related musculoskeletal disorders are commonly prevalent among nurses at Gondar town with low back and knee joint affected most. Overweight and professional experiences were significantly associated with work related musculoskeletal disorders. There is an enormous need for Nurses education on ergonomic intervention strategies to raise awareness regarding work related musculoskeletal disorders and to ensure that they remain healthy and safe as much as possible throughout their working life time. It is also mandatory that nurses should be advised to visit physiotherapists when they have work related musculoskeletal disorders.

Keywords: Musculoskeletal disorders; Physiotherapists; Soft tissue pain

Introduction

Work related musculoskeletal disorders (WMDs) are groups of syndromes characterized by symptoms of soft tissue pain, paraesthesia, stiffness, swelling, weakness, discomfort and loss of function that can be caused or aggravated by work related exposures [1]. These disorders have been recognized as a source of significant pain, disability and disadvantage for the injured person and a substantial burden on millions of people in both developed and developing countries, and affect all age groups and can also have a major impact on worker function, performance and productivity [1]. Several epidemiological studies have outlined the magnitude of musculoskeletal disorders (MSDs) and the nature of its relationship to work among nurses [2-9]. Nursing has been ranked as the tenth occupation within the highest professions which are susceptible to WMDs and injuries [10].

Factors contributing for the development of WMDs in nurses are wide spread and mostly occupational in origin [11-15]. Individual factors (age and sex) and psychosocial factors (low work support from

superiors and poor nurse physician contact) are also important underlying factors for the progress of WMDs [16-18].

Although numerous studies have investigated WMDs among nurses in developed countries, there is limited information available for the annual prevalence and contributing factors of WMDs among nurses of sub-Saharan African countries. The primary subjects of previous studies were nurses working either in hospitals or in communities. So the results of the previous studies were not inclusive to all types of nurses working in every setting. A knowledge gap therefore exists in scientific literature on the annual prevalence of WMDs and associated factors among nurses. Therefore, this study aimed to investigate the annual prevalence and associated factors of self-reported WMDs among nurses working at Gondar town governmental health institutions (GHIs).

Materials and Method

Study design and period

Institution based cross-sectional study was conducted from February 02 to June 20/2013.

Study area

The study was conducted at Gondar town government health institutions, Northwest Ethiopia. The town is located 738km Northwest of Addis Ababa, the capital of Ethiopia. Gondar town has a population of 206,987 [19]. Governmental health institutions at Gondar town are: two hospitals, eight health centers and twenty eight health posts. There are 428 nurses who are working in these health institutions.

Source and Study population

Nurses working in government health institutions of Gondar town in Northwest Ethiopia

Sample size and Sampling technique

Sample size was determined by single population proportion formula using the assumption of a 5% level of significance, the proportion of nurses who have WMDs would be estimated with 95% level of confidence; 70.8 % of nurses would have annual prevalence of WMDs [16] and marginal error of 3%. The required sample size was calculated by using Epi Info version 7 and sample size (n) = 290. By adding a 10% of non-response rate, the final sample size was 319. The sample was taken from a relatively small population (N = 428). By considering increasing sample size would increase the statistical power; all available nurses who were working at Gondar town governmental health institutions during the sturdy period were included in the study.

Operational definitions

Work related musculoskeletal disorders: perceived pain, ache or discomfort in any part of body segments caused, aggravated or exacerbated by work place exposures.

Body segments: neck, shoulder, upper back, lower back, hip /thigh, knee/leg and ankle/foot, wrist /hand

Body mass index: weight in kilograms divided by the square of the height in metres (kg/m²).

Underweight= BMI <18.50

Normal range= BMI b/n 18.50-24.99

Overweight = BMI b/n 25.00-29.99

Obese= BMI ≥30.00 (20).

Data collection procedures

Data were collected using structured questionnaire guided interview. Questionnaires used were adapted from the standard Nordic musculoskeletal questionnaires []. Six trained physiotherapists were undertaking the interview of study participants. Physical measurements also had been done to measure the participants' height and weight.

Data quality assurance procedure

Data collectors and supervisors were trained by the principal investigators for one day. The training was focused on familiarization and clarification of the questionnaire. Study tool was pre-tested among nurses who were not identified as the study population in other town.

Questionnaires were checked by the supervisors and principal investigators for its competence and consistency.

Data entry, management and analysis

Data were coded and entered into Epi Info version 7 and exported to SPSS version 16 for analysis. Overall proportion with 95% confidence interval (CI) had been calculated to determine annual prevalence. For testing of significance, categorical data were compared using chi-square test. Associated factors of WMDs were determined by using descriptive analysis. Multicollinearity test was also checked to assess the correlation between age and professional experience, height and BMI, sex and pregnancy. Logistic regression model had been used to assess the association of independent variables with WMDs. OR with 95% (CI) for risk indicators was calculated. The statistical tests were considered significant at a level <5% (<0.05).

Ethical considerations

The study was done after ethical clearance was secured from the Ethical Review Committee of College of Medicine and Health sciences, University of Gondar. Informed consent was obtained from study participants after being informed in detail about the objective, purpose, benefits and risks of the study. Appropriate measures were taken to assure confidentiality of information both during and after data collection. Identified subjects with WMDs during data collection time were given advice or referred, for further care, to physiotherapy.

Results

Socio demographic characteristics

Three hundred eighty nine participants were employed in this study. From these, 209 (53.7%) were females and had a mean (±SD) age of 30 ± 5.8 years, and 22.29 ± 0.8 kg/m² body mass index (BMI). Majority (68.9%) of respondents were working in hospitals while 73(18.8%) were working in health centers, and 48(12.3%) were in health posts. Half (51.4%) of the participants had diploma and the remaining had bachelor degrees (Table 1).

	Variables	n (%)
Sex	Male	180 (46.3)
	Female	209 (53.7)
Age	<25	70 (17.9)
	25-30	209 (53.7)
	31-40	85 (21.9)
	>40	25 (6.5)
Pregnancy	Not Pregnant	178 (85.2)
	Pregnant	31 (14.8)
Marital status	Married	200 (51.4)
	Divorced	12 (3.1)
	never married	177 (45.5)
Body mass Index in kg/m ²	Underweight <18	20 (5.1)

	Normal weight 18-25	314 (80.7)	Not Pregnant	89 (50.3)	89 (49.7)
	Over weight >25	55 (14.2)	Pregnant	23 (74.2)	8 (25.8)
Professional experience in year	<5	203 (52.2)	Level of higher education		
	10-May	135 (34.7)	Diploma nurse	106 (53)	94 (47)
	15-Nov	32 (8.2)	BSC nurse	116 (61.4)	73 (38.6)
	>15	19 (4.9)	Marital status		
Diabetes mellitus	Yes	4 (1)	Married	142 (71)	58 (29)
	No	385 (99)	Divorced	7 (58.3)	5 (41.7)
Previous history of Any other job	Yes	36 (9.3)	Never married	73 (40.6)	104 (59.4)
	No	353 (90.7)	BMI(Kg/m ²)		
Ergonomic training	Yes	0 (0)	under weight	6 (30)	14 (70)
	No	389 (100)	normal	178 (56.7)	136 (43.3)
Cigarette smoking in the past	Yes	6 (1.6)	over weight	38 (68.5)	17 (31.5)
	No	383 (98.4)	Professional experience in year		
Cigarette smoking at present	Yes	0 (0)	<5	85 (41.8)	118 (58.2)
	No	389 (100)	10-May	96 (71)	39 (29)
Working hours per week	40	323 (82.8)	15-Nov	26 (81.25)	6 (18.75)
	>40	67 (17.2)	>15	15 (78.9)	4 (21.1)
*Governmental health institutions					
Working institution					
			hospitals	152 (56.7)	116 (43.3)
			health centers	43 (58.9)	30 (41.1)
			Health posts	27 (56.25)	21 (43.75)
Have you been Diagnosed with DM?					
			Yes	3 (75)	1 (25)
			No	219 (56.9)	166 (43.1)
Any other job					
			Yes	31 (45.9)	191 (54.1)
			No	5 (27)	162 (73.0)
Ergonomic training					
			Yes	0 (0)	0 (0)
			No	222 (57)	167 (43)
Cigarette smoking in the past					
			Yes	3 (50)	3 (50)
			no	219 (57.2)	164 (42.8)
No. Cigarettes smoked in the past (n=6)					
			<5	1 (100)	0 (0)

Table1: Sociodemographic characteristics among nurses (n=389) at Gondar town GHIs, June 2013

Annual prevalence of work related musculoskeletal disorders

The overall annual prevalence of WMDs among nurses working at Gondar town governmental health institutions was 57.1%. Of which, 112 (50.5%) were females, and 152 (68.5%) were working in hospitals. Greater annual prevalence of self-reported WMDs was found between 31-40 years of age (77.6%) (Table 2).

Variables	WMDS	
	Yes	No
	n (%)	n (%)
Sex		
Male	110 (61.1)	70 (38.9)
Female	112 (53.6)	97 (46.4)
Age(years)		
<25	16 (22.9)	54 (77.1)
25-30	117 (56.0)	92 (44.0)
31-40	66 (77.6)	19 (22.4)
>40	23 (92)	2 (8)
Pregnancy		

>5	2 (40)	3 (60)
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Table 2: Distribution of self-reported WMDs by Sociodemographic characteristics of among nurses (n=389) at Gondar town GHIs, June 2013

Annual prevalence of self-reported WMDs in different body segments

Back (45%), knee (21.1%) and neck (17.2%) were the sites where the highest reported, whereas, wrist/hand pain (2.6%) was the least reported WMDs (figure1).

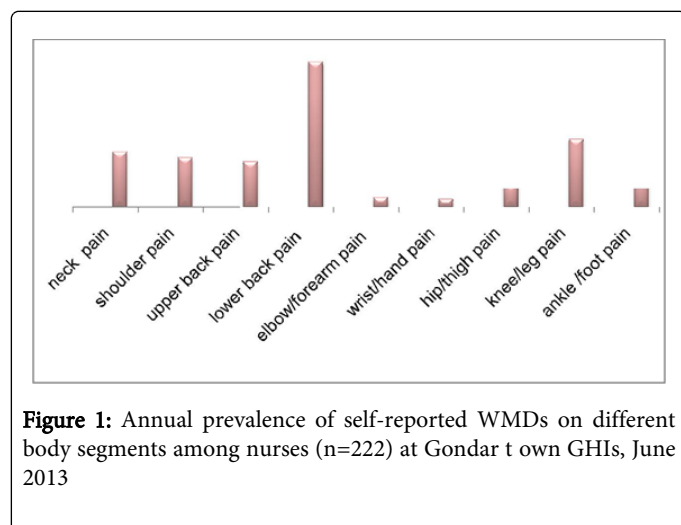


Figure 1: Annual prevalence of self-reported WMDs on different body segments among nurses (n=222) at Gondar town GHIs, June 2013

Prevalence distribution among Governmental health institutions

Table 3 shows the distribution of self-reported WMDs in different body segments of nurses working in Hospitals, health centres and health posts. Nurses who are working in hospitals reported the highest annual prevalence of low back pain (70.9%) followed by nurses who are working in health centres (20.6%).

	Hospital	Health centers	Health posts
WMDs	n (%)	n (%)	n (%)
Neck pain	55 (82.1)	11(16.4)	1(1.5)
Shoulder pain	48 (80.0)	11(18.3)	1(1.7)
Upper back pain	44 (80.0)	11(20.0)	0
Elbow/forearm pain	10(83.3)	2(16.7)	0
Wrist/hand pain	8(80.0)	2(20.0)	0
Low back pain	124 (70.9)	36(20.6)	15(8.6)
Hip/thigh pain	17(60.7)	4(14.3)	7(25.0)
Knees/leg pain	47(57.3)	11(13.4)	24(29.3)

Ankle /foot pain	18(50.0)	1(2.8)	17 (47.2)
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Table 3: Annual prevalence of WMDs in different body regions among nurses who reported work related musculoskeletal disorders at Gondar town GHIs, June 2013

Number of disorders among nurses of different work settings

Nurses who are working in hospitals had reported a maximum of six WMDs in different body segments simultaneously (0.45%). However, nurses who were working in health centers and health posts had reported a maximum of four WMDs at different body segments simultaneously (Table 4).

Variable	n (%)	Hospital n (%)	Health center n (%)	Health posts n (%)
One disorder	75 (33.9)	53 (70.7)	16 (21.3)	6 -8
Two disorders	37(16.7)	19 (51.4)	9 (24.3)	9 -24.3
Three disorders	70(31.5)	50 (71.4)	13 (18.6)	7 -10
Four disorders	35(15.8)	26 (74.3)	4 (11.4)	5 -14.3
Five disorders	4(1.8)	4 (100)	0 (0.00)	0 0
Six disorders	1(0.45)	1 (100)	0 (0.00)	0 0

Table 4: Number of disorders among nurses at Gondar town GHIs, June 2013

Factors affecting work related musculoskeletal disorders among nurses

Occupational factors: From all respondents who reported WMDs (222), 153(68.9%) believed that their WMDs was related to working in uncomfortable position, while 127 (57.2%), 124 (55.85% and 118(53.1%) respondents associated their WMDs with repetitive task, transferring heavy materials and/or equipments and working in the same position for a long time respectively (Table 5).

Occupational factors	n (%)
Not enough rest	97(43.67)
Treating many patients per day	85(38.28)
Repetitive task	127(57.2)
Working in uncomfortable position	153(68.91)
Working in the same position for a long time	118(53.15)
Bending /twisting back uncomfortably	110(49.54)
Sudden fall	with patients 106(47.74)
Transferring	dependent patients 117(52.7)

Transferring	heavy equipments materials/	124(55.85)
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Table5: Occupational factors for occurrence of WMDs among nurses (n=222) at Gondar town GHIs, June 2013

Psychosocial factors: From all participants who had at least one WMDs in any of their body segments reported as: 127(57.3%) were not satisfied by their job, 122(54.9%) were lacking cooperation among staffs, 107(48.2%) had poor nurse-physician interaction and 96(43.2%) their immediate supervisors were not interested to listen their personal problems.

Logistic regression analysis of factors associated with WMDs: Significantly associated variables with WMDs in bivariate analysis were entered into a multivariate logistic regression model as independent variables for the outcome of WMDs. Variables which were appeared as significantly associated factors with WMDs were BMI, professional experience, working in uncomfortable position and transferring heavy materials and equipment (Table 6). Being an overweight increases the chance of having WMDs 3.5times higher than being underweight [AOR= 3.52, 95%CI: (1.02, 12.04)]. Nurses who had worked more than 10 years have 2.4 times higher chance of developing WMDs than those who worked less than 10 years[AOR= 2.495%CI: (1.41, 4.19)].

Variables	WMDs	Crude OR	Adjusted OR
	n (%)	(95% CI)	(95%CI)
Age			
< 30	133(59.9%)	1	1
≥30	89(40.1%)	4.8(2.65,8.99)	1.98(0.73,5.3)
Sex			
Male	110(49.1%)	1	1
Female	112(50.9%)	0.8(0.49,0.92)	0.74(0.45,1.22)
Professional experience			
< 10 years	197(88.7%)	1	1
10 years	25(11.3%)	3.4(2.1, 5.4)	2.4(1.41,4.19)
BMI			
Underweight	6(2.7%)	1	1
Normal	178 (80.2%)	3.05(1.144,8.15)	2.4(0.84,7.36)
Overweight	38(68.5%)	5.07(1.66,15.4)	3.52(1.02,12.04)
Unanticipated sudden movement			
Yes	154(63.7%)	1.98(1.30,3.01)	1.24(0.56,8.23)
No	68(46.6%)	1	1
Sudden interruption from nursing care			
Yes	113(79%)	4(0.94, 7.56)	2.14(0.834,4.434)
No	109(44.3%)	1	1
Bending or twisting back uncomfortably			

Yes	147(63.4%)	2.53(1.35_5.80)	1.45(0.44,1.99)
No	75(47.8%)	1	1

Table 6: A multivariate logistic regression analysis of factors associated with WMDs among nurses (n=222) at Gondar town GHIs, June 2013

WMDs=work related musculoskeletal disorders, OR=odds ratio

Discussion

Annual prevalence of self-reported WMDs in the nursing population

Work related musculoskeletal disorders occur commonly among nurses and has been reported with a variable rate. In this study, the overall annual prevalence of self-reported WMDs among nurses was 57.1 %. It is lower than a study conducted in Ibadan, south west Nigeria (78%) [14]. A study conducted in Johannesburg South Africa among nurses working in two hospitals showed the annual prevalence of 45% and 75% [], the former (45%) is lower than our report. This difference could be due to variations in operational definitions of WMDs assumed by different studies; most of the previous studies have used only hospital nurses with variable sample sizes; variation in hospital working environment, awareness levels and practice of nurses regarding work place ergonomics.

The Annual prevalence of low back pain

Two studies conducted in South- and North-West Nigeria found that the annual prevalence of work related LBP to be 44.1% and 50% respectively [14,18] which is comparable with our result. However, result of the present study showed lower annual prevalence of work related LBP than a study conducted in Jimma Referral hospital, Ethiopia and Murtala Mohammad Specialist Hospital, Nigeria (70.8%) [16]. This inconsistency could be due to the variation in the level, duration and frequency of workloads among nurses of different settings in different countries [16].

Neck pain, shoulder and knee pain

Northwest Nigerian nurses' annual knee pain (22.4%) prevalence is consistent with result of this study; however, prevalence of neck pain in this study is slightly lower than a study in Northwest Nigeria (28%) [16].This may be because of our study combined study participants from three different settings where one setting could contribute or cofound to the results of others. The overall annual prevalence of knee, neck, and shoulder pains among nurses of hospitals, health centers and health posts showed decreasing from the annual prevalence rates shown in the literature reviewed [15,16].

The annual prevalence of shoulder pain in South Africa (11%) [6], Taiwan (17%) [17] and in Sirilanka (10%) [23].These results are more or less similar to the results of the present study. However, a study in Cape Town, South Africa found 41% annual prevalence of shoulder pain [24] which is quiet higher than our report. This disparity might be explained by the fact that the annual prevalence measurement that the study conducted in Cape Town used is more inclusive and general than the operational definition used by ours.

The Annual prevalence of other WMDs

A study on anthropometric variability, equipment usability and musculoskeletal pain among nurses in Western Cape Town reported 31% annual prevalence of upper back pain [25]. It is two times higher than report of the present study. This difference could be its anatomical position and association with low back, neck, and shoulder regions which would lead to confusion in identifying true upper back pain.

The yearly prevalence of elbow/forearm pain (13.7%) in rural Japan [26], wrist/hand pain (21.2%) in south Africa, and hip/thigh pain (52.1%) in south Korea [27] were showed to be higher than the annual prevalence rates reported by this study.

Factors Associated with Work related musculoskeletal disorders

In this study, being overweight was significantly associated factor for self-reported WMDs among nurses. Similarly, other studies reported that overweight nurses had a higher chance of developing WMDs [15,18]. This might be due to the fact that whenever the body gets overweight, mechanical stress on the body will increase and causes WMDs. However, studies done in Italy, and Greek vs. Dutch could not find an association between BMI and self-reported WMDs [5,28].

In this study, nurses who worked more than 10 years showed 3.45 times greater chance of having WMDs than those with less than 10 years of professional experience which is consistent with the report from Ibadan, Nigeria [14].

Conclusion

Self-reported WMDs are incredibly prevalent among nurses working at Gondar town governmental health institutions with low back and knee joint affected most. However, its annual prevalence is lower when compared internationally. Overweight and professional experience more than ten years were the factors which have been significantly associated with the occurrence of WMDs.

There is an enormous need for Nurses official education on ergonomic intervention strategies to raise awareness regarding work related musculoskeletal disorders and to ensure that they remain healthy and safe as much as possible throughout their working life time. It is also mandatory that nurses should be advised to visit physiotherapists when they have work related musculoskeletal disorders. Nurses also should take care of their body through taking protective methods at work place and should visit a physiotherapy department if they have any WMDs as soon as possible.

Limitations of this study

Since this study is an annual prevalence study, there might be a recall bias. It is also a self-report study so that the participants might also under /overestimate their WMDs.

Further Research: A prospective follow up study with appropriate sample size could be essential to assess the magnitude of work related musculoskeletal disorders appropriately and to identify the associated risk factors.

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