

Prevalence of Neck Pain among Self Employed Sewing Machine Workers in Northern Gondar, Amhara Region, Ethiopia

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Abstract

Introduction: Neck pain is one the major problem for working population, however it is usually neglected from clinical and research perspective as sewing machine operators are very often utilized for predicting risk factors for neck pain. Therefore considering the fact that there is alarming rise of incidence of neck pain and very little studies had addressed on this area in Ethiopia.

Objective: To assess the prevalence of neck pain and its associated factors among sewing machine workers in Gondar, Northwest Ethiopia, 2016

Methods: Institutional based cross-sectional study was conducted from May 01 to June 01 2016, in Gondar town among self-employed sewing machine workers by using stratified simple random sampling method to get the total samples of 419 participants by single proportion formula. Structured face to face interview questionnaires were used to collect quantitative data on magnitude of work-related neck pain and associated factors.

Result: From a total of 419 sewing machine workers included in the study 391(93.3%) were males and 28(6.7%) were females. Most of the respondents 135(32.2%) were in the age group of 30-39 years. The self-reported annual prevalence of work related neck pain among sewing machine workers was 45.8%, with higher prevalence among male workers 46.3%. The multivariate analysis showed that those employees who worked >8 hours per day were 2.6 times more likely to develop neck musculoskeletal disorders than those who had worked 8 hours per day [AOR=2.60, 95% CI: 1.19, 5.66].

Conclusion: Generally, there is high prevalence of neck pain among self-employed sewing machine workers in the study area. As the contributing factors exacerbation of the symptoms of neck pain working above the normal hour is strongly associated with the development of neck pain among sewing machine operators.

Keywords: Musculoskeletal disorders; Neck pain; Sewing machine operators

Abbreviations: AOR: Adjusted Odds Ratio; CI: Confidence of Interval; COR: Crude Odds Ratio; WHO: World Health Organization; WMSD: Work Related Musculoskeletal Disorders; WRNP: Work Related Neck Pain

Introduction

The magnitude of musculoskeletal disorders including neck pain in the textile and garment manufacturing industries due to unstandardized workstations is highly reported [1]. The burden of WMSD due to improperly working condition leads millions of working population for disability and injury in both developing and developed countries [2] Neck pain is one of the major WMSD in the working place, which is defined as pain experienced from the base of the skull (occipital) to the upper part of the back and extending laterally to the outer and superior bounds of the shoulder blade [3]. The problem of neck disorders has been found to increase with years of employment as a sewing machine operator. But some women never

experience more than slight or moderate symptoms and never develop clinical neck disorders despite many years of work [4,5]. A study revealed that sewing machine operators in clothing industry highly affected by work related upper limb pain and the pain was attributed to long working hours in a constrained working posture [6,7]. The frequency of reported neck pain in Norway sewing machine operators were indicated high [8]. The reports of WHO in Africa including Ethiopia more than 100 millions of workers employed in small scale industries are susceptible to neck pain discomfort. Additionally this organization reported between 10% and 30% of the workforce in developed and between 50% and 70% in developing countries exposed to WMSDs due to poor to poor working conditions [9,10]. A study conducted on one textile manufacturing factory in Botswana where indicates the prevalence of neck pain is 20% whereas a cross-section study conducted in Ethiopia in 2013 the self-reported neck pain among sewing machine operators of garment industry 45% [11,12]. Socio-demographic factors including age, level of education and year of employment or service year of the workers in garment industries were the factors to contribute in the development of neck pain symptoms [13-15]. Report on WMSDs from Beijing revealed those female sewing machine operators who was exposed to high sustained static load and

were held in more static positions developed neck disorders [16]. Psychosocial factors, a previous history of pain in the sewing machine workers are important predictors of neck pain incident [17]. Among sewing machine operators in Bangkok habit of doing less physical activity, smoking and poor perceptions of personal health of workers were strongly associated with the development of neck disorders [18]. Payment method through piece rate and less recovery time cycle were strongly associated with upper body musculoskeletal disorders among sewing machine operators [19]. The risk of neck pain is about two-fold for those experiencing mental tiredness at the end of the workday in comparison to those who do not experience tiredness. Shortage of personnel increases the risk of neck pain. Dynamic sitting chairs will lead to more variation in posture and comfort [20]. Stress at work is a growing problem for all workers, especially women. Many of the job conditions, along with the problem of balancing work and family issues, contribute to stress in the workplace [21].

Methods and Materials

The study was conducted in north Gondar town which is found in north western part of Ethiopia and is located at the attitude of 12.4 N and longitude of 27.21 E and it is 738 km away from capital city of Ethiopia, Addis Ababa and 178 km from regional town of Amhara, Bahirdar. There are more than 1150 self-employed sewing machine workers in the town. Institutional based cross-sectional study design was conducted from, May 01 to June 1, 2016 to assess the prevalence of neck pain and its associated factors among sewing machine workers in Gondar town. All the sewing machine workers of the Gondar town were considered as source of population from which the required sample size calculated. The sample size was determined by using a single population proportion formula assumptions with the level of confidence interval taken to be 95%, 5% margin of error, and P is the proportion of neck pain among sewing machine workers, since there was a study done on this specific population group in Ethiopia in garment industry the p value were 45%. Based on these assumptions the actual sample size for the study was be computed using the formula for single population proportion

$$n = (Z\alpha/2)^2 P (1-p)/d^2$$

Where, n=sample size, $Z\alpha/2$ =Critical value=1.96, P=proportion of neck pain among sewing machine workers which is currently known in our country=0.45, d=precision (marginal error) =0.05, Then $n = (1.96)^2(0.45*0.55)/ (0.05)^2=381$. Thus by adding 10% for possible non-response rate the total sample size were=419. Stratified simple random sampling technique was used to select samples from the study population, sewing machine workers were grouped by their area of location where they working. The town was divided in to four sub group area, as (Azezo, College, Arada and Piasa). Then we took samples from each of those sub areas by lottery method. Data was collected by interview of the clients using pretested and structured questionnaire. One day training was given to data collectors and supervisor before data collection on the objective, relevance of the study, confidentiality of information, respondent's right, informed consent and techniques of interview. Moreover, practical exercise was done by data collectors during training with the principal investigator. Data was collected by face to face interview using a structured and pre-tested questionnaire first prepared in English and translated in to Amharic language for appropriate and easiness in administering the questionnaire for the study subjects as they were Amharic language speakers. The Amharic version was again translated back to English to check for consistency of meaning. Translation of questionnaire was

done by involvement of language experts in both cases. The questions included in the questionnaire were prepared depending on review of different related literatures and variables identified to be measured. Training was given for data collectors and the issue of confidentiality and privacy was stressed during the training session and they were participated on pre-testing of the questionnaire after training. Data collectors approached the selected respondents by explaining the aims of the study and what sort of information was needed from them. To ensure the quality of data, one day training was offered for supervisors and data collectors on how to approach the study subjects, the content of the questionnaire, and selection of the study subjects.

The data gathered through the structured questionnaire was coded, entered, and analyzed by SPSS version 20.0 after it was checked and cleaned for its completeness and errors in coding and entering. All the data obtained from the study population was entered, cleaned and analyzed by the principal investigator. To explain the study population in relation to relevant variables, frequencies, tables, graphs and summery statistics were used. Associations between dependent and independent variables were assessed and its strength was presented using odds ratios and 95% confidence intervals. Both bivariate and multiple logistic regression were employed to assess the association between outcome and explanatory variables.

Ethical consideration

Ethical clearance was obtained from Ethical review board of University of Gondar. The purpose of study was explained clearly to the study participants and after informed verbal consent was obtained. Confidentiality was maintained at all levels of the study by avoiding use of name and other identifiers. All respondents were interviewed separately and appropriate measures were taken to assure confidentiality of information both during and after data collection.

Result

Socio demographic characteristics

A total of 419 sewing machine workers were included in this study with 100% response rate. Of the 419 in the study, 391(93.3%) were males. Most of the respondent 135(32.2%) were in the age group of 30-39 years. overall, 201(48%) were orthodox and 204(48.8%) were Muslim believers. Marital status, 71(16.9%) were single and 293(69.9%) were married, 170(57%) were attended secondary school. Among the respondent, 167(39.9%) were served from 1-5 years and 43(10.3%) were served above 15 years and 278(66.3%) were paid monthly salary more than 900 Ethiopian birr and 28(6.7%) were paid below 700 Ethiopian birr or (below 35.5 US dollar per month) (Table 1).

Variable	Frequency (%)
Sex	
Male	391 (93.3)
Female	28 (6.7)
Age	
<30	96 (22.9)
30-39	135 (32.2)

40-49	109 (26.0)
>49	79 (18.9)
Religion	
Orthodox	201 (48)
Muslim	204 (48.7)
Protestant	11 (2.6)
Others	3 (0.7)
Marital status	
Married	293 (69.9)
Divorce	36 (8.6)
Widow	19 (4.5)
Single	71 (16.9)
Educational level	
Illiterate	5 (1.7)
Primary school	10 (3.4)
Secondary school	170 (57)
Higher education	78 (26.2)
Monthly salary in ETB	
<700	28 (6.7)
700-900	113 (27)
>900	278 (66.3)
Job experience	
1-5 years	167 (39.9)
6-10 years	167 (39.9)
11-15 years	42 (10)
>15 years	43 (10.3)

Table 1: Socio demographic characteristics of sewing machine workers in north Gondar town Amhara Regional state, June 2016, (n=419).

Personal characteristics of sewing machine workers

Among 419 respondents only 148(26.5%) were doing physical exercise, of these 57(13.6%) were practicing twice per week and 44(10.5%) were exercising more than twice per week. From the total of the participant 55(13.1%) were have smoking habit, 87(20.8%) have chat chewing habit and 55(13.1%) respondents, had drinking habit (Figures 1 and 2).

Environmental factors: Among the respondent 113(27%) had work load, 340(81.1%) workers were satisfied in their work and the entire respondent chair was not adjustable. Organizational factors: From the total respondent 356(85%) were permanently work in sewing machine from which 251(51.3%) were work more than eight hours per day and all respondents' had no get safety training about ergonomics (Tables 2 and 3).

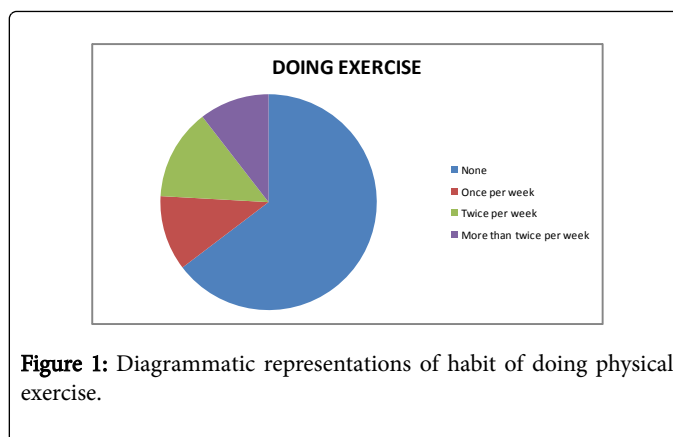


Figure 1: Diagrammatic representations of habit of doing physical exercise.

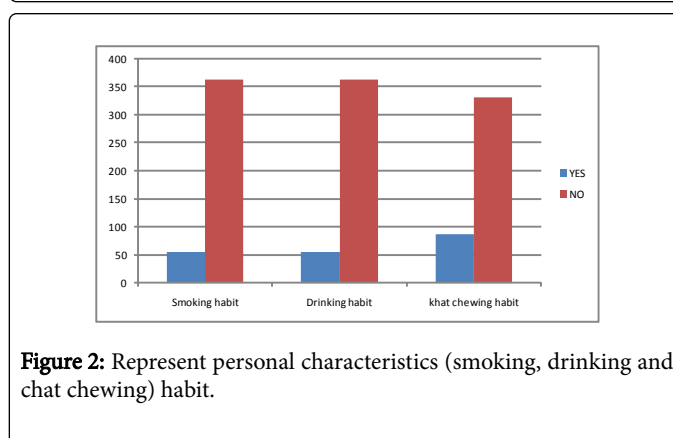


Figure 2: Represent personal characteristics (smoking, drinking and chat chewing habit).

Variables	Frequency (%)
Work load	
Yes	113 (27)
No	306 (73)
Job satisfaction	
Yes	340 (81.1)
No	79 (18.9)
Having adjustable chair	
Yes	0 (0)
No	419 (100)

Table 2: Environmental factors on sewing machine workers in north Gondar town Amhara Regional state, June 2016 (n=419).

Variables	Frequency (%)
Employment status	
Temporary	63 (15)
Permanent	356 (85)
Payment method	
Hourly	64 (15.3)

Piece rate	355 (84.7)
Working hour per day	
8 hours	53 (12.6)
<8 hours	151 (36.1)
>8 hours	215 (51.3)
Safety training	
Yes	0 (0)
No	419 (100)

Table 3: Organizational factors on sewing machine workers in north Gondar town Amhara Regional state, June 2016 (n=419).

The prevalence of neck pain

The prevalence of WRNP among sewing machine workers who had experienced trouble (ache, pain and discomfort) in their life time and in the last 12-month period were 45.8%. 192(45.8%) of respondents developed neck MSD, of which 81(42.2%) sewing machine workers had affected by neck pain after 2-4 years of work and 87(45.3%) were after more than four years of work. From workers have WRNP 40(20.8%) been absence from doing work and 30(15.6%) were changed their work do to neck pain (Table 4).

Variables	Frequency (%)
Having neck pain in their life time	
Yes	192 (45.8)
No	227 (54.2)
Having neck pain in the past 12 month	
Yes	192 (45.8)
No	227 (54.2)
Starting time of neck pain	
In the first years of work	24 (12.5)
After 2-4 years of work	81 (42.2)
After more than 4 years of work	87 (45.3)
Natures of onset	
Gradual	172 (89.6)
Suddenly	12 (6.3)
Accident	8 (4.1)
Absence from work	
Yes	40 (20.8)
No	152 (79.2)
Change work	
Yes	30 (15.6)

No	162 (84.4)
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Table 4: The prevalence of neck pain among sewing machine workers in north Gondar town, Amhara regional state June 2016 (n=419).

Factors associated with neck pain

In multivariate binary logistic regression analysis, variables like job experience, doing physical exercise, smoking, working hours and chat chewing were had significantly associated with neck disorder. Workers those who had work >8 hours per day were 2.6 times more likely develop neck disorder than others (Table 5).

Category	No n(%)	Yes n(%)	COR (95%CI)	AOR(95%CI)
Age				
<30 years	24(25.0)	72(75.0)	1	-
30-39 years	54(40.0)	81(60.0)	0.5 (0.28,0.89)	-
40-49 years	66(60.6)	43(39.4)	0.22(0.12,0.39)	-
>49 years	48(60.8)	31(60.2)	0.21(0.11,0.41)	-
Monthly salary				
<700 ETB	12(42.9)	16(57.1)	0.97(0.44,2.12)	-
700-900 ETB	63(55.8)	50(44.2)	0.57(0.37,0.89)	-
>900 ETB	117(42.1)	161(57.9)	1	-
Job experience				
1-5 years	55(32.9)	112(67.1)	1	1
6-10 years	77(46.1)	90(53.9)	0.57(0.38,0.89)	1.09(0.60,2.00)
11-15 years	26(61.9)	16(38.1)	0.30(0.15,0.61)	0.60(0.24,1.49)
>15 years	34(79.1)	9(20.9)	2.44(1.37,4.32)	0.23(0.07,0.67)
Doing physical exercise				
None	155(57.2)	116(42.8)	0.14(0.06,0.33)	0.31(0.11,0.81)
Once per week	13(27.7)	34(72.3)	0.49(0.17,1.38)	1.07(0.33,3.47)
Twice per week	17(29.8)	40(70.2)	0.44(0.16,1.19)	0.70(0.23,2.10)
More than twice	7(15.9)	37(84.1)	1	-
Smoking				
Yes	47(77.0)	14(23.0)	4.93(2.62,9.28)	-
No	145(40.5)	213(59.5)	1	-
Drinking habit				
Yes	41(74.5)	14(25.5)	0.24(0.12,0.46)	0.47(0.22,0.98)
No	151(41.5)	213(58.5)	1	1
Chewing habit				
Yes	63(72.4)	24(27.6)	0.24(0.14,0.41)	0.42(0.22,0.79)
No	129(38.9)	203(61.1)	1	1

Employment				
Temporary	15(23.8)	48(76.2)	1	-
Permanent	177(49.7)	179(50.3)	3.16(1.71,5.86)	-
Payment method				
Hourly	17(26.6)	47(73.4)	0.37(0.21,0.67)	-
Piece rate	175(49.3)	180(50.7)	1	-
Working hour				
8 hours	41(39.6)	110(60.4)	1	1
<8 hours	21(27.2)	32(72.8)	5.39(0.91,3.39)	0.88(0.425,1.82)
>8 hours	130(60.5)	85(39.5)	0.43(0.23,0.79)	2.60(1.19,5.66)

Table 5: Bivariate and multivariate logistic analysis of variables associated with work-related Neck MSD among sewing machine workers in north Gondar town, Amhara, Regional state, June, 2016 (n=419).

Discussion

Work related musculoskeletal disorders were common problems among sewing machine workers as indicated in different study areas. In the present study the prevalence of self-reported neck pain was 45.8%. This is higher than the similar study design conducted among the sewing machine workers in Colombia and Los Angeles. This discrepancy might be due to the socio economic and the technology used makes the difference. From those employees who had neck pain in past 12 months 40(20.8) of them were absent from their daily activities and 30(15.6) of the employees were changed their current job. This indicates the majority of working environment and working conditions in developing countries including Ethiopia were influences the workers to terminate their daily activities due to its hazardous. Thus in Ethiopia the majority of self-employed workers engaged in informal working activities were the occupational health and safety services poor. So such activities, it needs the government focus to improve the general working environment and working conditions of sewing machine operators. Additionally those workers who are working greater than 8 hours per day were 2.6 times more likely develop neck pain than those who work for 8 hours per day [AOR=2.60, 95% CI: 1.19, 5.66]. This is also it contradicts the standards set by Ethiopian Labor Proclamation which indicates any working hours not greater than 8 hours per day or 48 hours per week. Therefore the owner of the company should focus the standard sated by the ruling body to protect workers from the exposure of musculoskeletal disorders.

Limitations

Recall bias is considered as limitation

Conclusion

Generally, there is high prevalence of neck pain among self-employed sewing machine workers in the study area. As the contributing factors exacerbation of the symptoms of neck pain working above the normal hour is strongly associated with the development of neck pain among sewing machine operators. Therefore

the responsible body should give attention to improve the working conditions of these working populations.

Competing Interests

The authors declare that they have no competing interests

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