7. Work Related Musculoskeletal Disorders among Office Workers in East Gojam Zone, Ethiopia: Cross Sectional Study

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Abstract

The purpose of this study was to examine the status of work-related musculoskeletal disorders (WMSDs) among office workers in East Gojam Zone in some selected Woredas. Quantitative, cross-sectional, descriptive design was carried out to assess work related Musculoskeletal Disorder. Among 17 Woredas and 4 cities in East Gojam Administrative zone, 8 woredas and 2 cities were selected by using systematic random technique. Source populations of the study were the registered office secretarial workers and administrators/managers with any age and sex and currently on practice in the sample woredas. By using a systematic random sampling method, 286 office workers were selected from the population and this sample size was determined by using a single population proportion. Four self administered questionnaires were used to collect data: demographic characteristics of the participant, the short version of the International Physical Activity Questionnaire (IPAQ), work style questionnaire and the Nordic Musculoskeletal Disorder Questionnaire. The data analyses were conducted with the Statistical Package for Social Sciences (SPSS Version 24). As for the results, out of 286 subjects

participated, 238 fully completed and returned, yielding a response rate of 83.2%. Of the 238 office workers, 52.6% (n=120) were females and 47.4% (n=108) males. More than half of the office workers (54.4%, n=124) generally demonstrated a low physical activity level and the remaining 45.6 % (n= 104) office workers were categorized as a high physical activity level. WMSDs and physical activity level of office workers have shown a significant negative correlation (Neck r=-.38, shoulder, r = -.16, upper limp r= -24, back r= -27). From the participants (53.4%), (72.4%), (47%), (71.5%) were experiencing severe level of musculoskeletal symptoms in neck, shoulder, upper limb and back region respectively. Hence, there was a high prevalence symptom of musculoskeletal disorders in almost all participants on their four anatomical body regions (neck, upper limp, back and shoulder). The neck and back are the most and frequent affected body parts among the participants. The main complaint in this study was pain and muscular weakness due to sitting for a long period of time, work style and physical inactivity. Therefore, promoting physical activity among office workers to improve their physical fitness and improving their workplace condition can reduce work related musculoskeletal disorders of office workers.

Keywords: *musculoskeletal symptoms, office workers and musculoskeletal disorders*

1. Introduction

Nowadays, due to technological advancement, everything is done by the help of computers. This forces us to spend long period of time sitting on chairs **(**Pransky, Benjamin, Hill-Fotouhi et al., 2000 and Shariat A, et.al.,2016**).** MSDs are impairments of the bodily structures, such as muscles, joints, tendons, ligaments and nerves, which are caused or aggravated primarily by the performance of work and by the effects of the immediate environment in which work is carried out (Hales and Bernard1996). Although these disorders occur in various parts of the body such as neck, arm, wrist, and waist, low back pain is more prevalent. Work-related musculoskeletal disorders (WRMSDs) are a worldwide public health problem and often can lead to temporary or permanent disability and reduced quality of life **[**Ashiyat Akodu, Adegoke Akinfeleye, et al., 2015 and Shikdar, Al-Kindi., 2007**).** At workplace, the causes of musculoskeletal disorders are diverse but poorly understood (Mohanty., et al., 2017). Musculoskeletal pain often has long-term adverse physical and psychological consequences for the individual (Vargas Porras

et.al, 2013)**.** Many jobs share the characteristic of demanding sitting for long hours in front of a computer and other works (Okunribido & Wynn, 2010)**.**

The causes of work-related musculoskeletal symptoms are categorized as physical and psychosocial. The physical WRMSDs symptoms include intense, repeated, or sustained exertions; awkward, non-neutral, and extreme postures; rapid work place; repeated and/or prolonged activity; insufficient time for recovery, vibration, and cold temperatures **(**Teichtahl AJ et.al, 2015). Work related musculoskeletal disorders (WMSDs) developed gradually as a result of repeated trauma. Excessive stretching of muscles and tendons can cause injuries that only last a short time. But repeated episodes of stretching, causing tissue inflammation, can lead to long-lasting injury or WMSDs. **[**Hagberg, et.al, 1995) have classified them according to whether a disorder is related to tendon, nerve, muscle, circulation, joint or bursa. The International Commission on Occupational Health (ICOH) recognized work-related musculoskeletal disorders which describe a wide range of inflammatory and degenerative diseases and disorders that result in pain and functional impairment (Kilbom, A.E., 1994). According to the World Health Organization, work related musculoskeletal disorders arise when exposed to work activities and work conditions that significantly contribute to their development or exacerbation but not acting as the sole determinant of causation (**WHO**,1985).

Work related musculoskeletal disorders (WMSD) are a group of painful disorders of muscles, tendons and nerves. Work activities which are frequent and repetitive, or activities with awkward postures cause these disorders which may be painful during work or at rest. Repetitive activities done using arms and hands affect the hands, wrists, elbows, neck and shoulders. Work done using the legs can lead to work related musculoskeletal disorders of the legs, hips, ankles and feet **(**WHO, 2001). Some back problems also result from repetitive activities. With higher stress level comes muscle tension causing fatigue and again increased risk of work related musculoskeletal disorders **(**WHO, 2001)**.** Work related Musculoskeletal disorders (WMSDs) are a wide range of inflammatory & degenerative disease that results in pain and functional impairment of tissues.

Work related musculoskeletal disorders include three types of injuries: muscle injury, tendon injury and nerve injury. When muscles contract, they use chemical energy from sugars and

produce by-products such as lactic acid which are removed by the blood. A muscle contraction that lasts a long time reduces the blood flow. Consequently, the substances produced by the muscles are not removed fast enough, and they accumulate. The accumulation of these substances irritates muscles and causes pain. The severity of the pain depends on the duration of the muscle contractions and the amount of time between activities for the muscles to get rid of those irritating substances (Sjogaard, 1990).

Work related musculoskeletal disorders may progress in stages from mild to severe. In early stage, aching and tiredness of the affected limb occur during the work shift but disappear at night and during days off work. No reduction of work performance is observed. During intermediate stage aching and tiredness occur early in the work shift and persist at night, with a reduced capacity for repetitive work. In the late stage, aching, fatigue, and weakness persist at rest. Inability to sleep and to perform light duties is experienced by the subject. The first pain is a signal that the muscles and tendons should rest and recover, otherwise, an injury can become long-standing, and sometimes, irreversible **(**Centre for Occupational Health and Safety, 2005)**.** Work-related musculoskeletal disorders (WMSDs) related with repetitive and demanding working conditions continue to represent one of the biggest problems in office workers in the world. According to the World Health Organization, **(**WHO, 2001) work-related musculoskeletal disorders arise 60% (out of which 51% of WMSDs are office workers who work sitting) when exposed to work activities and work conditions that significantly contribute to their development or exacerbation.

Musculoskeletal disorders are one of the serious occupational health hazards that affect the health of office workers. Government and educational institutes involved in occupational health and working in the area of office workers‟ health should focus on exploring the reasons for musculoskeletal disorders and develop different intervention strategies to prevent work related musculoskeletal disorders. Office workers need to be efficient and productive at work place. Hence health in the work place is one of the major areas of research in the discipline of office workers. Specifically in the current research area there is insufficient research work in the area of work-related musculoskeletal disorders among office workers involved in repetitive tasks in different sectors. Cognizant of the importance of industry in the country‟s economic progress

and health of office workers, the key role players in the office and society, there is a need to explore the prevalence of work related musculoskeletal disorders among office workers. Hence, the aim of the present investigation was to examine the status of musculoskeletal disorders among office workers in east Gojam zone.

1.2 Objectives of the study

1.2.1 General Objective

To examine the status of the work-related musculoskeletal disorders among office workers in East Gojam Zone.

1.2.2 Specific Objective

- To determine the status of musculoskeletal disorders among office workers in different body regions (neck, shoulder, upper limb and back)
- To investigate the effect of Work style factor on work-related musculoskeletal disorders among office workers
- To assess the perception of participants in the study towards physical activity in prevention or control mechanism of WMSD.
- To examine the relationship between WMSD and physical activity level

2. Methods and Materials

2.1 Research Design

This study used a quantitative, cross-sectional, descriptive design. A quantitative design is appropriate for research studies that intend to determine the relationship between two or more variables. It also indicates that a descriptive design describes what exists, as well as determines the importance or significance and the frequency with which something occurs (Walker, 2005). The major purpose of descriptive research is to describe the state of affairs as it exists at present. In respect to the current study, the aim was to investigate the status of the work-related musculoskeletal disorders among office workers in East Gojam Zone.

2.2 Subject of the Study and Sample Size

The sample was chosen through simple random sampling technique. In the simple random sampling technique all the individuals in the defined population have an equal and independent

chance of being selected for the sample (Gay, Mills, Gand Airasian, 2006). A sample drawn at random is unbiased in the sense that no member of the population has any more chance of being selected than any other member and it is the best single way to obtain a representative sample (Kerlinger F, 1978).

There are 17 Woredas and 4 cities in East Gojam Administrative zone. Out of these, 10 (8 woredas and 2 cities) were selected randomly as a sample.

Source of the population were the registered office secretarial workers and administrators/managers with any age and sex and currently on practice in the sample woreda. The total population of the study consisted of 500 office workers from the ten selected woredas. From the total study population 57.2 percent i.e. 286 office workers were chosen at random to form the sample for the present investigation.

The sample size was determined by using the formula for estimating a single population proportion because all sample woredas have almost similar work environment and facilities. The sample size was calculated by taking the proportion of work-related musculoskeletal disorders which is 50% on office workers with 95% confidence level, 5 % margin of error to get an optimum sample size that allowed the study to look into various aspects of work related musculoskeletal disorders among office workers. Based on the above assumptions, the formula is as follows (Krejcie & Morgan, 1970).

$$s = X^2NP(1-P) \div d^2(N-1) + X^2P(1-P)$$

s = required sample size

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level

(3.841)= 1.96 x1.96 =3.8416

N = the population size

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

Based on this formula the sample size would be 217, assume 90% would be return rate, and then add 10%, the total sample would be 238.

- **Dependent variable**

A dependent variable is the variable hypothesized to depend on or be caused by another variable (Gay *et al.,* 2006). Work related musculoskeletal disorders are the dependent variable of the present study.

- **Independent variables**

The independent variable is the intended cause of the dependent variable (Gay *et al.,* 2006). The dependent variables selected for the investigation were classified as personal variables, work style factor and office works perception towards preventing WMSDs through physical activity. Personal variables of the study included age, length of work experience, body mass index and physical activity level. Work style factor variable can assess the work environment of the subject.

2.3 Data Collection Tools

Four self administered questionnaires were used to collect data. The first questionnaire requested for demographic characteristics of the participant, followed by the short version of the International Physical Activity Questionnaire (IPAQ), work style factor questionnaire, the Nordic Musculoskeletal Disorder Questionnaire and perceived benefits to exercise scale to measure office worker‟s perception towards preventing WMSDs through physical activity. The questionnaires were translated from English to Amharic and back to English by three independent professional translators. To ensure validity of the translated questionnaires in Amharic, a different independent professional translator examined it and the translated version was found to be similar to the original one. To further ensure the validity, clarity and reliability of the instrument, it was used in a pilot study on 15 office workers who were not part of the study before being used for data collection and it was found to be clear and understandable.

Demographic information including subjects' sex, age, years of practice, types of work and the key variables were collected through questionnaire.

2.3.1 International Physical Activity Questionnaire (IPAQ)

Physical activity level of the office workers will assess by using the short version of the International Physical Activity Questionnaire (IPAQ) (Aptel et.al, 2002)**.** Validity and reliability data from 12 countries (including Portugal) show IPAQ has comparable validity and reliability to CSA (Computer Sciences and Applications) monitor that assess physical activity and to other self- reported measures of PA **(**Haskell, 2007**.** According to the Guidelines for data Processing and Analysis of the IPAQ, total PA was expressed as metabolic equivalent (MET) minutes/week by weighting the reported minutes per week in each activity category by the metabolic equivalent specific to each activity (Total PA = 3.3 MET x walking minutes‟ x walking days + 4.0 MET x moderate-intensity activity minutes‟ x moderate days + 8.0 MET x vigorous-intensity activity minutes‟ x vigorous- intensity days). Physical activity was expressed as minutes per week by summing the time spent in moderate physical activity and vigorous physical activity (MVPA). Low physical activity, no physical activity or some activity reported, but not enough to satisfy the requirements of the other two categories; Moderate PA, any of the following three criteria: (1) 3 or more days of vigorous intensity activity for at least 20 min/day, (2) 5 or more days of moderate intensity activity or waking for at least 30 min/day, or (3) 5 or more days of any combination of walking, moderate intensity, or vigorous intensity activities achieving a minimum of 600 ME minutes per week; High PA either of the following two criteria: (1) 3 or more days of vigorous intensity activity accumulating at least 1500 MET minutes per week or (2) 7 days of any combination of walking or moderate or vigorous intensity activities achieving a minimum of 3000 MET minutes per week.

2.3.2 Scale to Assess the Work Related Musculoskeletal Disorders

Data collection tools assess the work related musculoskeletal disorders: Musculoskeletal pain and related symptoms will assess by the standardized Nordic Questionnaires for the Analysis of Musculoskeletal Symptoms. The musculoskeletal symptoms include pain, stiffness, swelling, spasms, cramps, numbness, tingling sensation, tiredness, soreness and weakness **(**Browne, 1984**).** Due to prolonged exposure to musculoskeletal disorders, a subject may experience the loss of physical functioning in the nine anatomical body regions Craig, 2003). With this theoretical background a scale was constructed to measure musculoskeletal disorders

such as prevalence of the musculoskeletal symptoms. A scale is used to measure the extent of prevalence of musculoskeletal symptoms of the respondents in neck, shoulder, upper limb, and back.

Scoring and Interpretation: The first section of the scale was intended to measure the extent of musculoskeletal symptoms experienced by the subjects in four anatomical body regions. The respondents were asked to indicate the level of discomfort experienced in terms of *always*, *frequently, sometimes, rarely* and *never* depending on the degree of symptom. To obtain uniformity in the responses of the subjects, the guidelines were set for the level of discomfort. The respondents were asked to mark „always" in case they experience the musculoskeletal symptoms throughout the week in the respective body part. If the frequency of experiencing the symptoms was 5-7 days in a week they were asked to mark „always", 3-4 days in a week they were asked to mark „frequently". When the frequency of experiencing the pain was 1-2 days in a week, few hours in a week and never in a week, the respondents were asked to indicate sometimes, rarely and never respectively. The response categories „always", „frequently", „Sometimes", „rarely" and „never" were given scores 5,4,3,2,1 respectively. The scores were interpreted such that the higher the score higher the extent of musculoskeletal symptoms experienced in respective anatomical body regions. The possible maximum score range for neck, shoulder, upper limb and back were 9-45, 9-45, 12-60 and 9-45 respectively.

2.3.3 Work Style Short Form Scoring Procedures

The scale used to evaluate the risk factor of the work environment leads to musculoskeletal disorder. The scoring system for this scale is (question 1-24): Almost never = 1, Rarely = 2, Sometimes =3, Frequently =4, Almost always = 5, question 25- 32 the form of the dichotomous (check box) items section that means blank = 0 and checked =1. There are three summary scores that can be calculated as indicated below. These have different scoring routines. Summary score 1 -Work style characteristic responses to the workplace score (Part 1): This summary score is Work style characteristic responses to the workplace (Part 1): Part 1: (Sum of 1–22) minus (sum of 23–24) Part 2: Work style reactivity to high work demands = (Sum of 25–32). Total score (Part 1 + Part).

2). According to the initial validation sample, a total Work Style Short Form score is

considered high risk if the score is >=28.

2.3.4 Perceived Benefits to Exercise scale

This scale was used to measure office worker‟s perception towards preventing WMSDs through physical activity. The scale includes 5 questions in the form of strongly disagree, disagree, agree and strongly agree (1-4 point scale respectively).

2.4 Validity and Reliability of the Instruments

The instruments used in this study had been found to be valid. The IPAQ demonstrated criterion validity correlation with values ranging from 0.14 - 0.53. Additionally, an extensive reliability and validity of the questionnaire was done in 14 centers across 12 countries, South Africa inclusive, during the year 2000 (Craig, 2003).The IPAQ instrument also demonstrated reliability correlations ranging from 0.96-0.46. Besides, the IPAQ has been tested across different settings both in developed and developing countries, whereby it was satisfactorily proved reliable and valid (Craig, 2003).The Nordic Musculoskeletal Disorder Questionnaire has demonstrated reliability results with Kappa values ranging from 0.88 to 1, and it is said to be internationally validated and respected, having been used in the assessment of musculoskeletal symptoms worldwide (Barros, & Alexandre, 2003). Furthermore, the questionnaires were piloted on 15 office workers from Debremarkos University before the final version was adopted for use in the study. This was done to assess the content validity and applicability of all the items for the office works population, its level of understandability and the time it takes to be completed. Later, a group discussion with the participants of the pilot study was done following the completion of the questionnaire to test content validity of the instrument and to see whether it was necessary to correct any of the questions. After the pilot study, the questionnaires were made minor amendment and correction for final to distribute.

The reliability of the Work Style Short Form was examined in terms of its internal consistency and stability over time in previous studies. The measure demonstrated a high degree of internal consistency with a reliability coefficient of a 0.89. Test–retest reliability was assessed by examining the correlation of the baseline short form total work style score with the short form total work style score from the surveys completed 3 weeks after the baseline assessment. This analysis indicated stable test–retest reliability with a correlation coefficient of r 0.88 (IPQ,

2005).

2.4 Data collection procedure

Firstly, we asked permission and got information from East Gojam Zone Administrative office to conduct the study at some selected woredas of office workers. Thereafter, ten research assistants from the ten sample woredas were met and enlightened on how the whole data collection process was going to be conducted. Specific time was then arranged with the research assistants as well as the participating office workers to complete the questionnaire at work as this would maximize participation rate and minimize errors when completing the questionnaires. The study was then explained to the participants before distributing the questionnaires. Besides, detailed instructions on how to complete the questionnaire were given and research assistants were asked to work individually, honestly and as quickly as possible. All questionnaires were completed in the presence of the researcher and/or research assistants to control the quality of data and increase the return rate of the completed questionnaire.

2.5 Data Analyses Method

The data would be recoded from question responses into meaningful prevalence variables. Double data entering was done to ensure data quality. Thereafter data was transferred into the Statistical Package for the Social Sciences (SPSS) version 24. Descriptive statistics was employed to summarize the demographic data of the study sample and main variables. The demographic and main data were presented using frequency tables and expressed as percentages, means and standard deviations. Correlation test was used to determine if any associations existed between work related disorders at four anatomical body regions with physical activity level and body mass index of participants. All tests were done at the level of significance $P \leq 0.05$.

3. Result

3.1 Characteristics of the study population

A total of 286 questionnaires were distributed among office workers of Debremarkos University and east Gojam zone, and 238 were fully completed and returned, yielding a response rate of

83.2%. Of the 238 office workers, 52.6% (n=120) were females and 47.4% (n=108) males. The participants‟ ages categorized in to three different age groups. Hence, 51.4 percent (n=114) of the respondents were categorized as young age (<35 years), 30.2 % (n=67) of the respondents were categorized as middle age (36-45 years) and 18.5 % (n=41) of the respondents were categorized as old age (> 45 years).

More than half (50.5 %, n=110) of the respondents‟ work experience was between 3 to 6 years, 24.3 % (n=53) of the respondents have the work experience between 7 to 11 years and only 25.2% (n=55) of the respondents have more than 12 years work experience. Regarding the average sitting time of office workers per day: 1.8 % (n=4) of the respondents were sitting in office for work only 2 to 4 hours per day, about 36.4 % (n=80) of the office worker would sit in office between 5 to 8 hours and 61.4 %(n=135) of the respondents for more than 8 hours a day.

The educational status of the respondents shows that 58.8 %(n=130) of the respondents have diploma, 36.2 %(n=80) have first year and only 5 % (n=11) of the respondents have second degree. Among the office workers 49.1% (n=111) were secretary and 46.5 % (n=105) of the respondents were manager and only 4.4 % (n=10) were professional. Most of the office workers (67.1%, n= 151) were married and 32.4 % (n= 73) were unmarried.

3.2 Physical activity levels of the participants

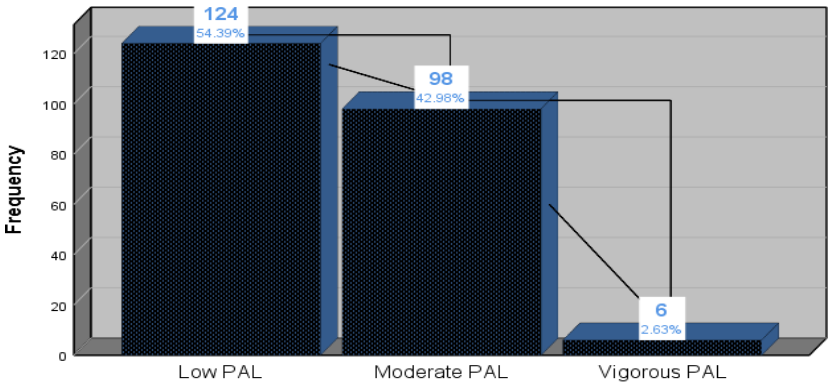

Figure 3.1 : PAL of Participants

Office workers who scored less than 599 MET-minutes/weeks were considered inactive while those who scored 600 and above MET-minutes/week, were considered active. As demonstrated in Figure 3.1 below, more than half of the office workers (54.4%, n=124) generally demonstrated a low physical activity level the remaining 45.6 % (n= 104) of office workers were categorized as a high physical activity level.

3.3 The Severity of Musculoskeletal Disorder

More than half of the sample (53.4%) was experiencing severe level of musculoskeletal disorder symptoms in neck. Only 3.1 percent were experiencing normal and (6.6 %) low musculoskeletal symptoms in neck. Most of office workers (72.4%) were experiencing severe level of musculoskeletal symptoms in shoulder. Only 1.8 percent was experiencing normal musculoskeletal symptoms in shoulder and 2.5 %of the respondents were experiencing normal musculoskeletal symptoms. 47 percent of the office workers were experiencing severe level and 32.5 % of office workers were experiencing musculoskeletal symptoms in upper limb. The remaining 20.2 per cent were experiencing low musculoskeletal symptoms in upper limb (Table 2). Most of the office workers (71.5%) experienced sever level of musculoskeletal symptoms in back and 13.2 % of office workers were experiencing moderate level of musculoskeletal symptoms in back. Only 15.4 per cent were experiencing low musculoskeletal symptoms in back region.

Table 1: Severity of musculoskeletal disorder in neck, shoulder, upper limb and back (N=228)

Frequency of Experiencing symptoms	Neck Symptom	Number	%	Shoulder	Number	%	Upper limb Symptoms	Number	%	Back Symptoms	Number	percent
Normal	9	7	3.1	9	4	1.8	12	-	-	9	-	-
Low	10 to 16	15	6.6	10 to 14	6	2.5	13 to 24	46	20.2	10-17	35	15.4
Moderate	17 to 38	79	33.2	15 to 37	53	23.2	25 to 51	74	32.5	18-38	30	13.2
Severe	39 to 45	127	53.4	38 to 45	165	72.4	52 to 60	108	47.4	39-45	163	71.5
	Total	270	100	Total	270	100	Total	270	100	Total	270	100
	Mean	27.1		Mean	25.7		Mean	37.0		Mean	27.7	
	S.D.	10.9		S.D.	11.5		S.D.	13.5		S.D.	10.5	

Table 2: Work-style factor score of office workers

Variable(Norm)	Number	Percent
Low Risk (<28)	46	20.2
High Risk (>=28)	182	79.8

Most of the office workers (79.8, n=182) revealed that their work style has a high risk factor for musculoskeletal disorder and the remaining 20.2 percent reported that their work style has a low risk factor for musculoskeletal disorder.

3.4 Musculoskeletal Disorder Symptoms in Neck

Among the respondents 92.5% were experiencing the feeling of stiffness, 87.3 percent of respondents reported that there was appearance of swelling around neck, 90.8 % respondents reported that occurrence of spasms around neck, occurrence of cramps (87.7) feeling of numbness (93%), tingling sensations (88.6%), feeling of pain radiating to head causing head ache (89.5%), feeling of pain radiating from neck to shoulder (84.1%) and feeling of pain that pain around neck (See Table 4).

Table 3: Distribution of sample by the presence of musculoskeletal symptoms in neck (N=238)

Musculoskeletal symptoms in Neck	Frequency			
	Yes	**Percent**	No	**Percent**
Feeling of stiffness	211	**92.5**	17	**7.5**
Appearance of swelling	199	**87.3**	20	**12.7**
Occurrence of spasms	207	**90.8**	21	**9.2**
Occurrence of Cramps	200	**87.7**	28	**12.3**
Feeling of numbness	212	**93**	16	**7**
Tingling sensations	202	**88.6**	26	**11.4**
Feeling of pain radiating to head	204	**89.5**	24	**10.5**
Feeling of pain radiating from neck to	192	**84.1**	36	**15.8**
Feeling of pain	203	**90.2**	22	**9.8**

3.5 Musculoskeletal Disorder symptoms in shoulder

Among the respondents, 73 per cent were experiencing the feeling of pain in shoulder followed by 61 per cent feeling pain radiating to upper limb, 56 per cent feeling soreness, 55 per cent feeling stiffness and 54 per cent with appearance of swelling (Table 5).

Table 4: Distribution of the sample by the presence of musculoskeletal disorder symptoms in shoulder (N=227)

Musculoskeletal symptoms in Shoulder	Frequency			
	Yes	**Percent**	No	**Percent**
Feeling of pain	205	**90.3**	22	**9.7**
Appearance of swelling	197	**86.8**	30	**13.2**
Occurrence of spasms	205	**90.3**	22	**9.7**
Occurrence of Cramps	211	**92.9**	16	**7.1**
Feeling of numbness	207	**91.2**	20	**8.8**
Tingling sensations	210	**92.5**	17	**7.5**
Feeling of pain radiating to head causing	211	**92.9**	16	**7.1**
Feeling of pain radiating from neck to	216	**95.1**	11	**4.9**

According to table 4, 205 (90.3%) of the respondents have a feeling of pain and spasm in their shoulder and 197 (86.8%) of the office workers face swelling in their shoulder, 211(92.9%) of the workers get cramps, 207(91.2%) of the workers experience numbness, 210(92.5%) of the respondents have tingling sensations, 211(92.9%) and 216(95.1%) of the office workers face feeling of pain radiating to head causing head ache and feeling of pain radiating from neck to shoulder respectively.

3.6 Musculoskeletal disorder Symptoms in Upper Limp

The responses regarding the level of musculoskeletal symptoms in the upper limb of participants (see table 4.6) reveal that 210(92.1%) of respondent said that their Feeling of pain is high and 215(94.3%) faced Feeling of stiffness while 208(91.2%) of the respondents said that Appearance of swelling is high and 212(93%) of the respondent answered their Occurrence of spasms in upper limb, 208(91.2%) Occurrence of Cramps, 213 (93.4%) Feeling of numbness, 205(**90%)** Tingling sensations, 206(90.3%) had Feeling soreness, 204(89.5%) Feeling of heaviness 205(90%) Feeling of burning in Palms 217(95.2%) had Tingling sensations in fingers.

Table 5: Distribution of sample by the presence of musculoskeletal symptoms in upper limb (N=228)

Musculoskeletal symptoms in upper limb	Frequency			
	Yes	**Percent**	No	**Percent**
Feeling of pain	210	**92.1**	18	**7.9**
Feeling of stiffness	215	**94.3**	13	**5.7**
Appearance of swelling	208	**91.2**	20	**8.8**
Occurrence of spasms	212	**93**	16	**7**
Occurrence of Cramps	208	**91.2**	20	**8.8**
Feeling of numbness	213	**93.4**	15	**6.6**
Tingling sensations	205	**90**	23	**10**
Feeling soreness	206	**90.3**	22	**9.7**
Feeling of heaviness	204	**89.5**	24	**10.5**
Feeling of burning in Palms	205	**90**	23	**10**
Feeling of burning in Palms	213	**93.4**	15	**6.6**
Tingling sensations in fingers	217	**95.2**	11	**4.8**

3.7 Musculoskeletal disorder symptoms in Back

According to table 5, 213 (93.4%) of the respondents received feeling of pain in the back while 216 (94.7%) of the respondents responded that they averagely receive feeling of stiffness in their back. In addition, 209(91.7%) of the respondents responded high occurrence of spasms; 212 (93%) of the respondents said that their levels of Occurrence of Cramps in back is high; 214 (93.9%) of the respondents‟ face feeling of numbness in their back region, 212 (93%) had tingling sensations; while 218 (95.6%) of the workers grieved by feeling of pain radiating to head causing headache and 203 (89%) of the workers faced Feeling of pain radiating from neck to shoulder.

Table 6: Distribution of sample by the presence of musculoskeletal symptoms in back (N=228)

Musculoskeletal symptoms in back	Frequency			
	Yes	**Percen**	No	**Percen**
Feeling of pain	213	**93.4**	15	**6.6**
Feeling of stiffness	216	**94.7**	12	**5.3**
Appearance of swelling	209	**91.7**	19	**8.3**
Occurrence of spasms	214	**93.9**	14	**6.1**
Occurrence of Cramps	212	**93**	16	**7**
Feeling of numbness	214	**93.9**	14	**6.1**
Tingling sensations	212	**93**	16	**7**
Feeling of pain radiating to head causing	218	**95.6**	10	**4.4**
Feeling of pain radiating from neck to	203	**89**	25	**11**

According to table 6, 213 (93.4%) of the respondents that received Feeling of pain in the back, while 216 (94.7%) of the respondent responded that averagely receive Feeling of stiffness in their back. In addition, 209 (91.7%) of the respondent responded high Occurrence of spasms; 212 (93%) of the respondent said that the level of Occurrence of Cramps in back is high; 214 (93.9%) of the respondents‟ face feeling of numbness in their back region, 212(93%) had Tingling sensations; while 218 (95.6%) of the workers grieved by Feeling of pain radiating to head causing head ache and 203(89%) of the workers faced Feeling of pain radiating from neck to shoulder.

Table 7: Correlation of WMDs symptoms with PFL, BMI and sitting time

Anatomical Body regions of WMDs Symptoms			
	PFL	Sitting Time	BMI
Neck	r=-.38	.181	r=.24
P-Value	**.000**	**.007**	**.000**
Shoulder	r=-.16	.046	r=.27

P-Value	**.000**	**.488**	**.000**
Upper Limp	r=-.24	.173	r=.19
P-Value	**.000**	**.000**	**.000**
Back	r=-.27	.67	r=.48
P-Value	**.000**	**.000**	**.000**

Table 8: Office worker's perception towards preventing WMSDs through PA

No.	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1.	Exercise is a medicine for	7.9	2.2	38.2	51.3
2.	RE PA can prevent WMSD	3.1	3.9	33.3	59.6
3.	PA can treat WMSD	0.9	2.6	33.8	62.7
4.	Live longer if I exercise	6.6	5.7	31.6	56.1
5.	PA have a positive effect on	0	7.9	35.1	57

Note: PA, physical activity, WMSDs, work related musculoskeletal isorder

4. Discussion

Based on the results of the study reported, the prevalence of work-related musculoskeletal symptoms of neck, shoulder, upper limb and back of the participants was found to be 53.4%, 72.4%, 47.0% and 71.5% respectively, making neck and back the most frequently and highly affected body region of the participants. This finding was relatively equivalent to that of a study conducted in Lagos Nigeria (Back 71.3%, neck 59.3%, shoulder 48.0% and hand 28.0%) (Kiss, Meester and Braeckman, 2008). On the other hand, we found a lower magnitude of WRMSDs symptoms compared to a study conducted on computer users in Nigeria neck (30%) shoulder (45%), low back (43%), and wrist (30%) (Morken, Magerøy, & Moen, 2007)**.** This result is similar with the result of the study (Sluka et. al, 2013) computer users WRMSDs symptoms which are 47.13%, 46.43%, 38.04% and 59.86% respectively. The result also showed that as the age of office workers increased, they experienced shoulder and back symptoms, the same with (Chau, 2014) the age group between 41 to 50 years reported 60% and 43.43% of the cases of musculoskeletal injuries respectively. Older workers are more susceptible to work-related MSD than younger workers because of

decreased functional capacity (Auvinen**,** 2007 and **M.Vollenbroek**-Hutten**, 2006)** and also aged workers need more time for recovery than their counterpart youngsters **(**H.J.C.G.Coury, 2009)**.**

World Health Organization (WHO) and American College of Sports Medicine (ACSM) have stated that every individual should perform at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity exercise per week in a regular manner for a healthier and better life **(**L.L. Andersen, 2017 and **C**. H. Andersen et.al, 2012)**.** In the present study, the majority (61.4%) of office works require more than 8 hours of sitting time in their office. This rate has been associated with long term sitting on screen-based activity **(**M.K.Zebis et.al, 2011)**.** Our results can merely be related to (54.4%) generally demonstrated a low physical activity level. It is stated that an increase in the sitting time causes many health problems (Baltimore, 2013)**.** In many studies, both sitting time and physical inactivity are associated with musculoskeletal disorder; similar findings support the above idea **(**Talwar et.al, 2009 and Harrington et.al, 2009). Regular physical activity is the best way of preventing, managing and treating of work related musculoskeletal disorders and pains since it can strengthen our muscle, bones, ligaments and tendons (Bhanderi et.al, 2007)**.** Interventions to reduce neck and shoulder pain have to be made either for relaxing the painful muscles (Huang et.al, 2003) or for performing physical exercise to strengthen them **(**Westgaard RH, de Luca CJ., 1999)**.** In general, there are promising effects of strength, endurance and flexibility training on pain in the neck and shoulders **(**European Agency for Safety and Health at Work (OSHA, 2007). Physical exercise also enhances the strength and flexibility of the muscles; lowers the risk of injury to the neck, shoulders, and lower back; and strengthens the vertebral column **(**Berberoğlu, 2013)**.** Findings of this study reveal that the majority of the respondents (79.8%) have work style which is a high-risk factor for musculoskeletal disorders. The work style factors were also associated with loss of productivity. Findings from several experimental studies suggest that prolonged activation of muscle fibers during low-level contractions such as typing may result in fatigue and increase pain sensitivity. Ignoring musculoskeletal symptoms and continuing work in an adverse job environment without breaks may further exacerbate the preexisting musculoskeletal symptoms (Bhanderi et.al, 2007 and, Huisstede et.al, 2006).

5. Conclusion

In general, it can be concluded that there was a high prevalence symptoms of musculoskeletal disorders in almost all participants on their four anatomical regions (neck, upper limp, back and shoulder). Most of office workers were experiencing severe level of musculoskeletal symptoms in neck, shoulder and back. In the current study one of the major factors that aggravate their musculoskeletal disorders is work-style factor. The work style of the office workers in the current study is considered as a high-risk factor for musculoskeletal disorder. Office worker‟s perception towards preventing work related musculoskeletal disorders through PA is positive. Most of the respondents believe that physical activity can prevent and manage musculoskeletal disorder through physical activity but their physical activity level was low. The neck and back are the most and frequent affected body parts of the participants. The main complaint in this study was pain and muscular weakness due to sitting for a long period of time, work style and physical inactivity. Therefore, promoting physical activity among office workers to improve their physical fitness and improving their workplace condition can reduce work related musculoskeletal disorders of office workers.

6. Recommendations

1. East Gojam Administrative Zone may use findings of this study to evaluate the risk of work related musculoskeletal disorder among their office workers as well as to design interventions aimed at reducing its prevalence, such as:

- Providing training to increase/improve the awareness of office works about the problem of work related musculoskeletal disorders
- Creating a safe working environment and conditions by providing psycho-socio-support to the office workers.
- Finally, considering the various positive health benefits of regular physical activity, the administrators should endeavor to promote regular physical activities among office workers and all other employees in order to maintain a healthy and competitive staff.

2. The ministry of health in Ethiopia should make an effort to take action into preventing work related musculoskeletal disorders in the office workers at large by implementing preventive measures using a multi-dimensional approach since work related musculoskeletal disorder risk

factors are different. Findings of this study may not be generalized to the whole population; however, they are not limited only to the office workers. The ministry of health may therefore use findings from this study to develop preventive measures of work related musculoskeletal disorders, especially low back pain among all office workers in Ethiopia.

3. Office workers should be responsible for their own health by taking into account preventive measures and coping strategies against work-related disorders such as low back pain which was found so prevalent among them. Based on the literature about physical fitness, the researchers highly recommend office workers to maintain a healthy life style in terms of regular physical activity which also contributes to their mental wellbeing.
4. Finally, further research should be done to identify ways of improving healthy, safe and conducive working conditions for office workers in general.

7. Strength and weaknesses of the study

7.1 Strengths of the study

The strength of the study is that there was a high response rate of 83.2%. This shows that the office workers were most willing to contribute to the study. As for the rest of the office workers (16.7%) who declined to participate in the study, they attributed it to one of the ethical considerations that clearly stated that participation in the study was voluntary.

7.2 Weakness of the study

One of the weaknesses of this study was the small sample size, thus the findings could not be generalized to all the office workers in Amhara region as well as in Ethiopia. Secondly, as participants were asked to report if they had any musculoskeletal pain during the last twelve months, they might not recall every instance of their work related musculoskeletal disorder experiences.

In the same context, there could have been a bias also when participants had to recall and state the actual time in minutes or hours they spent doing a physical activity. Likewise, **[46]** suggest that self-reported instruments may not favor individuals to consistently recall the accumulated frequency and duration of all physical activity they perform.

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