



Addis Ababa University College of Health Sciences School of Public Health

PRACTICE OF ERGONOMIC PRINCIPLES TO PREVENT WORK-RELATED
MUSCULOSKELETAL DISORDER AND ASSOCIATED FACTORS AMONG
HEALTH CARE WORKERS IN PUBLIC HOSPITALS OF ADDIS ABABA,
ETHIOPIA

BY: - YOHANNES KENNE (BSC)

Advisor: 1. Dr. NAOD FIRDU (MD, MPH)

2. Mr. WONDIMU AYELE (Msc, PhD fellow)

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By Yohannes Kenne (BSC) signature _____ Date _____

Approved by the examining board

Chairperson, department graduate committee; signature date

Advisor:

1. Dr. Naod Firdu (MD, MPH) _____

2. Mr. Wondimu Ayele (Msc, PhD fellow) _____

Internal examiner

1. _____

External Examiner

1. _____

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List of acronym and Abbreviation

AA- Addis Ababa

AAU- Addis Ababa University

AOR – adjusted odd ratio

BLR- binary logistic regression

CDC – Centers for Disease Control and Prevention

COR- crude odd ration

GMH- Gandhi memorial hospital

HCWs- health care workers

ILO- international labour organization

KAP – knowledge, attitude and practice

LBP - low back pain

MOH- ministry of health

MSD- musculoskeletal disorder

NICU- neonatal intensive care unit

OLR- ordinal logistic regression

SPSS- statistical package for social sciences

WHO – world health organization

WRMSD- work related musculoskeletal disorder

YRS- years

ZMH- Zewditu memorial hospital

Abstract

Background: -Healthcare providers are at risk of Work-related musculoskeletal disorders including low back pain, neck pain, shoulder pain and results in discomfort, inability to perform tasks properly, and affects the quality of life and reduces productivity. Practice of ergonomics principle to prevent work-related musculoskeletal disorder among healthcare providers is not well studied in Ethiopia.

Objective:-This study aimed to assess the Practice of ergonomics principle to prevent work-related musculoskeletal disorder among healthcare providers in public hospitals.

Methods:-Institutional-based Cross-sectional study design was conduct among 422 selected health workers from February- April/2020 in three selected public hospitals found in AA City Administration. Participants were selected by using systematic random sampling techniques. A semi-structured self-administered questionnaire was used to collect data. Data were entered to EPIdata 3.1 and exported to SPSS 20 for further analysis. Descriptive statistic was used to summarize knowledge, attitude and practice and also ordinal logistic regression was applied to test significant association.

Result: -A response rate of this study was 94%. 239 (60.2%) of the respondents were female and 224(56.4%) of them were single in marital status. 262(66%) of study respondents had a fair knowledge level regarding WRMSDs preventions and occurrence. And again 254(64%) of the respondents had a poor attitude toward WRMSDs. Only 9(2.3%) of the respondents were practicing of ergonomic principles while at work. The level of knowledge was significantly associated with practices of ergonomics principles. Practices of ergonomics principles was significantly associated with sex of respondents, number of working days per week, number of working hours per day were significantly associated with level of practice at p-value <0.05.

Conclusion and Recommendation: - the proportion of health workers knowledge, found to be unsatisfactory in the prevention and occurrence of WRMSDs and poor attitude and practices of ergonomic principles might result in a high prevalence of WRMSDs and also there are associated factors with practice level. So it is recommended that healthcare providers should focus on preventive strategies and health facilities and government should give attention on preventive strategies and developing guidelines

Key words: - work- related MSDs, knowledge, attitude, practice, ergonomic principle

1. INTRODUCTION

1.1 BACKGROUND

Work-related musculoskeletal disorders are musculoskeletal injuries caused or exacerbated by various forms of exposure within the work environment (1). Health care providers are at significant risk of such disorders including low back pain, neck pain, shoulder pain and results in discomfort, inability to perform tasks properly, and affects the quality of life and reduces productivity that will affect the economy of the societies. (1-7)

Nowadays, however, industrializations, mechanization, development of equipment minimizing the physical workload, work-related musculoskeletal disorders (WRMSDs) are still becoming to be one of the occupational health hazards that has a wide range of sign and symptom involving muscles, tendons and joints with a significant cause of morbidities among health workers and affecting occupational health, productivities and career of health workers (8, 9). These work-related musculoskeletal disorders are multifactorial phenomena. According to Bruno et al, 2012, several psychosocial, biomechanical and individual factors are the major contributors to the occurrences of the WRMSDs (10).

Work-related musculoskeletal disorder diseases remain major health problems among health professionals due to work related hazards and poor ergonomics practices. Most of the health professionals perform repetitive activities that expose them to this disease. Most of work related musculoskeletal disorders developed over time and are caused by the work type itself or the working environments of the individual. The prevalence among categories of hospital staff (nurses, physiotherapists, midwives, dentists, Obstetrics and Gynecology, medical students) ranges from 43% to 78% with most affecting the body parts of low back pain, neck pain, shoulder pain (11). According to different studies from all over the world, nurses have a high prevalence of work-related musculoskeletal disorders. For example from America ranges from 35-47% in the USA, Europe from 10-50%, France, Asia 78.6% in China and Africa 80.8% in Uganda (12).

Work-related musculoskeletal disorder (WRMSD) is one of the main public health concerns resulting from the increasing demands of the health care service utilization, temporary and permanent disabilities, require high cost and reduce the quality of life it usually incurs (13,). Moreover, it is a contemporary occupational health problem, representing reduced productivity, absenteeism, and

growing compensation costs. For instance, in the united kingdom, an estimated 6.6 million working days were lost due to Work-related musculoskeletal disorder, constituting 24% of all days lost due to work-related health problems in 2017 (14).

It is necessary to implement the principles of ergonomics to prevent the occurrence of work-related musculoskeletal disorders in work place in all aspects of medical practices. This would ensure better productivity, job satisfaction and the quality of life among health personnel (14, 15). However, for effective implementation of ergonomics principles to prevent WRMSD, medical health workers must have a better knowledge about the aggravating factors and how to apply the ergonomic principles. Ergonomics is an applied science that includes processes, procedures and equipment design which ensure work efficiency and safety of health workers. Ergonomics involves applying theory, principles and design in an occupational environment to ensure better health professionals wellbeing and job performance (16). Application of ergonomic principle in medical practices would reduce pain and morbidity associated with medical practices within the workers, decrease stress while working, and improve job satisfaction and quality of life (2).

According to the world health organization (WHO) work-related musculoskeletal disorder is defines as a “disorder of the muscle, tendons, peripheral nerve or vascular system not directly resulting from an acute or instantaneous event (e.g. slides or falls). These disorders are considered to be work linked when the work environment and the performance of work contribute significantly, but are just one of a number of genes leading to the movement of a multi factorial disease” (23).

Work-related musculoskeletal disorders (WRMSDs) are groups of syndromes characterized by symptoms of soft tissue pain, swelling, weakness, discomfort, painfulness, burning sensation, cramping and loss of function that can be caused or aggravated by work-related exposures. These disorders have been recognized as a source of significant disability, pain and disadvantage for the injured person and a substantial burden on millions of people in both developing and developed countries, and affect all age groups and can also have a major impact on worker function, life, performance and productivity (22).

1.2 STATEMENT OF THE PROBLEM

Globally, about millions of working-age group peoples are work under poor and risk working environment, due to these working place disease and injuries continued to be the leading cause of mortality and morbidity. WHO/ILO report shows that every 15 seconds workers die from work-related disease or injuries. Every 15 seconds 153 workers, every day 6300 people are dying as a result of work-related hazards (17). Annually an estimated 130 million peoples visit healthcare physicians including outpatient, hospital and emergency rooms as a result of Musculoskeletal disorders (18). The burden of work-related musculoskeletal disorders globally has wide impact that comprises the second- highest global volume of years lived with disabilities. Worldwide one in three people and America one in two people live with a painful musculoskeletal disorder (1).

Work-related musculoskeletal disorders are responsible for morbidity, lowering the quality of the workers' life and reducing productivity in many working populations. Work-related musculoskeletal disorder affecting health care providers should never be treated lightly and is the most expensive form of work-related disabilities attributing to about 40% of all costs towards the treatments. [2, 3]

The Medical profession is known to be at a higher risk of work-related musculoskeletal disorder and it is one of the least studied areas in our country which poses major health and socioeconomic problems among healthcare workers. International labor organization (ILO) and world health organization (WHO) regards WRMSDs as new epidemic that should be researched and solved and also there are limited studies investigating interventions to protect healthcare workers (19). To apply intervention first the knowledge, attitude and practice status among health care worker should be understood. So this study tries to assess the knowledge, attitude, and practices of ergonomics principles among hospital health care providers which are the least studied area.

A longitudinal interventional study shows, the improvement in the knowledge, attitude and practices have positive effects on the prevention of musculoskeletal disorders in teachers and also enhancing awareness and application of ergonomics principles has improved the challenges of musculoskeletal disorder in nurses. However knowledge, attitude and practice of ergonomic principles to prevent this problem have yet not been studied in Ethiopia among health professionals (29, 30).

1.3 SIGNIFICANC OF THE STUDY

Around the world, many studies are conducted, which focuses on prevalence and risk factors associated with work-related musculoskeletal disorders, but this study assesses the knowledge, attitude and practices of ergonomics principles among different groups of health care professionals. Understanding the status of knowledge of health care workers on work-related musculoskeletal disorder, attitudes towards the application of ergonomic principles to prevent the occurrence of the problem and practices of ergonomic principles while at works will help to develop strategies to prevent and control work-related musculoskeletal disorder and disability. And again it will helps the stake holder such as the ministry of health and other health-related organizations as a reference to develop policies to improve the safety and health of health care workers in the country.

Therefore conducting this study is important in solving work-related musculoskeletal disorder among health professionals by providing valid information on the knowledge, attitude and practices of hospital health workers. Because in Ethiopia, there are few studies available that show the prevalence of the work-related musculoskeletal disorder among specific health categories like nurses (4) and laboratories (21). But this study will provide information on the knowledge, attitudes towards WRMSDs and ergonomic principle practices of healthcare workers to prevent or minimize the impact of work-related musculoskeletal disorder. And also conducting this study will be important to fill the gap in the representativeness of the health professional categories. But this study will incorporate all clinical health professional categories like nurses, Physicians, Laboratories, Physiotherapists, and Dentists. And also will provide valuable information for researchers for further investigation and for facility and healthcare workers to prevent work-related MSDs.

2. LITERATURE REVIEW

Practices of ergonomics principles to prevent work-related MSDs

To prevent the occurrence of work-related musculoskeletal disorder, it is necessary that the applying the principles of ergonomics in all aspects of medical practicing areas. Applying principles of ergonomics ensure better health of worker and productivities. However, for good practice or application of these principles at the workplace to prevent the disorder, all health professionals first must have good knowledge about work-related musculoskeletal disorder and risk factors aggravating the occurrence of this disorder and how to apply principles of ergonomics. Ergonomics is an applied science involving processes and procedure and product design that ensures work efficiency and the health and safety of workers. It involves applying theory, principle, and design in an occupational environment to ensure optimal healthy and overall system performance (2, 4, and 9).

The main goal of applying principles of ergonomics in healthcare service provision includes prevented or reduced pain induced as a result work reduced morbidities among workers, increase comfort and job satisfaction, improved musculoskeletal health, improved work productivity, and improved quality of life (36).

Applying ergonomics in working place improves overall the health of healthcare workers and improves their performances. A Study done in India among health care shows that the practical application of ergonomic principles at the workplace was not satisfactory and suggests the practice of ergonomic principles needs basic improvements (27).

A Study done in Bangladesh among resident doctors indicates that poor ergonomic principles were practiced by 49.5% of the residents while 26% of the residents were practicing was adequate. Among principles not practiced were; taking breaks while working in mid time was not practice by 64.3% and 69.2% of the residents didn't use an adjustable chair while giving health services. (28)

A cross-sectional study conducted in Pakistan among hospital dental interns shows that the majority of dentists exhibit a score of fair (62.7%) practices of ergonomic principles while 20.9% and 16.4% recorded poor and good scores of ergonomic principles practices respectively. For example 52.2% the respondents never took a break at all during their working time while 7.4% like to take break after serving every 2-3 patients and only 10.4% of patients took a break between each patient. (37).

According to a systematic literature review conducted in India concluded that healthcare provision is a high risk of physical injuries like work-related musculoskeletal disorder and exposure to physical and organizational risk factors that require ergonomic intervention (Dental Ergonomics to Combat Musculoskeletal Disorders: A Review). A cross-sectional analytical study conducted among health care workers shows that only 8.9 % of the respondents were strictly applying ergonomic principles like operator's position, patient position and chair position while treating patients. (38).

A systematic literature review results the application of several ergonomic intervention in health care service provision points to prevent WRMSDs among healthcare providers were found to show a positive effect on the prevention of musculoskeletal disorder(39) and this is also supported by the study done in Malaysia by adding to get successful ergonomic practice in working area emphasis should give for applied ergonomic training since trained healthcare workers practice better than others (40).

A Study among health professionals aimed to assess their practices of ergonomics in their clinical session shows that even though they had good knowledge and attitude their application of ergonomic principle for preventing work-related musculoskeletal disorders was not satisfactory (41). Another study done among health workers shows only 8% of them were had good practices of ergonomic principles to prevent this disorder (10).

A study conducted among dental students and dental practitioner reveals that the knowledge and attitude towards work-related health hazards were good but the occurrence and prevalence of occupational health hazards including work-related musculoskeletal disorder were very high among these health professionals (21). This indicates the practice of ergonomic principles and habits of safety material usage are poor.

A cross-sectional study conducted in Egypt shows that only 5% of the study respondents were had to practice ergonomic principles in their duty station (31). Poor practices of ergonomic principles in their working area were also indicated among physiotherapists in Nigeria whereas a high knowledge was observed which shows an increase in knowledge didn't result in desired practices (33).

A number of studies ensure that knowledge and practices of ergonomic principles required preventing musculoskeletal disorder-induced as a result of medical practices by healthcare workers. In a study among oral health workers shows that 51% of the respondents had no good knowledge of applying principles of ergonomics to prevent WRMSDs and only 8% of them had good practice of the principles to prevent these disorder (10).

Knowledge and practices of important ergonomic principles at working place required for preventing work-related musculoskeletal disorders become the public health concerns that need to be addressed. In a study done among dental students and dental practitioners, 21.4% of the study participants had good knowledge and 40.1% with poor knowledge while 10.7% of the study participants had good practice of ergonomic principles to prevent work-related musculoskeletal disorder (7). However, in study done in India among hospital doctors (2) 96.4% of the respondents had a good knowledge with 13.9% of good practice of the necessary principles of ergonomics.

A study conducted among dental student and dental practitioner shows that the knowledge and attitude towards occupational hazards were good but the occurrence of occupational hazards among hospital health workers was very high (21) which indicates the practices of ergonomic principles and habits of safety material usage is poor.

A cross-sectional study conducted in Egypt among dentistry students revealed that only 25% of the study participants were had a good knowledge concerning ergonomics applied at work place and work-related musculoskeletal disorder whereas 84.8% of them had a positive attitude while only 5 % of the dentistry students have had practices the ergonomics principles at their duty stations (31). Poor practices of ergonomics principles were also reported among physiotherapists in Nigeria whereas a high knowledge was observed (33) which show an increase in knowledge didn't result in desired practices.

Controversial results revealed by different studies (2, 9). In a study from Addis Ababa, Ethiopia done among hospital clinical laboratories, 84.6% of them had never heard about WRMSD and ergonomics, and also 93% of the participants reported the need for training on the application of ergonomic principles in the working area (21). Reversely, 96% of study respondents in India had a good knowledge with poor practices (2). The prevalence of WRMSDs is very high that might be due to unsatisfactory KAP. Study done in Jimma specialized hospital among nurses and Gonder city in

Ethiopia indicated that the prevalence of WRMSDs was 67.5% and 57% respectively and it was also associated with occupational hazards and poor knowledge of back care ergonomics (22, 20).

The first step in preventing work-related musculoskeletal disorders in working place is to assess and verify that the healthcare workers are aware of musculoskeletal disorders related to work. Lack of knowledge regarding musculoskeletal disorder is one of the barriers in the prevention work-related musculoskeletal disorder (24). According to this review application of knowledge from ergonomics principles can have beneficial effects on health workers health and work performance. According to study in a Malaysia the knowledge of health workers towards work-related health hazards including work-related musculoskeletal disorder were not satisfactory in the prevention of this disorder (25). Another study in India also shows that only 35.6% of the dental clinicians were aware of ergonomics principles applied in the workplace to prevent WRMSDs which is also not satisfactory (26).

A comprehensive understanding of work-related musculoskeletal disorder and ergonomic principles applied in working place while working is important. A Study conducted in India that assesses the knowledge and practicing of ergonomics while working among healthcare workers indicates 85% of the respondents were had adequate knowledge on work-related MSD prevention ways (27) whereas a study among resident doctors in Bangladesh shows 68% of the resident doctors were not aware of work place ergonomic principles in the prevention of work-related musculoskeletal disorder (28).

According to a study in jimbaran among health workers (29) there is a significant effect of ergonomic program on healthcare worker's health in performing day to-day activities in the health institutions. An ergonomics program is an intervention in working areas to reduce or prevent work place health hazards like work-related musculoskeletal disorder.

A Study conducted in Nigeria among medical laboratories indicates that only 22% of the participants know the benefit of ergonomic principles application in the prevention of work-related musculoskeletal disorder in the laboratory working place. The level of knowledge is poor among these study participants in prevention of this disorder, similar study done among laboratory health professionals in Malaysia the level of their knowledge was poor (30).

A number of studies ensure that knowledge of ergonomics principles required for preventing musculoskeletal disorder-induced as a result of medical practices like patient lifting and treating, patient moving, etc by healthcare workers. In a study among oral health workers shows that more than half of the study participants (51%) had no good knowledge of work related MSDs and how to apply principles of ergonomics to prevent this disorder (10).

Knowledge regarding work place hazards like work related musculoskeletal disorder and way of prevention at work place required for preventing WRMSDs become public health concern that needs to be addressed. In the study done among dental students and dental practitioners, 78.6% of the study respondents were had no good knowledge among this 40.1% were with very poor knowledge regarding WRMSDs and way of prevention (31). But a study done in India among hospital doctors almost 96% were had good knowledge (2).

A cross-sectional study conducted in Egypt among dentistry revealed that only 25% of the study participants were had a good knowledge of coming ergonomics applied at work place and work-related musculoskeletal disorder whereas a high knowledge was observed among physiotherapists in Nigeria (32).

Literature suggests that positive or strong attitude of health care workers will significantly increase the chance of successful work-related musculoskeletal disorder prevention activities. A study conducted in India suggests that almost 85% of the study participants were had adequate attitude towards ergonomic principles applied in the workplace and work-related musculoskeletal disorder as occupational health hazard (27).

An experimental study done in the united states among nurses working in hospitals reveals that the attitudes of the nurses in the treatment groups were good while performing nursing procedures and also shows that improved application of ergonomics principles in nursing procedures can reduce the risk of developing work-related musculoskeletal disorder due to improper working position and attitude whereas the control group result was not good in their attitudes. Practices of ergonomic principles in working place can improve the attitudes of nurses while performing their activities in accordance with standard ergonomic principles (33).

A Study conducted in India among dentists to assess knowledge, attitudes and practices of ergonomic principles reveals that the majority of the respondents were had positive attitudes towards ergonomic principles but their attitudes not satisfactory for the prevention of WRMSD in workplace (34).

A cross-sectional study was conducted in Nigeria among physiotherapists to assess the knowledge, attitude and practices. According to this study result 52% of the respondents were had negative attitudes towards the application of ergonomics principles in manual handling techniques (35).

Factors associated with KAP of healthcare workers towards WRMSDs

A study conducted in India among dentist shows that number of extended exposure and total time of exposure are important factors affecting the knowledge, attitude and practices of principles in working place to prevent work-related musculoskeletal disorders (31).

A study done in Egypt showed that work experience has effects on the level of knowledge in the prevention of work-related musculoskeletal disorder. As experience increase the probability of having good knowledge also increase that may leads to the prevention of work-related musculoskeletal disorders (9).

A study conducted in Zimbabwe and Palestine showed that work experience of healthcare workers has an effect of the knowledge towards the occurrence and prevention of work-related musculoskeletal disorder and also educational level of healthcare workers statistically associated with the awareness level towards the prevention of this disorder in work-places (7, 46).

A study in Pakistan among dentists showed that attitude and practice level of the dentists were significantly associated with number of working days per week. As number of working is not more than five days per week the level of practicing ergonomics principles also increase (27).

A study done in India among healthcare workers indicated that positive relationship was observed between knowledge and practices which was for every one unit increase in knowledge 0.74 unit increase in practice of ergonomics principles in the prevention of work-related musculoskeletal disorders (31).

Conceptual frame work

This conceptual frame work was developed by reviewing different kinds of literatures to associate the dependent and independent variables.

Work-related musculoskeletal disorder can result from different factors. Among different factors associated with WRMSD are personal factors (like Age, sex, marital status, education, and work experience) and hospital health workers (like job categories, working department and availability of training) and knowledge and attitude

The knowledge of health care workers on the work-related musculoskeletal disorder may matter in the prevention and reduction of this health problem. Attitude toward the application of ergonomics principles and practices of the ergonomics principles at work place can determine the occurrence and the prevention and control of WRMSDs.

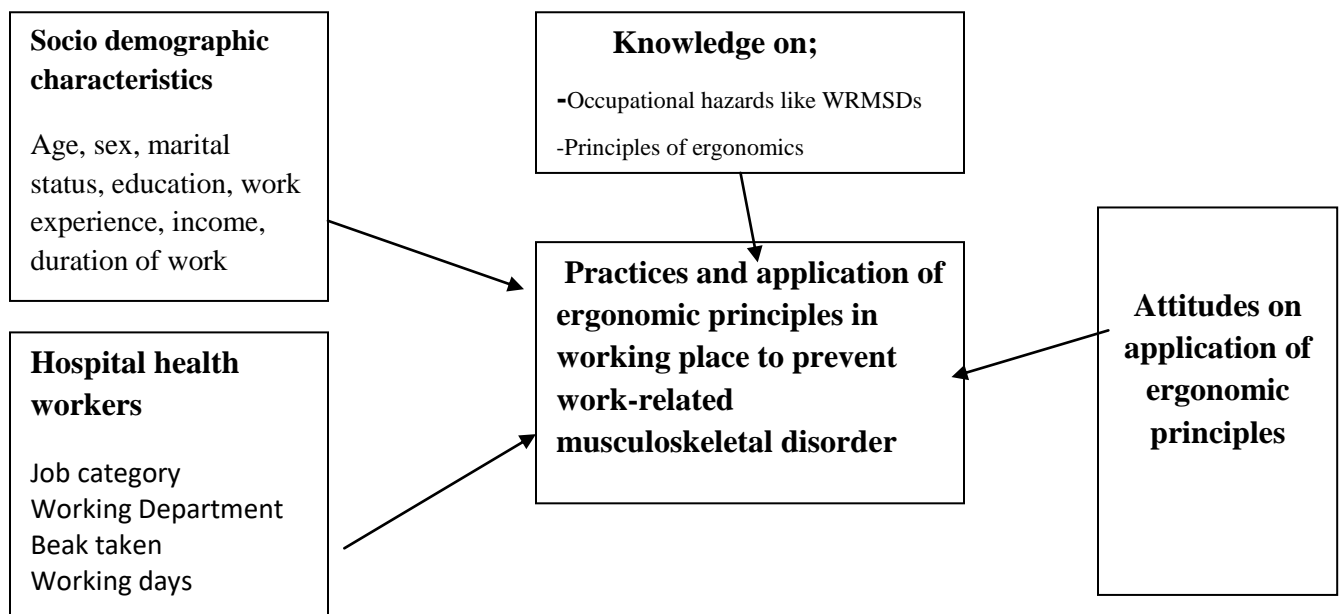


Fig 1.1 conceptual framework of work-related musculoskeletal disorder among hospital healthcare workers (adapted with some modification from after reviewed different literatures). (2, 4, 9, 23)

3. OBJECTIVES

3.1 GENERAL OBJECTIVES

To assess the Practice of ergonomic principles to prevent work-related musculoskeletal disorder and associated factors among health care workers in public hospitals, Ethiopia, 2020

3.2 SPECIFIC OBJECTIVES

- To assess the practice of ergonomic principles to prevent work-related musculoskeletal disorders among respondents, Ethiopia,2020
- To assess factor associated with practice of ergonomic principles of healthcare workers to prevention work-related musculoskeletal disorders.

4. METHODS and MATERIALS

4.1 Study area

The study was conducted in a selected Public hospital in Addis Ababa City. Addis Ababa is the capital city of Ethiopia which lies at an altitude of 7,546 feet. According to the 2018 CSA, the City has a total population of 3,601,694 in an estimated area of 530.14 square kilometers. There are 11 Public Hospitals in Addis Ababa. From these, 6 hospitals are owned by Addis Ababa Health Bureau, 4 by the Federal Ministry of Health, 1 by Addis Ababa University. The city is divided into 11 sub-cities containing 144 woredas.

The study was conducted in Zewditu memorial hospital, Minilik II and Yekatit12 hospitals in Addis Ababa city administration and all medical health care workers working within these hospitals was a participant of this study. All hospitals are currently operated under the Addis Ababa city administration. Zewditu hospital has 596 medical health workers working in different departments. minilik hospital has 678 and yekatit12 has 702 medical health workers working in different departments

4.2 Study design;

Institutional based cross-sectional study design was conducted to assess practices of ergonomics principles to prevent WRMSDs in selected public hospital in Addis Ababa city administration

Source population

All health professionals employed and working at selected hospitals including nurses, physicians, laboratory professionals, pharmacist, Radiologists, physiotherapists, Anesthesia and dentists

Study population;

All medical health professionals who were directly engaged in selected medical units and currently working in all inpatient department, outpatient, emergency, laboratory, NICU, Physiotherapist and Dentists from whom data was collected and who were willing to participate in this study

Eligibility criteria;

Inclusion criteria: all medical professionals employed by Zewditu memorial hospital, Menelik II Hospital and yekatit12 hospitals. Currently working in hospitals and who have direct contact with patients and willing to participate

Exclusion criteria: healthcare worker who is not employed and ill

Study Variable

Dependent variable

Practices of ergonomic principles to prevent work-related musculoskeletal disorder

Independent variable

Work-related musculoskeletal disorder

Number of years of work

Professional category of respondents

Age of respondent

Sex of respondents

Marital status of study participants

Duration of work

Currently Position of respondents

Knowledge level of study participants

Attitude level of study participants

4.3 Sample size determination and sample procedure

The sample size of this study was determined based on the sample size determination formula using single population proportion for specific objectives one, two and three

$$: n = \frac{Z_{\alpha/2}^2 pq}{d^2}$$

The minimum sample size was calculated. Where: n = minimum sample size required,

Z_{α} = value corresponding to the confidence level of 95% which is 1.96.

p = anticipated proportion of individuals knowledge, attitude and practice of ergonomic principles to prevent WRMSDs. Since there was no similar study done in a similar setting (Addis Ababa, Ethiopia for specific objective one, two and three), p - will be 50%

d = error margin (5%).

$$\begin{aligned} \text{Thus: } n &= 1.96^2 \times (50 \times 50) / 5^2 \\ &= (3.8416 \times 2500) / 25 \\ &= 9604 / 25 \\ &= \mathbf{384}. \end{aligned}$$

Considering 10% non-respondent rate the final sample size will be **422**

For specific objective four: - to assess associated factors for KAP; the sample size was determined by using Epi Info 7 with absolute precision of 5%.

To calculate sample size the following assumptions was considered

Two sided confidence level= 95%

Power = 80%

Ratio of unexposed to exposed =1

Outcome in unexposed group=50%

Odd ratio =2 (50)

The sample size was calculated by using Epi Info 7, statically for sample size and power for cohort and cross sectional study considering the above criteria the sample size yields 296. Considering 10% non-response rate $(296+30) = 326$ participants were included.

The decision was done by comparing the sample size of objective one, two and three with objective four and finally 422 was used as a sample size of this study.

4.4 Sampling selection procedure;

From all hospitals found under Addis Ababa city administration, purposely three patient overloaded hospitals were selected by observing their annual reports as listed below for 2012 E.C.

1. Yekatit 12 Medical College General Hospita = 179384
2. Dagmawi Menilik Referral Hospital = 91672
3. Zewditu Memorial General Hospital = 68332
4. Ras Desta Damtew Memoreal General= 68325
5. Gandhi Memorial General Hospital = 65761
6. Tirunesh Beijing Hospital = 60220

In this case Yekatit 12 Medical College General Hospita, Dagmawi Menilik Referral Hospital and Zewditu Memorial General Hospital were selected by their patient loads respectively.

The Determined sample was proportionally allocated to each selected hospitals. Yekatit 12 hospitals has 702 medical healthcare staff, Dagmawi Menilik has 678 medical healthcare staffs and Zewditu memorial hospital has 596 medical staffs

$$\text{Zewditu memorial hospital} = 596 / (596+678+702) * 100 = 30$$

$$= 30 * 422 / 100 = 127$$

$$\text{Menelik II Hospital} = 678 / (596+678+702) * 100 = 34$$

$$= 34 * 422 / 100 = 143$$

$$\text{Yekatit12 hospital} = 422 - (127 + 143) = 152$$

$$\text{Total sample size} = 127 + 143 + 152 = 422$$

And again the determined sample of each hospitals were proportionally allocated for each department of health workers for all selected hospitals as shown below in table 4.1

Lists of a health worker was used as a sampling frame and finally from the sampling frame (lists of health workers for each department separately was prepared) from each department systematic random sampling techniques was used to select study participants by calculating sample interval using $K = N/n$ formula ($N =$ represents total number of health workers for selected departments while, $n =$ represent sample size as shown from table 4.1 below). Every K^{th} were selected for study participants and the first study participant was selected by data collectors.

Table 4.1 sample proportion for each hospitals and departments

Zewditu memorial hospital				Menelik II Hospital			Yekatit hospital			total
Working departments	Number	Proportion	Sample	Number	Proportion	Sample	Number	Proportion	Sample	
inpatient	145	59	38	158	66	39	165	14.4	46	116
Outpatients	156	21	40	166	18	48	132	15.7	49	145
Laboratory	22	4	14	20	5	12	21	4.6	16	40
Emergency	65	6	14	86	7	20	78	11.1	18	51
Physiotherapist	4	3	3	5	2	2	6	2.7	3	8
NICU	45	1	14	25	0	19	45	9.3	17	50
Dentists	4	3	4	3	2	3	5	3.1	3	12
	445	100	127	463	100	143	452	100	152	422

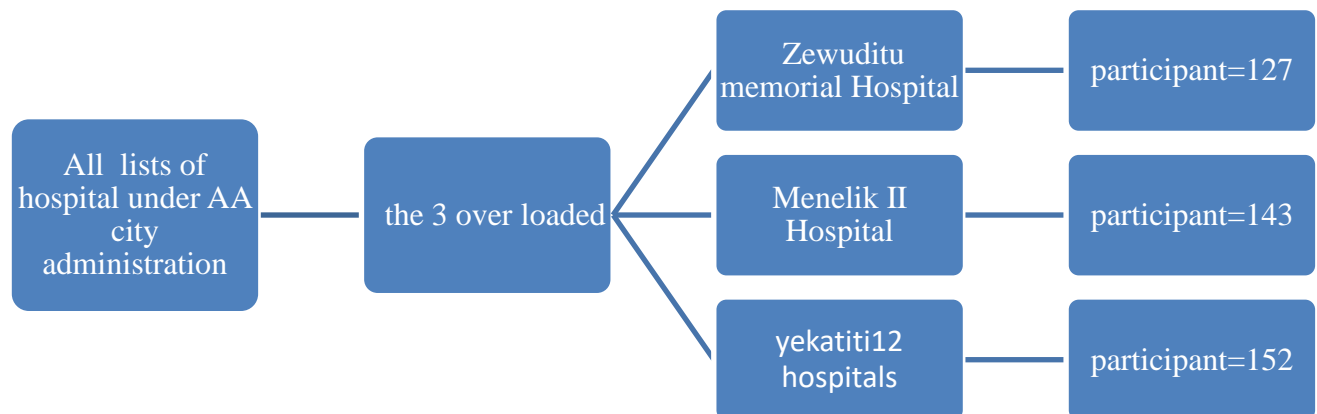


Figure-3:-sampling procedure

4.8 Data collection;

A structured Self-administered questionnaire was used to collect the data. The questionnaire was adapted from pre-existing studies (17, 4,) and reviewing different kind of literatures. The questionnaire contains socio-demographic characteristics, comprehensive knowledge, attitude and practices of principles of ergonomics to prevent work-related musculoskeletal disorder. The knowledge of the hospital healthcare worker regarding the prevention of work-related musculoskeletal disorder at workplace or while at work was asked. 15 items Yes and no option were provided. Based on different studies (4), the result was summarized as good knowledge, fair knowledge and poor knowledge. Correctly answering between 75% and 100% question was regarded as good knowledge, correctly answering between 40% and 74% questions was regarded as fair knowledge and below 40% question was regarded as poor knowledge. The other part was about their attitude towards the application of ergonomic principles in preventing the occurrence of occupational work related musculoskeletal disorder while at work. 10 items Yes liker (agree and disagree) option type of question was asked and based on their answer, was categorized as good attitude and poor attitudes based on previous similar studies. Finally, the practice of ergonomics principle in working areas was assessed. The question was a multiple-choice option type and the respondents were allowed to choice all option that was applied to them. Among 15 items options, those who apply between 11

and 15 were regarded as good practice, between 6 and 10 were regarded as moderate and below 5 were regarded as poor practice basing previous similar studies.

4.9, Operational definition

Knowledge: it is information that an individual participant is aware of what work-related musculoskeletal disorder is prevention means of work-related musculoskeletal disorder, and how it may occur due to daily work. Or Knowledge is what the participant respond regarding the prevention and occurrence of work-related musculoskeletal disorder at workplace or while at work. Based on their score was regarded as good knowledge if score 11-15, fair knowledge if score 6-10 and poor knowledge if score below 5 among 15 questions. (4, 9, 17)

Attitude: it is the perception or outlook of the individuals regarding the application of ergonomic principles in preventing the occurrence of occupational work related musculoskeletal disorder while at work. The score was summarized as good attitude if score 6-10 and poor attitudes if score 1-5 based on previous studies. (4, 9)

Practice: it is the overt behavior, habit and custom that a person does, practice or carry out ergonomic principle in their daily activities in the prevention of work-related musculoskeletal disorder while at work. Based on their practices of ergonomic principles in working place to prevent work-related musculoskeletal disorder, the result was summarized as good practice if answered between 11-15, moderate practice if answered 6-10 questions and poor practice if answered below 5 among 15 asked questions. (4, 9)

4.10, Data analysis

The final collected data was entered into Epidata and the statistical analysis was done by using the SPSS software 20 version. The data was summarized using frequency and descriptive statistics. For dependent variables level of practice, ordinal logistic regression was used to determine strength of association and finally a p-value <0.05 was taken as signifying variables. Ordinal logistic regression was selected because of the practice level is a categorical and has 3 outcome categories or values. Model fit was checked by using Goodness-of-fit table using Pearson chi-square test. Non-significant test result was taken as the indicators that the model fit the data well. Goodness-of-fit was selected to check model fit because it is most frequently used than others by different researchers.

4.11, Data quality management

The questionnaire was standardized and prepared first in the English language after reviewing different kind literatures and then was translated to the Amharic language for data collection purposes. And back English again by a different translator to check translation clarity. The data collection was supervised by one supervisor with a BSC degree with supervisor experience and three data collectors with a BSC degree with a health background. The data collectors and supervisors were trained on the subject matter tools and objectives of the research and how to ensure proper data collection. The questionnaire was pre-tested before collecting the actual data. Daily report and reviewing the data was ensured. Informed consent was obtained from the study participants. The confidentiality was assured for the information by not taking the name of participants

4.12, Ethical consideration;

Ethical approval was obtained from Addis Ababa University School of public health ethical review committee. A Formal letter for cooperation was obtained from Addis Ababa University School of public health and also ethical approval and support letter was obtained from Addis Ababa Health Bureau public health research and emergency management directorate. And also ethical approval was obtained from the Yekatit12 hospital ethical review committee. A Clear explanation about the purpose of the study was given to the respondents before conducting the interview and assurance was given to them that the interview was done with their voluntarism and their view was purely used for academic purpose and the information they were gave was kept confidential. To maintain the anonymity and confidentiality of the informants, the real name was not mentioned.

Participants were also be informed and assured that there was no any form of harm because of participating in the study

4.13, Dissemination of results

The final results of the research would be presented to Addis Ababa University, College of health science, school of public and the copy would be disseminated to Addis Ababa Health Bureau public health research and emergency management directorate and the respective hospitals.

5. RESULTS

5.1 socio-demographic characteristics of the study participants

A total of 422 hospital health workers were included in this study and 397 (94%) were responded completely from all study participants. Among study participants, 239(60.2%) were female and 224(56.4%) were single. Most (78.3%) 311 of the study participants had degree educational level while only 7(1.8%) of them was specialist. The age of the most participant (61%) 242 falls between 21-30yrs age group with mean of age 26.76 and $\bar{x} \pm SD$ 4.52. The work experience of the participants shows that, 191(48%) of them served less than 5 years and 220(55.6%) of them had worked five days per week and also 249(63%) of them had worked greater than eight hours per day. Almost 193(49%) of the study participants had taken 30-60 minutes breaks per day. Among female participants, 108 (45%) had have children ranging from 1-5 children. Most 140(35%) and 106(27%) of the study participants were working in outpatient and inpatient respectively. The monthly salary of the most participants 214(54%) falls between 6001-8000 birr while only 48(12%) were below 6000 birr. (Table 1)

Table 1:- Demographic characteristic of the study respondents in selected public hospitals in Addis Ababa, Ethiopia, July 2021 (n=397).

Variables	Frequency (n=397)	Percentage
Age		
21-30yrs	242	61.0
31-40yrs	135	34.0
41-50yrs	11	2.8
51-60yrs	9	2.3
Sex		
Male	158	39.8
Female	239	60.2
Marital status		
Married	169	42.6
Single	224	56.4
Divorced	2	.5
Widowed	2	.5
Number of children female participants have		
Less than 2 children	79	73
3-5 children	29	27
Educational level		
Diploma	18	4.5

Degree	311	78.3
Master	22	5.5
general practitioner	39	9.8
Specialist	7	1.8
Monthly salary		
<6000	48	12.1
6001-8000	214	53.9
>8001	135	34.0
Years of experience		
Less than 5yrs	191	48.1
5-10 yrs	162	40.8
10-15 yrs	26	6.5
Above 15 yrs	18	4.6
Number of working days per week		
<=5 days	220	55.6
6-7 days	176	44.4
Number of working hours per day		
Less than 6hrs	23	5.8
7-8hrs	125	31.5
>8hrs	249	62.7
Break taken per day		
<30min	154	38.8
30-60min	193	48.6
>60min	50	12.6
Working departments		
Inpatient	106	26.7
Outpatient	140	35.3
Laboratory	38	9.6
Emergency	47	11.8
Physiotherapy	8	2.0
NICU	46	11.6
Dentistry	12	3.0

5.2. Knowledge of HCWs in the prevention of work-related musculoskeletal disorders

Reliability of the data was performed to check internal consistency of the data by using Cronbach's Alpha test and the result shows 0.671 indicating almost satisfies the minimum standards. Overall the knowledge questions real response ranges from 39% to 80%. 318(80%) and 312(79%) of the respondents correctly answer the importance of stretching exercise and taking regular breaks in the prevention of work-related musculoskeletal disorder during working whereas only 155(39%) respondents correctly respond the side effect of forceful hand exertions while working can contribute to the occurrence of MSDs. The average score of knowledge was 65.4%.

5.3 knowledge level of HCWs towards work-related musculoskeletal disorders prevention

Figure 1:- Knowledge level of respondents in the prevention of WRMSDs

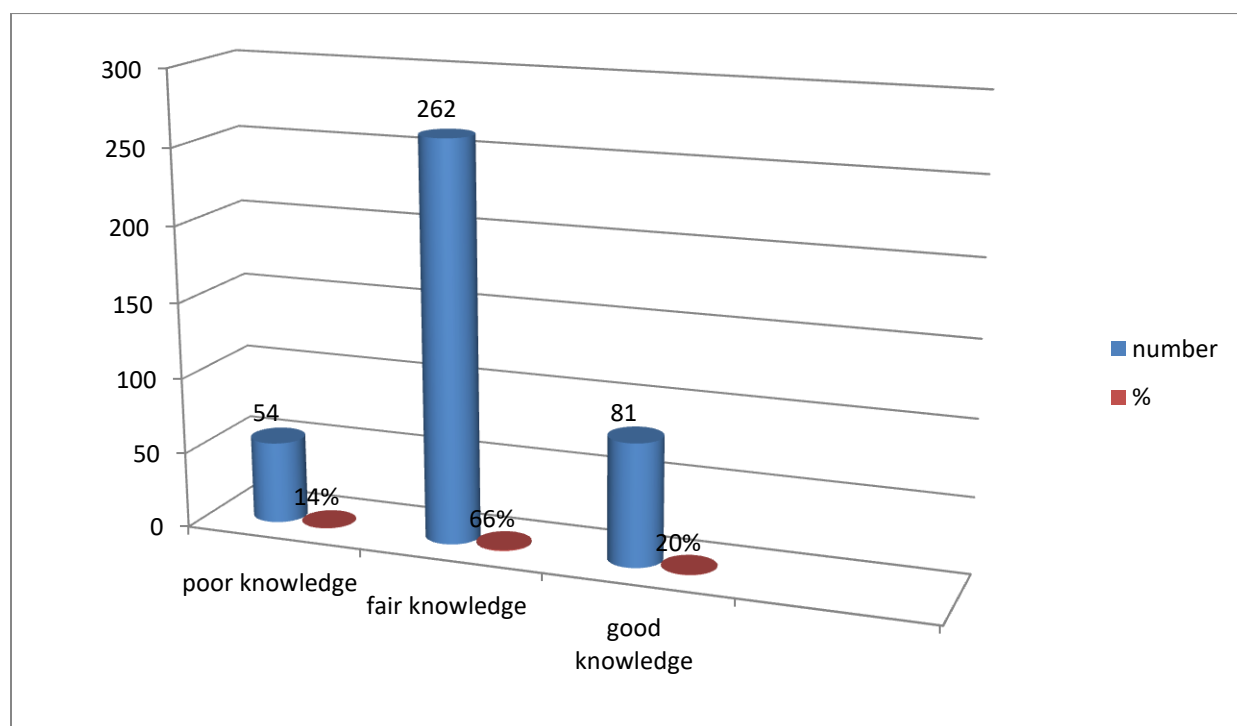


Figure 1 above shows that the majority of respondents from selected public hospitals had fair knowledge 262(66%) as they were able to respond between 6 to 10 questions asked to assess their knowledge regarding prevention of work-related musculoskeletal disorder at work place. 81(20%) of the study respondents were had good knowledge whereas 54(14%) were had poor knowledge regarding work-related musculoskeletal disorder prevention.

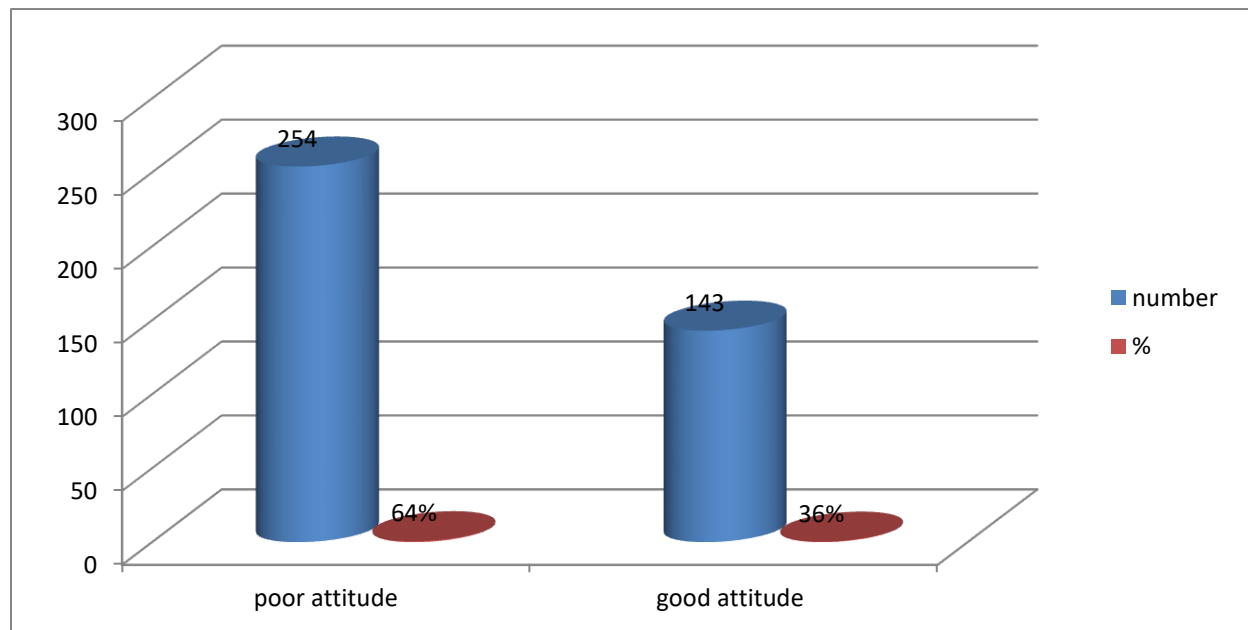
Almost all level of knowledge was more observed among youngest age group (21-30 yrs.). Good and fair knowledge was more observed among female respondents 51(63%) and 157(60%) than male respondents whereas poor knowledge was more observed among female respondents 31(57%) in the prevention and occurrence of work-related MSDs in work-place. The result also shows that the level of knowledge of respondents among all educational level, almost at all level of education majority of the respondents had fair knowledge toward prevention and occurrences of work-related musculoskeletal disorder. Poor level of knowledge regarding prevention and occurrences of work-related musculoskeletal disorder were not observed among diploma and specialists.

5.5 Attitude towards Application of Ergonomics in the Preventing work-related MSDs

Regarding the ten (10) questions asked to assess study participants’ attitude toward the prevention of work-related musculoskeletal disorders, almost 280(70.5%) believe that applying ergonomic principles at work-place to avoid musculoskeletal disorders is an achievable task. And also 268(67.5%) agreed on engaging in physical activity/exercise e.g. stretching, walking etc. are ideal for maintaining good health. Whereas, 250(63%) disagree on Taking breaks while performing my duties at work is a mere waste of time

5.6 Level of attitude towards work-related musculoskeletal disorder prevention

Figure .2; - Attitude level of healthcare workers towards work-related musculoskeletal disorder prevention



Regarding the ten (10) questions asked to elicit the respondents' attitude towards work-related musculoskeletal disorder prevention, figure 2 above show that majority of the study respondents from the 3 selected hospitals 254(64%) had a poor attitude toward work-related musculoskeletal disorder prevention. 143(36%) of the respondents, however, had good attitude toward work-related musculoskeletal disorder prevention.

The result shows that Poor attitude toward prevention of work-related musculoskeletal disorder was more observed among female 149(38%) respondents than male 105(26%) respondents while 90(23%) female and 53(13%) male respondents had good attitude toward prevention of work-related musculoskeletal disorder. Both good and poor attitude was more observed among female study participants. This table also show that the level of attitude across the educational level. Poor attitude is more prevalent than good attitude toward the prevention of WRMSD among all educational level.

5.8 Practices of Ergonomic Principles to Prevent Work Related Musculoskeletal Disorder

Concerning 15 ergonomics principle options asked for which respondents were assessed for practice to prevent work-related musculoskeletal disorder, table 6 below show that the most always practiced principles was Changing positions while working (164) followed by Keeping shoulders relaxed while working (87), Keeping back supported while sitting (79), Adjusting the workspace for better operator-patient positioning (60) and Working with assistance when necessary (59) among others. However, Ensuring and/or advocating for ergonomically considered shift duties (34) and Placing feet flat on the floor when working (38) were the least always practiced ergonomics principles to prevent work-related musculoskeletal disorder among others. The highest never practiced principles were, Consideration of ergonomic principles when purchasing work materials, tools and/or equipment (61) and Ensuring and/or advocating for ergonomically considered shift duties (50) among all others. The Majority of the ergonomics principles were practiced sometimes than others to prevent WRMSD. Ensuring orderliness of work instruments while working (59%) and consciously positioning the body within safe ergonomic limits while working (58%) were the highest principles practiced sometimes then other principles

Table 2:- Ergonomics principles practiced in the prevention of work- related musculoskeletal disorder in selected hospitals in Addis Ababa, Ethiopia, July 2021 (n=397).

s. n	Ergonomic principles	always	sometimes	rarely	never
1	Changing positions while working	164(41%)	188 (47%)	34 (9%)	11(3%)
2	Keeping back supported while sitting	79(20%)	204 (51%)	81(20%)	33(8%)
3	Keeping shoulders relaxed while working	87(22%)	176 (44%)	101(25%)	33(8%)
4	Taking intermittent breaks while working	47 (12%)	207(52%)	116(29%)	27(7%)
5	Ensuring gentle hand movements	44(11%)	214(54%)	117(29%)	22(6%)
6	Engaging in physical activity while working, e.g., stretching etc.	40(10%)	216(54%)	92(23%)	49(12%)
7	Ensuring and/or advocating for ergonomically considered shift duties	34(9%)	201 (51%)	112(28%)	50(13%)
8	Adjusting the workspace for better operator-patient positioning	60(15%)	210(53%)	95 (24%)	32 (8%)
9	Working with assistance when necessary	59 (15%)	212 (53%)	110(28%)	16 (4%)
10	Stopping work activity for a while when discomfort arises	49 (12%)	192 (48%)	120(30%)	36 (9%)
11	Ensuring orderliness of work instruments while working	42 (11%)	236 (59%)	92 (23%)	27 (7%)
12	Consciously positioning the body within safe ergonomic limits while working	44 (11%)	229 (58%)	90 (23%)	34 (9%)
13	Placing feet flat on the floor when working	38 (10%)	224 (56%)	95 (24%)	40(10%)
14	Keeping neck tilted only within safe limits	45 (11%)	206 (52%)	104(26%)	42(11%)
15	Consideration of ergonomic principles when purchasing work materials, tools and/or equipment	55 (15%)	202 (51%)	79 (20%)	61(15%)

5.9 Level of Ergonomics principles practiced preventing work-related musculoskeletal disorder

Figure .3:- Level of ergonomics principles practiced

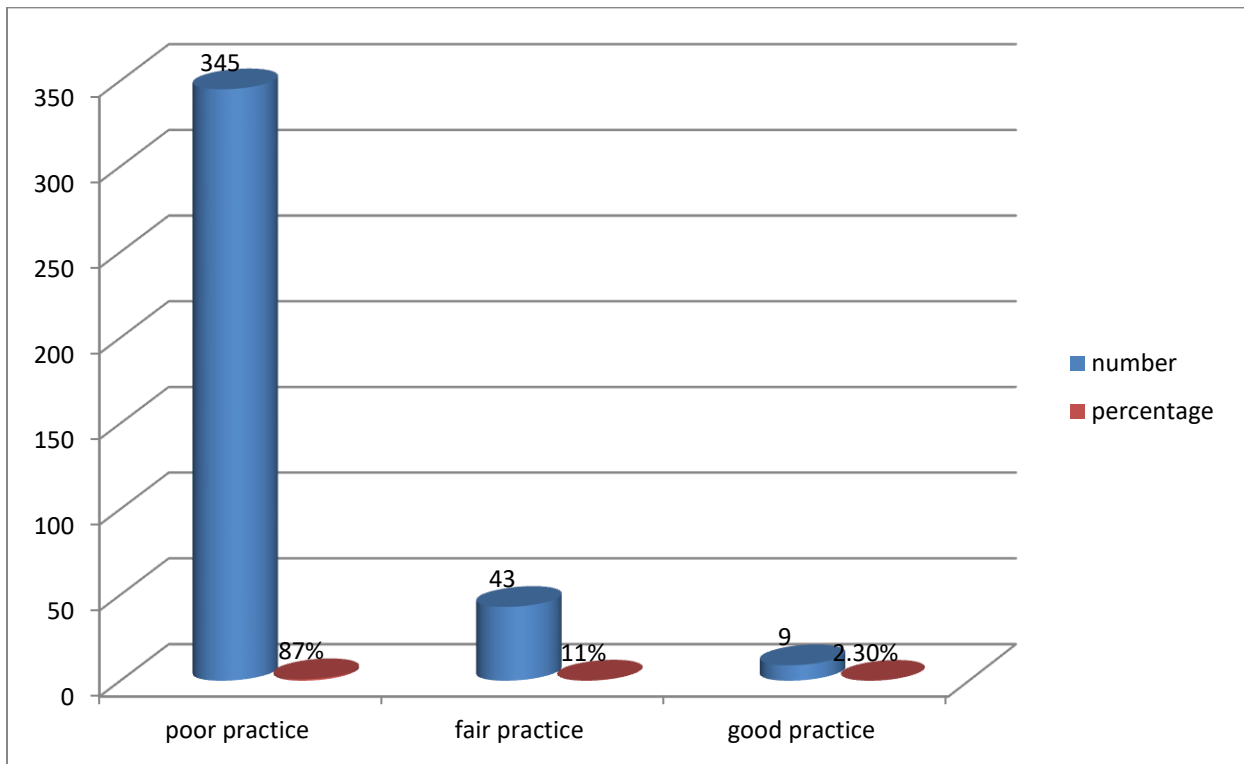


Figure 3 above shows that the level of ergonomics principles practiced preventing WRMSDs. Based on 15 principles asked to assess the level of principles practiced among respondents when at work, majority 345(86.9%) of the respondents poorly practiced these principles, 43(10.8%) had a fair level of practice of these ergonomics principles. However, only 9(2.3%) of the study respondents had good practice of these ergonomics principles to prevent work-related musculoskeletal disorders. The level of ergonomics principles practiced preventing work-related musculoskeletal disorders were more observed among female respondents than male respondents (Table 6). Good level of practice was more seen among male study participants whereas fair and poor levels of practice in the prevention of work-related MSDs were observed among female respondents (Table 6).

Figure 4:- levels of principles practiced by level of education and work experiences

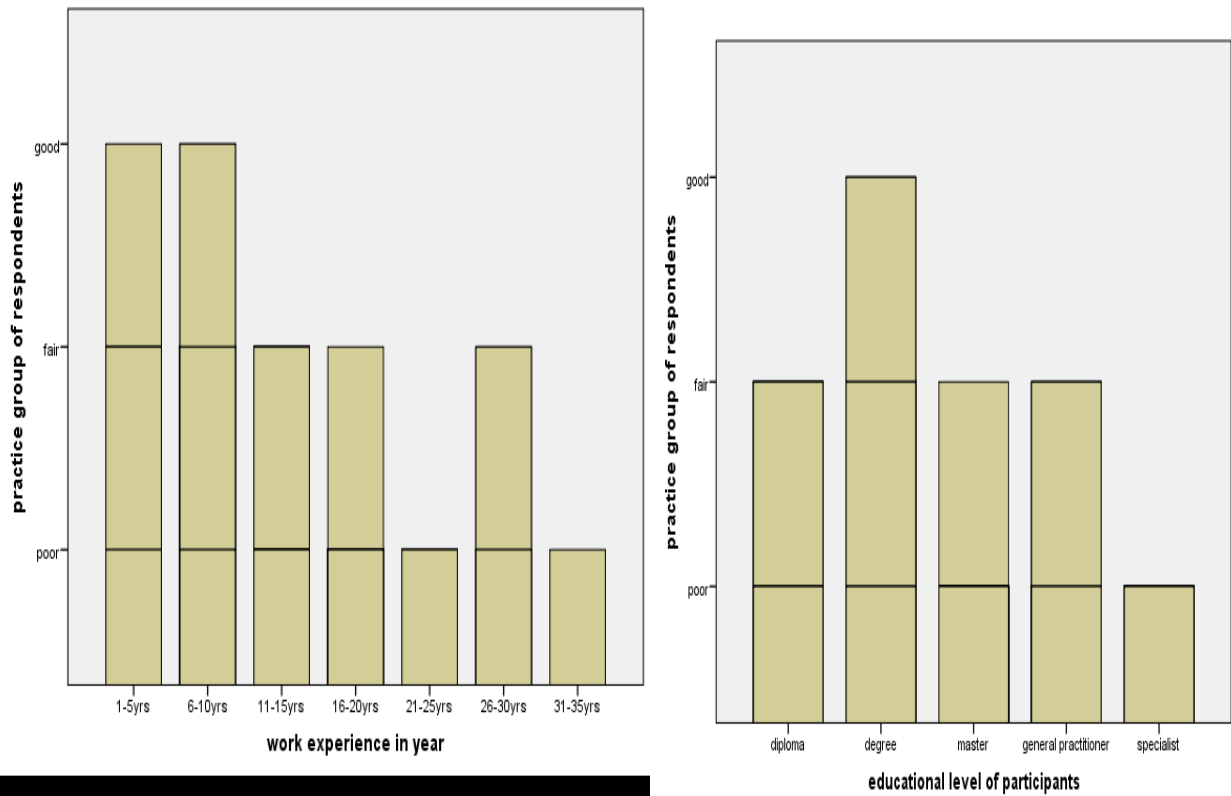


Figure 4 shows the level of practiced ergonomic principles by their work experience and educational level among study respondents. Good practiced principles were observed almost among the least experienced (1-5 yrs. and 6-10 yrs.) study respondents. Fair practiced principles were seen among the first four groups work experience while poor practices were observed among all work experience groups. Good practices' of ergonomics principles were only observed among degree educational level respondents whereas good and fair practiced principles were not observed among specialist study respondents.

5.13 Ordinal logistic regressions

For dependent variables practice levels was analyzed by using ordinal logistic regression that allowed us to compare multiple outcome categories for assessing existence and significant association with all independent factors. Model fit was checked by using Goodness-of-fit table using Pearson chi-square test. This model is selected due to most frequently used and easy to express the result. The result indicates that model fit the data well at p-value 0.648. Table 3 below shows that sex of respondents has a significant association with practice of ergonomic principles at p-value 0.026. Number of working days per week and number of working hours per day were significantly associated with level of ergonomics principle practice at p-value <0.05. The odds ratio was calculated by taking the exponent of the pooled estimate relative value to a given predictor, i.e. e^B and we obtain estimate of odds ratio ($\exp(B)$). Thus, the value of odd ratio for knowledge level for poor knowledge level is 2.077 which indicates that healthcare workers who have poor level of knowledge towards work-related musculoskeletal were 2 times more have good practice of principles of ergonomics and also healthcare workers whose knowledge level was fair is 1.4 times more likely to have a good practices of ergonomics to prevent work-related musculoskeletal disorders. The odds ratio of sex of study respondents is 10.23 which indicate that male healthcare workers are 10 times more likely to have good practices of ergonomic principles than female healthcare workers to prevent work-related musculoskeletal disorders. Number of working days per week has an odd ratio of 0.587 which indicates that health care workers those works less or equal to five days per week were 0.6 times lesser more likely to have a good practice of ergonomics principles than who works greater than five days per week to prevent the disorders of work-related musculoskeletal. The odds ratio of number of working hours for less than or equal to six hours per day is 7.099 which indicates that health care workers those works less or equal to six hours were 7 times more have a good practices of ergonomics principles than who works greater than eight hours per day and also those works 7-8 hours were 13 times more have a good practices of ergonomics principles than the reference group.

Table .3:- Ordinal logistic regression analysis for factors and practice level of healthcare workers in selected public hospital in Addis Ababa, Ethiopia, July 2021 (n=397).

variables		Estimate	Std. Error	Wald	d f	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[practice level = 1]	11.517	1685.362	.000	1	.995	-3291.733	3314.766
	[practice level= 2]	13.391	1685.362	.000	1	.994	-3289.859	3316.640
Location	[attitude level=1]	-.728	.752	.937	1	.333	-2.203	.746
	[attitude level=2]	0 ^a			0			
	[knowledge level=1]	.731	1.244	.346	1	.047	-1.707	3.169
	[knowledge level=2]	.314	1.145	.075	1	.049	-1.931	2.558
	[knowledge level=3]	0 ^a			0			
	[age=2]	-8.534	471.085	.000	1	.986	-931.845	914.776
	[age=3]	-10.171	471.085	.000	1	.983	-933.480	913.139
	[age=4]	-21.622	616.320	.001	1	.972	-1229.588	1186.343
	[age=5]	0 ^a			0			
	[sex=1]	2.375	1.517	4.946	1	.026	.401	6.349
	[sex=2]	0 ^a			0			
	[marital status=0]	-6.816	1442.841	.000	1	.996	-2834.732	2821.101
	[marital status=1]	-2.615	2.154	1.474	1	.225	-6.837	1.606
	[marital status=2]	-1.815	2.541	.510	1	.475	-6.796	3.165
	[marital status=3]	-14.683	689.144	.000	1	.983	-1365.381	1336.015
	[marital status=4]	0 ^a			0			
	[number of child=1]	1.037	.972	1.139	1	.286	-.868	2.942
	[number of child=2]	0 ^a			0			
	[education leve=1]	1.494	990.238	.000	1	.999	-1939.337	1942.324
	[education leve=2]	.317	990.236	.000	1	1.000	-1940.510	1941.145
[education leve=3]	.461	990.237	.000	1	1.000	-1940.368	1941.291	
[education leve=4]	.046	990.237	.000	1	1.000	-1940.783	1940.875	

[education leve=5]	0 ^a			0			
[salary=1]	.002	1.975	.000	1	.999	-3.870	3.873
[salary=2]	-1.163	1.044	1.24 0	1	.265	-3.210	.884
[salary=3]	0 ^a			0			
[experience =1]	9.767	471.081	.000	1	.983	-913.534	933.068
[experience=2]	8.849	471.081	.000	1	.985	-914.453	932.151
[experience=3]	10.791	471.081	.001	1	.982	-912.511	934.093
[experience=4]	0 ^a			0			
[workind day=1]	-.532	.817	.424	1	.022	-2.132	1.069
[working day=2]	0 ^a			0			
[work hour=1]	1.961	1460.62 5	.000	1	.041	-2860.811	2864.73 3
[work hour=2]	2.632	1363.76 9	.000	1	.045	-2660.306	2685.57 0
[work hour=4]	0 ^a			0			
[break hour=1]	-2.126	1.221	3.03 2	1	.082	-4.518	.267
[break hour=2]	-.617	1.033	.357	1	.550	-2.641	1.407
[break hour=3]	0 ^a			0			
[working department=1]	.149	1.720	.008	1	.931	-3.223	3.521
[working department=2]	-1.006	1.596	.397	1	.529	-4.135	2.123
[working department=3]	.946	1.791	.279	1	.597	-2.564	4.457
[working department=4]	-.297	1.815	.027	1	.870	-3.854	3.260
[working department=5]	-14.493	1363.77 0	.000	1	.992	-2687.433	2658.44 6
[workingdepartment =6]	-.716	2.144	.112	1	.738	-4.918	3.486
[workingdepartment =7]	0 ^a			0			

NB ;- 0^a is reference group

6. DISCUSSION

In the prevention of work-related musculoskeletal disorders among healthcare workers, effective application of ergonomics principles is very important that all healthcare workers should know about these principles and how they can be applied at work-place. Effective applications of these ergonomics principles would improve job satisfaction, job performance and long lives healthiness. In this study the assessment of knowledge of work-related musculoskeletal disorder prevention at work-place was carried out. The assessment showed that the majority of the study respondents were had a fair knowledge of two thirds regarding the prevention of work-related musculoskeletal disorder at work-place. Only one in five the study respondents had good knowledge regarding work-related musculoskeletal disorders prevention while 54(13.6%) of them had poor knowledge regarding work-related MSD prevention.

This low level of good knowledge (20.4%) is in-line with findings of a study done in Malaysia among health workers (25), in which not satisfactory knowledge regarding prevention of musculoskeletal disorder occurred as a result of work was reported. Another study also supported the finding of this study, in which only 35% of dental clinicians in India (26) were had good knowledge about applied ergonomics principles at work-place to prevent work-related musculoskeletal disorders. The finding of a study done in Bangladesh (28) also supported the finding of this study, in which only 32% of doctors were had good knowledge which is also not satisfactory in the prevention of this work-related musculoskeletal disorders among healthcare providers while at work. The low level of good knowledge towards the prevention of work-related musculoskeletal disorders may results in poor practices of ergonomic principles while at work and this may exposes the health workers to work-related MSDs. This may happen due to lack of on job refresher training for health workers.

This low result of good knowledge among study respondents is, however, not supported by other studies. Among which, a study conducted in India (2) among doctors was reported the 96% of study respondents had good knowledge regarding prevention of these disorders. The difference might be due to difference in sample size variation and study participant composition. The finding of this study also not in lined with study done in India (27) reported that 85% of study respondents were had adequate knowledge which is satisfactory in prevention of work related musculoskeletal disorder. The difference might be due to difference in study subjects; participants were periodontists, but the study participants of this study were all medical health workers.

This high result of fair knowledge among study respondents of this study is in-line with study conducted in Egypt (32) among dentists who reported that the majority (49%) of the respondents were had a fair knowledge regarding the prevention of work-related MSDs. The finding of the study done in Pakistan (37) also supports the result of this study, in which the majority of the respondents had fair knowledge (43%) concerning work-related musculoskeletal disorder prevention. The disparities between the finding of this study and studies scoring good knowledge might be study subject differences and training options. Raising the awareness with different means like on job training is very important to prevent the disorders occurred due to their working conditions. And also at graduating school commonly all health departments should be educated supporting the curriculum.

From this study assessment of attitude towards the application of ergonomics principles to prevent work-related musculoskeletal disorders was carried out. Attitude toward the application of these principles is very crucial in the prevention of these disorders. The assessment in this study show that majority of the study respondents had a poor attitude 254(64%) toward the prevention of these disorders. 143 (36%) of the study respondents had a good attitude which is not satisfactory in the prevention of these disorders.

The high results of this poor attitude are in-line with the findings of a study done in the United State among hospital nurses who reported that poor attitude toward the prevention of these disorders occurred at work-place (33). The result of a study conducted in India was also in-line with this in which not satisfactory attitude among study respondents were reported (34). The study conducted in Nigeria among physiotherapists was also in-line with the result of this study which show that majority (52%) of respondents were had poor attitude toward the application of ergonomics principles to prevent work related musculoskeletal disorders (35).

Literatures suggests that good attitude of healthcare providers toward applications of ergonomics principles will significantly increase the prevention activities of work related musculoskeletal disorders. The study conducted in India in contrasts with the finding of this study in which 85% of the respondents were had good attitude toward the application of ergonomics principles (27). This difference could be due to variation in subject study (periodontists), sample size variation, and data collection tool. This result is also not supported by study done among doctors that reported almost 96.9% of the respondents were had good attitude toward work- related musculoskeletal disorders at

work place (2). The difference might be due to difference study subjects, sample size variation and study setting which was in teaching hospital. The finding of this result also not in lined with study conducted among dental professionals (42) who reported a high attitude level score (75%). The difference might be due to difference in study subjects which was only on dentists, sample size variation and working environment condition. And also this result is not supported by study done among dentists (43) who reported that almost all respondents were had a good attitude toward the application of ergonomics principles to prevent work-related musculoskeletal disorders at work places this variation might be due to study participants, variation in sample size and study site.

The right and timely practices or application of ergonomic principles at work place promotes the health, efficiency and wellbeing of healthcare providers by preventing work-related musculoskeletal disorders. When level of knowledge and attitude good enough towards prevention of work related musculoskeletal disorders, the real practices of the ergonomics principles will ensured. In this study practice of these principles was assessed within 15 principles each with 4 scales. The results of this study show that majority 345(86.9%) of the study respondents had poor practices of ergonomics principles to prevent WRMSDs.

The high proportion of this poor practice is agreed with a study conducted in Bangladesh which reported 50% of the respondents were poorly practiced the ergonomics principles (28). Other study that in-line with this study also show that only 8% of the study respondents were had good practices which is very low to prevent work- related musculoskeletal disorders (10). The finding of a study done in Egypt that in-line with the finding of this study also indicates the only 5% of the study respondents were had good practices of the ergonomics principles (31). And also a study done in India among hospital doctors (2) only 13.9% of them had good practice of the necessary principles of ergonomics that in-line with the study this result. This finding is also strongly consistent with study conducted in Egypt among dentists.

Study conducted among dentist (9) is not consistent with the finding of this study as 49% of the study respondents were had a good practice of ergonomic principles to prevent work related musculoskeletal disorder. This disparity may have been due to study subjects who only rely on dentists as against different health professionals working in different clinical departments and sample size difference which was only 55 participants. The finding of this study is also not supported by study conducted in Cameroon who reported 66% of the study respondents had score a good practice

of ergonomic principles at work-place to prevent these disorders (44).the variation might be their knowledge was good enough that may results in a good practices and also this inconsistent may have been due to sample size difference which was only 80 study participants and the study subjects was only from oral health professionals. The other study which is not consistent with the finding of this study is Indian study that reported good practices (42). The difference might be study subject and sample size variation.

From this evidences which is very low practice, it can suggested that healthcare providers working in different clinical departments like inpatient, outpatient, emergency, laboratory, neonatal intensive care unit, physiotherapy and dentistry are vulnerable to develop work related musculoskeletal disorders and need some interventions like on job training.

In current study, the practice of healthcare workers showed a significant association with sex of respondents. Similar to this study, study conducted in India (2) and Pakistan (37) indicated that sex of healthcare workers significantly associated with practices of ergonomics. But the result is not in-line with study in Ethiopia (47) and Malaysia ().This difference might be due to working area setup and study respondent which was focused on laboratory workers. Number of working days per week shows a significant association with level of practice. Similar to this study, a study conducted in Nigeria (50) and Pakistan (37) showed that adequate practice of ergonomics among respondents was found to be significantly associated with working day per week. But study conducted in Ethiopia (47) and Nigeria (50) was not in-lined with this result. This difference might be due to working area setup and study respondents. Number of working hours per day is significantly associated level of ergonomics principles practices. Similar to this study, a study conducted in Nigeria (50) and Pakistan (37) showed that adequate practice of ergonomics among respondents was found to be significantly associated with working hours per day. The finding of this result is not in-lined with studies conducted in Uganda (8) which showed no association. This difference might be due to study subject variation which focuses only on nurses.

7. Strength

This is to assess practice of ergonomics principles to prevent work-related musculoskeletal disorders among healthcare workers and associated factors that may give ample of information for all interested in general.

High response rate was achieved because the data collectors were carefully selected and well informed and trained

8. Limitations

This study doesn't assess the work place environment analysis

Social desirability might be introduced; even though much effort was done to minimize it

Since the study design is cross sectional temporal relationship could not be assessed.

This study lacks qualitative study that could support quantitative study

9. Conclusion

In this study, it is evident that the majority of the study respondents had fair knowledge level and poor attitude toward prevention of work related musculoskeletal disorders at work place. The practice of ergonomic principles important to prevent work related musculoskeletal disorder was also very low. Knowledge level and practices of ergonomics principles are significantly associated. Sex of respondents, Number of working days per week and number of working hours per day were significantly associated with practice level of ergonomics principles to prevent work-related musculoskeletal disorders.

10. Recommendation

Base on this study findings, the following recommendation are forwarded accordingly.

To the healthcare workers

Better to self-update regarding work-related musculoskeletal disorders occurrence and methods of prevention

Better to practice all possible ergonomic principles to that used to prevent the occurrence of work-related musculoskeletal disorders.

Minimizing extra working days or hours that used to minimize exposure to WRMSDs

To the health facilities

Since the prevention and occurrence of WRMSDs knowledge and practices level of healthcare workers were not satisfactory among the respondents, the hospitals should facilitates on-going orientation/training concerning the principles of ergonomics are required for the health workers.

The hospitals should ensure the availability all needed materials for ergonomics application

The health facility should adjust working and breaking time for minimizing overstress or extra work that may expose the staffs to WRMSDs.

To the government

The government/ministry of health/ health bureau should give emphasis for the health of healthcare workers by ensuring availably of ergonomically conducive working environment

The government/ministry of health/ health bureau should ensure the availability of prevention guideline or training manuals and cascading to healthcare workers

The government/ministry of health/ health bureau should conduct periodic assessments and taking intervention action regarding the work-related musculoskeletal disorders among healthcare workers.

Further research

I recommend further study including work-place ergonomics analysis and qualitative aspect.

REFERENCES

1. Work related musculoskeletal disorder statistics (WRMSDs) in Great Britain, 2019. Available at <http://www.hse.gov.uk/statistics/causdis/musculoskeletal/index.htm>
2. Ephraim-Emmanuel, B.C., Ogbomade, R., Idumesaro, B.N. and Ugwoke, I., 2019. Knowledge, Attitude and Practice of Preventing the Occurrence of Work-Related Musculoskeletal Disorders among Doctors in University of Port-Harcourt Teaching Hospital. *Journal of Medical Research and Innovation*, 3(2), pp.e000161-e000161.
3. Yasobant S, Rajkumar P. Work-related musculoskeletal disorders among health care professionals: A cross-sectional assessment of risk factors in a tertiary hospital, India. *Indian journal of occupational and environmental medicine*. 2014 May;18(2):75.
4. Hanna Assefa (MD), Prevalence and risk factors of low back pain in nurses working at Tikur Anbessa specialized hospital and Zewditu memorial hospital, Addis Ababa, Ethiopia. 2017
5. Yasobant S, Rajkumar P. Work-related musculoskeletal disorders among health care professionals: A cross-sectional assessment of risk factors in a tertiary hospital, India. *Indian journal of occupational and environmental medicine*. 2014 May;18(2):75.
6. Nur Azma BA, Rusli BN, Oxley J, Quek K. Work related musculoskeletal disorders in female nursing personnel: prevalence and impact. *International Journal of Collaborative Research on Internal Medicine and Public Health*. 2016;8(3):294-98.
7. Chiwaridzo M, Makotore V, Dambi JM, Munambah N, Mhlanga M. Work-related musculoskeletal disorders among registered general nurses: a case of a large central hospital in Harare, Zimbabwe. *BMC research notes*. 2018 Dec 1;11(1):315.
8. Munabi IG, Buwembo W, Kitara DL, Ochieng J, Mwaka ES. Musculoskeletal disorder risk factors among nursing professionals in low resource settings: a cross-sectional study in Uganda. *BMC nursing*. 2014 Dec;13(1):1-8.
9. Dr. Karibasappa G.N DSA, Dr. Rajeshwari K. Dentists' Knowledge, Attitude and Behavior towards the Dental Ergonomics. *IOSR Journal of Dental and Medical Sciences*. May 2014; Volume 13(Issue 5 Ver. II.):PP 86-9.
10. da Costa BR, Vieira ER. Risk factors for work related musculoskeletal disorders: a systematic review of recent longitudinal studies. *American journal of industrial medicine*. 2010 Mar;53(3):285-323.

11. Kutty RK, Tadesse K, Kamaraj B. Prevalence and Various Risk Factors of Musculoskeletal Pain among Physiotherapists: A Survey Study. *Research & Reviews: A Journal of Neuroscience*. 2015 Nov 9;5(3):14-20.
12. Anderson SP, Oakman J. Allied health professionals and work-related musculoskeletal disorders: a systematic review. *Safety and health at work*. 2016 Dec 1;7(4):259-67
13. Long MH, Bogossian FE, Johnston V. The prevalence of work-related neck, shoulder, and upper back musculoskeletal disorders among midwives, nurses, and physicians: a systematic review. *Workplace health & safety*. 2013 May;61(5):223-9.
14. Yasobant S, Rajkumar P. Work-related musculoskeletal disorders among health care professionals: A cross-sectional assessment of risk factors in a tertiary hospital, India. *Indian journal of occupational and environmental medicine*. 2014 May;18(2):75.
15. Yasobant S, Rajkumar P. Health of the healthcare professionals: A risk assessment study on work-related musculoskeletal disorders in a tertiary hospital, Chennai, India. *International Journal of Medicine and Public Health*. 2015;5(2).
16. Wadhawan R, Luthra K, Sidhu JK, Solanki G. Comforting the dental surgeon a review on ergonomics. *Int J Odontol Sci*. 2015;1:1-9.
17. CDC, Work-Related Musculoskeletal Disorders & Ergonomics, 2020 available at <https://www.cdc.gov/workplacehealthpromotion/health-strategies/musculoskeletal-disorders/index.html>
18. ILO. *Creating Safe and Healthy Workplaces for All* 2014.
19. Berberoğlu U, Tokuç B. Work-related musculoskeletal disorders at two textile factories in Edirne, Turkey. *Balkan medical journal*. 2013 Mar;30(1):23.
20. Kebede Deyyas W, Tafese A. Environmental and organizational factors associated with elbow/forearm and hand/wrist disorder among sewing machine operators of garment industry in Ethiopia. *Journal of environmental and public health*. 2014;2014.
21. Haile EL, Taye B, Hussen F. Ergonomic workstations and work-related musculoskeletal disorders in the clinical laboratory. *Laboratory Medicine*. 2012 Nov 1;43(suppl_2):e11-9.
22. Sikiru L, Shmaila H. Prevalence and risk factors of low back pain among nurses in Africa: Nigerian and Ethiopian specialized hospitals survey study. *East African journal of public health*. 2009 Apr 1;6(1).

23. Shipra N, Rohit N, Aggarwal NG. Ergonomic principles to prevent musculoskeletal disorders in dental professionals. *International Journal of Dental Health Concerns*. 2015;1(1):1-5.
24. Yazdani A, Wells R. Barriers for implementation of successful change to prevent musculoskeletal disorders and how to systematically address them. *Applied ergonomics*. 2018 Nov 1; 73:122-40..
25. Deros BM, Daruis DD, Basir IM. A study on ergonomic awareness among workers performing manual material handling activities. *Procedia-Social and Behavioral Sciences*. 2015 Jul 3; 195:1666-73.
26. Padmapriya R. Awareness of dental ergonomics amongst dental practitioners and post graduates in Chennai city-A cross sectional study. *International Journal of Medical Science And Diagnosis Research*. 2019 Sep 30;3(9).
27. Ketkar GN, Malaiappan S. Knowledge Attitude and Practice of Ergonomics and Musculoskeletal Disorders as an Occupational Hazard among Periodontists in India—A Questionnaire Based Survey. *Journal of Pharmaceutical Research International*. 2020 Aug 28:162-83
28. Hasan AS, Salek AK, Ahmed SM. Awareness and practice of computer-related ergonomics among resident doctors. *Bangabandhu Sheikh Mujib Medical University Journal*. 2020 Jun 16;13(2):53-7.
29. Prapti NK, Nurhesti PO, Tirtayasa K. Ergonomic Program And Nursing Intervention In Nursing Students. *Journal of a Sustainable Global South*. 2020 Feb;4(1):17.
30. Almutairi NS, Tamrin SB, Guan NY, How V. Review of knowledge, attitude, and practice among laboratory workers towards occupational safety and health. *Malaysian J. Med. Heal Sci*. 2020;16(1):297-303.
31. Siddiqui TM, Wali A, Khan OH, Khan M, Zafar F. Assessment of knowledge, practice, and work environment related to ergonomics among dental students and dental practitioners. *International Journal of Contemporary Dental & Medical Reviews*. 2016;2016.
32. Adje M, Odebiyi DO, Okafor UA, Kalu M. Ergonomic principles in patient handling: Knowledge and practice of physiotherapists in Nigeria. *Work*. 2018 Dec 4(Preprint):1-8.
33. Prapti NK, Nurhesti PO, Tirtayasa K. Ergonomic Program and Nursing Intervention In Nursing Students. *Journal of a Sustainable Global South*. 2020 Feb;4(1):17.

34. Karibasappa GN, Sujatha A, Rajeshwari K. Dentists' knowledge, attitude and behavior towards the dental ergonomics. *IOSR J Dent Med Sci.* 2014; 13:86-9.
35. Mbada CE, Adejuyigbe OI, Omole JO, Idowu OA, Okafor UA, Adekanla BA, Okonji AM. Assessment of knowledge, attitude and perception of Nigerian physiotherapists on manual handling techniques. *Journal of Environmental and Occupational Health.* 2015 Dec 18;4(4):203-9
36. Ratzon NZ, Bar-Niv NA, Froom P. The effect of a structured personalized ergonomic intervention program for hospital nurses with reported musculoskeletal pain: An assigned randomized control trial. *Work.* 2016 Jan 1;54(2):367-77.
37. Mumtaz R, Haroon S, Sajjad S, Masoud S, Hashmi J. Ergonomics knowledge and practices of dental interns in Islamabad. *Pakistan Oral & Dental Journal.* 2018 Nov 26;38(3):341-4
38. Kumar S, Gupta VK, Mishra G. Ergonomics in Dentistry: Really A Practice or Just a Tactics.
39. Lietz J, Ulusoy N, Nienhaus A. Prevention of Musculoskeletal Diseases and Pain among Dental Professionals through Ergonomic Interventions: A Systematic Literature Review. *International Journal of Environmental Research and Public Health.* 2020 Jan;17(10):3482.
40. Sirat RM, Rohani JM, Ahmad N, Shaharoun AM, Haron H. Education Level, Working Experiences and Ergonomics Training Effect on Ergonomics Awareness and Practices in Malaysia. *International Journal of Engineering & Technology.* 2018;7(3.24):12-7.
41. Munaga S, Rawtiya M, Khan S, Chitumalla R, Kubagiri SK, Sajjan P. Assessment of knowledge, practices, and work place condition related to ergonomics among dental students of Bhopal city-A questionnaire study. *Journal of Orofacial Sciences.* 2013 Jul 1;5(2):109.
42. Kalghatgi S, Prasad KV, Chhabra KG, Deolia S, Chhabra C. Insights into ergonomics among dental professionals of a dental institute and private practitioners in Hubli-Dharwad twin cities, India. *Saf Health Work* 2014;5:181-5.
43. Bushra R, Ayesha A, Afsheen A, Anum T. Ergonomic hazards to dental surgeons: A cross-sectional study. *Pak Oral Dent J* 2016;36:168-71.
44. Ashu MA, Kamo H. Work-related musculoskeletal disorders amongst oral health workers in Cameroon. *Oral Health Dent Manag* 2016; 15:1-6.
45. Kasaw Kibret A, Fisseha Gebremeskel B, Embaye Gezae K, Solomon Tsegay G. Work-related musculoskeletal disorders and associated factors among bankers in Ethiopia, 2018. *Pain Research and Management.* 2020 Sep 8;2020.

46. Alqam TI. Occupational hazards among laboratory workers in Palestinian governmental hospitals in the West Bank (Doctoral dissertation, Master Thesis).
47. Wondwossen K. Assessment of knowledge, attitude and practice towards occupational health and safety among medical laboratory personnel in selected governmental teaching hospitals of Ethiopia. Addis Ababa: AAU. 2015.
48. Sakzewski L, Naser-ud-Din S. Work-related musculoskeletal disorders in Australian dentists and orthodontists: risk assessment and prevention. *Work*. 2015 Jan 1;52(3):559-79.
49. Siddiqui TM, Wali A, Khan OH, Khan M, Zafar F. Assessment of knowledge, practice, and work environment related to ergonomics among dental students and dental practitioners. *International Journal of Contemporary Dental & Medical Reviews*. 2016;2016.
50. Adje M, Odebiyi DO, Okafor UA, Kalu ME. Ergonomic principles in patient handling: Knowledge and practice of physiotherapists in Nigeria. *Work*. 2019 Jan 1;64(4):825-32.

ANNEXES

Annex I. English version Informed Consent Information sheet

Principal investigator: yohannes kenne

Title: Knowledge, Attitude, and Practice of ergonomics principles to Prevent Work-Related Musculoskeletal Disorders among healthcare providers in public hospitals, Addis Ababa, Ethiopia, 2020

Hello. My name is _____, I am here to collect data for

The research purpose, which is conducted to complete a thesis for Master's Degree of Public Health. The study will be conducted in public hospitals of Addis Ababa town.

Before you decide to participate or not in this study, I like to clarify the purpose of the Study, risk and benefits.

Purpose: The main purpose of this study is to assess Knowledge, Attitude, and Practice of ergonomics principles to Prevent Work-Related Musculoskeletal Disorders among healthcare providers in public hospitals. This finding will help to identify the main gap in regarding application of ergonomics principles that is used to prevent work place musculoskeletal disorders.

Procedure: After signing the consent form you will start to fill the questions using structured questionnaire. The questions will take 20 to 30 minute of your time.

Risk/Discomfort: There is no any risk that will happen to you due to your participation, but your precious time will be used to answer the question. Some questions may be too personal but it is helpful for the study.

Benefit or Incentive: By your participation, you may not get the direct benefit/incentive, but this research finding will give information about knowledge, attitude and practice of ergonomics principles to prevent work related musculoskeletal disorders.

Confidentiality: The information that you will give will be kept confidential (will not be shared with any one) and used only for research purpose. A code will be used to identify the participant therefore, writing your name is not needed.

Rights of Participants: Your participation in this research is fully voluntary and you have also a right to refuse some question you are not willing to answer. You have also a full right to withdraw from this study at any time you want.

Are you willing to participate in this study? 1. Yes 2. No

Annex II. Amharic version information sheet

የምርምር/ጥናት ማብራሪያ የስምምነት መግለጫ ቅፅ

ጥናተ አድራጊ፡- ዮሐንስ ኬኔ

ርዕስ፡- በስራ ምክንያት የጡንቻና የመገጣጠሚያ አካላት ህመም ለመከላከል ግንዛቤ፣ አመለካከትና የስራ ደህንነት መርሆች ትግበራን በተመለከተ በአዲስ አበባ በሚገኙ የመንግስት ሆስፒታሎች ላይ ምርምር ማድረግ።

ጤና ይስጥልኝ ስሜ _____ ይባላል።አዚህ

የመጣሁት በህብረተሰብ ጤና የሁለተኛ ዲግሪዬን ለመስራት በአዲስ አበባ በሚገኙ የመንግስት ሆስፒታሎች ላይ ጥናት ለማድረግ ነው።

በጥናቱ ላይ ለመሳተፍ ወይም ላለመሳተፍ ከመወሰንዎት በፊት የጥናቱን

አላማ፣ጥናቱላይ በመሳተፍዎ የሚያገኙትን ጥቅም እና ጉዳት አብራራልዎታለው።

አላማ፡-የዚህ ጥናት ዋና አላመው በስራ ቦታ ላይ በስራ ምክንያት ለሚከሰቱ የጡንቻ እና የመገጣጠሚያ አካላት ህመምን በተመለከተ የጤና ባለሙያዎች ግንዛቤ፣አመለካከት እና የስራ ደህንነት መርሆች ትግበራን በአዲስ አበባ በሚገኙ የመንግስት ሆስፒታሎች ውስጥ ጥናት ማድረግ ነው። ይህ ግኝት ይህ ችግር እንዳይባባስ ለመከላከል እንዲሁም የምርመራ ልምዶችን በማካበት ችግሩ ሳይባባስ ለመከላከል ይረዳናል።

የአሰራር ሂደት፡- የስምምነት ፎርምን ከፈረሙ በኋላ መረጃው ከ 20-30 ደቂቃ የተዋቀረ መጠይቅ በመጠቀም ጥያቄውን ይሞላሉ።

ሊያስከትለው የሚችለው ጉዳት፡- በጥናቱ በመሳተፎዎ የሚደርስብዎት ምንም አይነት ጉዳት አይኖርም።ነገር ግን ለቃለ መጠይቁ የምንወስድብዎት ሰዓት ይኖራል።

ጥቅሞች/ማበረታቻዎች፡- በመሳተፍዎ የሚያገኙት ቀጥተኛ ጥቅም ላይኖር

ይችላል።ነገር ግን የጥናቱ ውጤት ለጤና ባለሙያዎች በርእሱ ዙሪያ መረጃ ይስጣል።በዚህ ርዕስ ዙሪያ ማንኛውም ጥያቄ ካለዎት ይብራራሎዎታል።

ሚስጥር ስለመጠበቅ፡- የሚሰጡት መረጃ በሚስጥር የሚያዝ ሲሆን ለዚህ ጥናት አገልግሎት ብቻ የሚውል ነው።መለያ ቁጥር ስለምንጠቀም ስምዎትን መፃፍ አያስፈልግም።

የተሳታፊው መብት፡- የርስዎ ተሳትፎ ሙሉ በሙሉ በፍቃደኝነት ላይ የተመሰረተ ነው።የማይፈልጉትን ጥያቄ አለመመለስ እንዲሁም በማንኛውም ሰዓት ከጥናቱ መውጣት ይችላሉ።

በዚህ ጥናት ለመሳተፍ ፍቃደኝነዎት? 1. አዎ 2. አይደለሁም

Annex III. English version Informed Consent

Detail information about the study was explained to me. I have understood that the main objective of this study is to assess Knowledge, Attitude, and Practice of ergonomics principles to Prevent Work-Related Musculoskeletal Disorders among healthcare providers in Zewditu memorial hospital, Menelik II Hospital, and Yekatit 12 hospital, 2020.

In addition, I understand about how the data collection is proceeding and the time it takes to complete the data collection. I also understand that the research imposes no risk on me. I assured that there would be confidentiality of my response and collected data used only for the study.

It also explained to me that I have the right to stop participation at any time.

In addition, I understood that participating in this study is important for scientific knowledge and base for further study. Therefore, I have now consented to participate in the study by signing this form.

Signature of participants _____ date _____

Name and signature of data collectors _____ date _____

Annex iv Amharic version informed consent

የስምምነት መዋዋያ ሰነድ፡

ስለጥናቱ ጥናቱን ከሚካሄደው አካል በቂ መረጃ ተሥጥቶኛል። ከዚህም በተጨማሪ ከኔ የሚወሰደው መረጃ በእኔ ላይ ምንም አይነት ጉዳት የማያስከትል መሆኑን ተረድቻለሁ። እንደሁም እኔን በተመለከተ የመረጃ ሚስጥራውነት የተጠበቀ መሆኑን እና በጥናቱ ለመሳተፍ ፍቃደኛ ካልሆኑክ በጥናቱም ለመሳተፍ እንደማልገደድ ነገር ግን ስለ በጤና ባለሙያዎች ላይ በስራ ምክንያት የሚከሰቱ የጡንቻና የመገጣጠሚያ አካላት ህመም ከስራ ጋር የተዛመደ የጡንቻ ህመም ዙርያ ያለኝን መረጃ ብለጥና ምርመራ ቢደረግ ወደ ፊት በችግሩ ዙርያ ለሚሰሩ ስራዎች ግብአት መስጠት እንደሚችል ተረድቻለሁ።

ስለሆነም በዝህ ጥናት ለመሳተፍ የተስማማሁ መሆኔን በፍርማዬ አረጋግጣለሁ።

የተሳታፊው ስምና ፊርማ _____ ቀን _____

የመረጃ ሰብሳብው ስምና ፍርማ _____ ቀን _____

Annex v . English version Questionnaire

Work related musculoskeletal disorder among health professionals

Part one: Socio demographic characteristics

S. No	Questions /variables	Coding category	Skip to
1	Age of the worker	Age in years _____	
2	Sex of worker	1. male 2. female	
3	What is your current marital status?	1. Married 3. Divorced 2. Single 4. Widowed	
4	How many children do you have (for female only)	-----	
5	Educational level	1. Diploma 4. G/ practitioner 2. Degree 5. specialist 3. master	
6	Monthly salary	----- birr	
7	Overall, how-many- years have you been worked in hospital	----- years	
8	How many days do you Work per week	-----days	
9	How many hours do you actively Work per day?	a. 1-2 b. 3-4 c. 5-6 d. 7-8 e. >8	
10	For how long do you take breaks from work in a day?	a. <30 minutes b.30-60 minutes c.>60 minutes	
11	At what department are you currently working	-----	

PART TWO: KNOWLEDGE OF PREVENTION OF MUSCULOSKELETAL DISORDERS

(MSDs) please circle your answers

s.n	Questionnaire	Response
1	Can grasping small instruments for long periods prevent the occurrence of MSDs?	Yes No
2	Can forceful hand exertions while working contribute to the occurrence of MSDs?	Yes No
3	Can abnormally positioning the hand or wrist prevent the occurrence of MSDs?	Yes No
4	Will rest while working contribute to the occurrence of MSDs?	Yes No
5	Do taking adequate breaks between work procedures prevent the occurrence of MSDs?	Yes No
6	Can frequent lifting of heavy equipment/materials at work contribute to the occurrence of MSDs?	Yes No
7	Will flexing the wrist between 100 ⁰ and 120 ⁰ prevent the occurrence of MSDs?	Yes No
8	Does bending the neck beyond 20 ⁰ while working contribute to the occurrence of MSDs?	Yes No
9	Can flexing the upper back contribute to the occurrence of MSDs?	Yes No
10	Will keeping the shoulders relaxed prevent the occurrence of MSDs?	Yes No
11	Can avoiding prolonged working hours be useful in preventing the occurrence of MSDs?	Yes No
12	Can stretching exercises be useful in preventing the occurrence of MSDs?	Yes No
13	Does having good access to instruments, visibility and comfort during work be useful in preventing the occurrence of MSDs?	Yes No
14	Does taking regular breaks and achieving optimal work posture play a vital role in preventing the occurrence of MSDs?	Yes No
15	Can the consideration of ergonomics in acquisition of hospital equipment play a vital role in preventing the occurrence of MSDs?	Yes No

PART THREE: ATTITUDE TOWARDS APPLICATION OF ERGONOMICS IN PREVENTING MUSCULOSKELETAL DISORDERS (MSDs) please circle your answer

s.n	Questionnaire	Response
1	For better viewing of my workspace, it is preferable to bend my head forward instead of adjusting the workspace.	Agree Disagree
2	. I cannot do without bending my back while working because it makes my work easier.	Agree Disagree
3	. In order to finish my work on time, I prefer to attain the same position (e.g. sitting) for long periods while working instead of changing positions while working.	Agree disagree
4	Taking breaks while performing my duties at work is a mere waste of time.	Agree Disagree
5	Forceful hand movements while working enables me get work done on time regardless of the consequences that may occur	Agree Disagree
6	engaging in physical activity/exercise e.g. stretching, walking etc. are ideal for maintaining good health	Agree Disagree
7	my back supported while working is always considered whenever I'm working	Agree Disagree
8	Workplace adjustment while working in order to avoid musculoskeletal disorders is a difficult task.	Agree Disagree
9	In a bid to avoid musculoskeletal disorders, neck bending while working must be avoided	Agree Disagree
10	Applying ergonomic principles at work to avoid musculoskeletal disorders is an achievable task.	Agree Disagree

PART FOUR: PRACTICES OF ERGONOMIC PRINCIPLES TO PREVENT WORK RELATED MUSCULOSKELETAL DISORDER

Which of the following principles of ergonomics did you apply while at work to prevent work related musculoskeletal disorder? **(PLEASE CHOOSE ALL OPTIONS APPLIED BY YOU)**

s. n	Ergonomic principles	Say Yes if you apply or say no if not	If yes, How often did you apply? please circle your answer
1	Changing positions while working		A, always c, rarely, b, sometimes d, never
2	Keeping back supported while sitting		A, always c, rarely, b, sometimes d, never
3	Keeping shoulders relaxed while working		A, always c, rarely, b, sometimes d, never
4	Taking intermittent breaks while working		A, always c, rarely, b, sometimes d, never
5	Ensuring gentle hand movements		A, always c, rarely, b, sometimes d, never
6	Engaging in physical activity while working, e.g., stretching etc.		A, always c, rarely, b, sometimes d, never
7	Ensuring and/or advocating for ergonomically considered shift duties		A, always c, rarely, b, sometimes d, never
8	Adjusting the workspace for better operator-patient positioning		A, always c, rarely, b, sometimes d, never
9	Working with assistance when necessary		A, always c, rarely, b, sometimes d, never
10	Stopping work activity for a while when discomfort arises		A, always c, rarely, b, sometimes d, never
11	Ensuring orderliness of work instruments while working		A, always c, rarely, b, sometimes d, never
12	Consciously positioning the body within safe ergonomic limits while working		A, always c, rarely, b, sometimes d, never
13	Placing feet flat on the floor when working		A, always c, rarely, b, sometimes d, never
14	Keeping neck tilted only within safe limits		A, always c, rarely, b, sometimes d, never
15	Consideration of ergonomic principles when purchasing work materials, tools and/or equipment		A, always c, rarely, b, sometimes d, never

Annex vi. Amharic version questionnaire

መጠይቅ

በየጤና ባለሙያዎች ላይ በስራ ምክንያት የሚከሰቱ የጡንቻና የመገጣጠሚያ አካላት ህመም ከስራ ጋር የተዛመደ የጡንቻ ህመም

ክፍል አንድ:- ማህበራዊና ኢኮኖሚያዊ ሁኔታ መረጃዎች

ተ.ቁ	ጥያቄዎች / ተለዋዋጮች	የምልክት ምድብ	ዝላል ወደ
1	የሰራተኛው ዕድሜ	ዕድሜ በዓመት _____	
2	የሰራተኛ ፆታ	1. ወንድ 2. ሴት	
3	የአሁኑ የጋብቻ ሁኔታዎ ምንድን ነው?	1. ያገባ 3. ፍቺ 2. ነጠላ 4. ባሏ የሞተ	
4	ስንት ልጆች አለዎት (ለሴት ብቻ)	-----	
5	የትምህርት ደረጃ	1. ዲፕሎማ 4. ጂ / ባለሙያ 2. ዲግሪ 5. ባለሙያ 3. ዋና	
6	ወርሃዊ ደመወዝ	----- ብር	
7	በአጠቃላይ ፣ ስንት አመት በሆስፒታል ውስጥ ሲሰሩ ቆይተዋል	-----	
8	በሰዎች ስንት ቀናት ነው የሚሰሩት	----- - ቀናት	
9	በቀን ስንት ሰዓት በትጋት ይሰራሉ ?	ሀ. 1-2 ለ. 3-4 ሐ. 5-6 መ. 7- ሠ. >8	
10	በቀን ውስጥ ከስራ እረፍት ለምን ያህል ጊዜ ይወስዳሉ?	ሀ. <30 ደቂቃዎች ሐ. 30-60 ደቂቃዎች ሐ> 60 ደቂቃዎች	
11	በየትኛው ክፍል ውስጥ ነው የሚሰሩት?	-----	

ክፍል ሁለት : የግንዛቤ መመዘኛ ጥያቄዎች መልሶቹ ላይ ያካተቡ

ተ.ቁ	ጥያቄዎች	ምላሽ
1	ትናንሽ መሳሪያዎችን ለረጅም ጊዜ መያዙ የጡንቻና የመገጣጠሚያ አካላት ህመም መከሰት ሊከላከል ይችላል?	አዎ የለም
2	በሚሰሩበት ጊዜ በኃይል የሚሠሩ የእጅ እንቅስቃሴዎች ለጡንቻና የመገጣጠሚያ አካላት ህመም መከሰት አስተዋጽኦ ያደርጋሉ?	አዎ የለም
3	እጅን ወይም አንጓን ባልተለመደ ሁኔታ ላይ ማድረግ የጡንቻና የመገጣጠሚያ አካላት ህመም እንዳይከሰቱ ይከላከላል?	አዎ የለም
4	በሚሰሩበት ጊዜ እረፍት ማድረግ ለጡንቻና የመገጣጠሚያ አካላት ህመም መከሰት አስተዋጽኦ ያበርዳል?	አዎ የለም
5	ሂደቶች መካከል በቂ እረፍት መውሰድ የጡንቻና የመገጣጠሚያ አካላት ህመም መከሰትን ይከላከላል?	አዎ የለም
6	በሥራ ቦታ ብዙ ጊዜ ከባድ መሳሪያዎችን / ቁሳቁሶችን ማንሳት ለጡንቻና የመገጣጠሚያ አካላት ህመም መከሰት አስተዋጽኦ ያበረክታል?	አዎ የለም
7	የእጅ አንጓውን በ 100 ° እና በ 120 ° መካከል መለዋወጥ የጡንቻና የመገጣጠሚያ አካላት ህመም እንዳይከሰቱ ይከላከላል?	አዎ የለም
8	በሚሰሩበት ጊዜ አንገትን ከ 20 ° በላይ ማጠፍ ለጡንቻና የመገጣጠሚያ አካላት ህመም መከሰት አስተዋጽኦ ያደርጋሉ?	አዎ የለም
9	የላይኛውን ጀርባ ማወዛወዝ ለጡንቻና የመገጣጠሚያ አካላት ህመም መከሰት አስተዋጽኦ ሊያደርግ ይችላል?	አዎ የለም
10	ትኩረት ዘንድ እንዲል ማድረግ የጡንቻና የመገጣጠሚያ አካላት ህመም እንዳይከሰት ይከላከላል?	አዎ የለም
11	. ለጡንቻና የመገጣጠሚያ አካላት ህመም እንዳይከሰት ለመከላከል የተራዘመ የሥራ ሰዓት መሰራትን ማስቀረት ጠቃሚ ሊሆን ይችላል?	አዎ የለም
12	የጡንቻና የመገጣጠሚያ አካላት ህመም ክስተቶች እንዳይከሰቱ ለመከላከል የአካል ብቃት እንቅስቃሴ መልመጃዎች ጠቃሚ ሊሆኑ ይችላሉ?	አዎ የለም
13	በስራ ወቅት በቂ የመሳሪያዎች አቅርቦት ፣ የእይታን ደረጃ እና ምችት የጡንቻና የመገጣጠሚያ አካላት ህመም እንዳይከሰት ለመከላከል ጠቃሚ ነው?	አዎ የለም
14	መደበኛ ዕረፍቶችን መውሰድ እና ጥሩ የሥራ ሁኔታን ማግኘት ጡንቻና የመገጣጠሚያ አካላት ህመም እንዳይከሰት ለመከላከል ወሳኝ ሚና ይጫወታል?	አዎ የለም
15	የሆስፒታል ቁሳቁሶችን በምናገኘበት ጊዜ የሙያ ደህንነትን መሰረት ማድረግ የጡንቻና የመገጣጠሚያ አካላት ህመም እንዳይከሰት ለመከላከል ወሳኝ ሚና ይጫወታል?	አዎ የለም

ክፍል ሦስት - ስለ የሙያ ደህንነት ትግበራ የጡንቻና የመገጣጠሚያ አካላት ህመም ለመከላከል አመለካከትን በተመለከተ። በመልሶቹ ላይ ያካተቡ

ተ.ቁ	ጥያቄዎች	ምላሽ
1	የሥራ ቦታዬን በተሻለ ሁኔታ ለማየት የሥራ ቦታውን ከማስተካከል ይልቅ ራሴን ወደ ፊት ማጠፍ ተመራጭ ነው	እስማማለው አልስማማም
2	. እየሠራሁ ሳለሁ ጀርባዬን ሳላጥፍ መስራት አልችልም ምክንያቱም ሥራዬን ቀላል ያደርገዋል ።	እስማማለው አልስማማም
3	ሥራዬን በሰዓቱ ለመጨረስ እኔ በምትሠራበት ጊዜ የሥራ ቦታን ከመቀየር ይልቅ ለረጅም ጊዜ አንድ ዓይነት ቦታ (ለምሳሌ ቁጭ ብዬ) መስራትን እመርጣለሁ ።	እስማማለው አልስማማም
4	በሥራዬ ላይ እያለሁ እረፍት መውሰድ ጊዜ ማባከን ብቻ ነው ።	እስማማለው አልስማማም
5	እየሠራሁ እያለ በኃይል የሚንቀሳቀሱ የእጅ እንቅስቃሴዎች በሰዓት መከናወን እንድችል ይረዳኛል	እስማማለው አልስማማም
6	በአካል ብቃት እንቅስቃሴ / የአካል ብቃት እንቅስቃሴ መሳተፍ ለምሳሌ መዘርጋት ፣ መራመድ ወዘተ የመሳሰሉት ጤናን ለመጠበቅ ተስማሚ ነው።	እስማማለው አልስማማም
7	በምሠራበት ጊዜ ጀርባዬን መደገፍ ሁል ጊዜም መታሰብ አለበት።	እስማማለው አልስማማም
8	የጡንቻና የመገጣጠሚያ አካላት ህመም ችግር ለማስቀረት በሚሠራበት ጊዜ የሥራ ቦታ ማስተካከያ ማድረግ ከባድ ሥራ ነው ።	እስማማለው አልስማማም
9	የጡንቻና የመገጣጠሚያ አካላት ህመም ችግር ለማስቀረት አንገት አጠፎ መስራት መቅረት አለበት።	እስማማለው አልስማማም
10	የጡንቻና የመገጣጠሚያ አካላት ህመም ችግር ለማስወገድ የስራ ደህንነት (ergonomic) መሰረታዊ መርሆዎችን መተግበር ሊደረስበት የሚችል ተግባር ነው ።	እስማማለው አልስማማም

ክፍል አራት፡የጡንቻና የመገጣጠሚያ አካላት ህመም ለመከላከል የስራ ደህንነት መርሆች ትግብራን በተመለከተ

ከሚከተሉት የሙያ ደህንነት መርሆች ትኞቹን ትተገብራለህ ወይም ስራ ስትሰራ የተኖቹን ተግባራዊ? (በእርስዎ የሚተገቡትን ሁሉንም አማራጮች ይምረጡ)

s. n	የሙያ ደህንነት መርሆች	የሚያመለክቱ ከሆነ ወይም አይሆንም ከሆነ አዎ ይበሉ	መልስዎ አዎ ከሆነ ስንት ጊዜ ያመለክቱ ነበር? እባክዎን መልስዎን ያክብቡ
1	በሚሠራበት ጊዜ ቦታዎችን መለወጥ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
2	በሚቀመጡበት ጊዜ ወገብን/ጀርባን መደገፍ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
3	በሚሰሩበት ጊዜ ትኩረትዎን ዘና ማድረግ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
4	በሚሠራበት ጊዜ የማያቋርጥ ዕረፍቶችን መውሰድ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
5	ረጋ ያሉ የእጅ እንቅስቃሴዎችን ማረጋገጥ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
6	በሚሠራበት ጊዜ በአካል እንቅስቃሴ መሳተፍ ፣ ለምሳሌ ፣ መዘርጋት/ መንጠራራት ወዘተ.		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
7	የሙያ ደህንነትን መሰረት ያደረገ የስራ ለውጥ ማድረግ/ማረጋገጥ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
8	ለተሻለ ስራ የስራ ቦታውን ማስተካከል ወይም ምቹ ማድረግ ለምሳሌ የታካሚ አቀማመጥ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
9	አስፈላጊ ሆኖ ሲገኝ ከሚረዳ ሰው ጋር መሥራት		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
10	ምቹት በማይኖርበት ጊዜ ለተወሰነ ጊዜ የሥራ እንቅስቃሴውን ማቆም		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
11	በሚሰሩበት ጊዜ የሥራ መሣሪያዎች ቅደም ተከተል መያዙን ማረጋገጥ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
12	በሚሰሩበት ጊዜ በአስተማማኝ የሙያ ደህንነት (ergonomic) ገደቦች ውስጥ ሰውነትን በጥንቃቄ ማስቀመጡ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
13	በሚሰሩበት ጊዜ እግሮችን መሬት በማስቀመጥ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
14	አንገትን ደህንነቱ በተጠበቀ ወሰን ውስጥ ብቻ እንዲንጠለጠል ማድረግ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ
15	የሥራ ቁሳቁሶችን/ወይም መሳሪያዎችን ሲገዙ የሙያ ደህንነት መርሆችን(ergonomic) ከግምት ውስጥ		ሀ ፣ ሁል ጊዜ ሐ ፣ አልፎ አልፎ ፣ ለ ፣ አንዳንድ ጊዜ መ ፣ በጭራሽ

	ጥሰታዎች		
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