



ADDIS ABABA UNIVERSITY
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**ASSESSING THE PREVALENCE AND ASSOCIATED
FACTORS OF OCCUPATIONAL INJURY IN STANDARD
AND SHIFT WORKERS OF TEXTILE AND GARMENT
FACTORIES IN ADAMA, ETHIOPIA**

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A thesis to be submitted to the School of Graduate Studies of Addis Ababa University, College of Health Sciences, School of Public Health in partial fulfillment of the requirements for the degree of Master of Public Health

JUNE 2021
ADDIS ABABA, ETHIOPIA

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Acknowledgment

I would like to express my thanks and appreciation to Addis Ababa University College of Health Science, School of Public Health for offering this chance. My deepest gratitude goes to my advisor Dr Samson Wakuma for his constructive comment and encouragement in the development of this paper. I would also like to thank Norwegian Program for Capacity Development in Higher Education and Research for Development for funding this research work. My deepest gratitude is also for staffs of Else Addis, Adama spinning and Nazareth textile and garments and study participants for their valuable information and willingness. I would like to extend my thanks to my respected husband, Alemayehu Zerihun, for his understanding of my devotion and strong support. The last but not the least I would like to express my gratitude to my families and friends for their constructive support throughout thesis work.

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Acronyms

ACP: African Caribbean and Pacific

AGOA: African Growth and Opportunity Act

CSA: Central Statistical Authority

EPI Info: Epidemiological Information

EU: European Union

GTP: Growth and Transformation Plan

ILO: International Labor Organization

MoFED: Ministry of Finance and Economic Development

PPE: Personal Protective Equipment

PPS: Probability Proportional to Size

SPSS: Statistical Package for Social Sciences

OSH: occupational safety and health

GDP: Gross Domestic Product

Abstract

Background: Occupational accidents and work-related diseases have a major impact on individuals and their families, not only in economic terms, but also in terms of their physical and emotional wellbeing in the short- and long-term. Furthermore, they can have major effects on enterprises, affecting productivity, leading to potential disruptions of production processes, hampering competitiveness and impacting on the economy and society more widely. However, different studies have been conducted on prevalence and associated factors of injury, but the prevalence of injury during standard and work shift is not separately reflected in any of the studies. While, Adama is one of the industry zone in the country but no study conducted on occupational injury in textile factories.

Objective: The aim of this study is to assess the prevalence of injury occurred in standard and Shift work pattern among textile and garment workers in Adama Oromia.

Methods: Institution based comparative cross-sectional study design applied in three textile and garment factories from February 2020 to January 2021. A total of 588 (294 rotational shift and 294 regular day workers) were participated. Structured questioner and observation checklist were used to collect the data. Data entered with Epi data version 3.1 and was analyzed using SPSS version 25. Significance of association determined by p- value < 0.05 and adjusted Odds ratio with 95 % CI.

Result: The prevalence of occupational injury among rotational shift workers is higher (316 per 1000) than regular day workers (201 per 1000). The difference in prevalence is significant ($X^2 = 10.257$; $P < .001$). Shift workers are 1.843 times [OR= 1.843: 1.265, 2.686] more likely exposed to occupational injury than regular day workers. Absence of health and safety training [[AOR= 7.01: 3.237, 15.204], [AOR= 7.01: 3.237, 15.204]], safety supervision [[AOR= 3.13:1.692, 5.813], [AOR= 3.81: 1.967, 7.381] sleep disorder [[AOR= 3.12: 1.680, 5.806], [AOR= 2.73: 1.325, 5.647]] and Personal Protective Equipment were significant factors identified in rotational and regular day work, respectively.

Conclusion: The prevalence of occupational injury is higher among rotational workers than regular day workers. Sleep disorder, health and safety training and supervision are among the factors associated with occupational injury.

Recommendation:Employers should arrange health and safety training before engaging to work for new employees and dedicate spaces for short naps and help workers to use properly. Regular and consistent supervision should be maintained at work places by health and safety officers at industries as well by Bureau of **Labour and Social Affairs** at regional and zonal level.**Employees** Workers should have to take enough rest after night works and should take nap in between at nighttime if sleep disturbs their work in addition to consistent use of Personal Protective Equipment.

Key words: Rotating Shift work, Regular day work, Occupational injury

1. Introduction

1.1. Background

Ethiopia has long history in textile industry since 1936 by establishing first factory at Dire Dawa. Most of the industries were dominated by public enterprises that account for 72% of total manufacturing value added, 62% of gross value of production, employ 57% of the manufacturing work force and account for 64% of wages and salaries (1). According to another source, the share of state-owned enterprises in the output of medium- to large-size manufacturers declined from 58% in 2000/2001 to 51% in 2004/05(2).

The growth of textile industry in the last decades was minimal and most of them owned by state enterprises. In recent years around 51 % growths seen in the sector involving local and international investors. More than 65 international textile investments have licensed in the past 5-6 years. Currently there are one hundred and seventy-five companies investing on textile and closing (3). The rapid growth has internal and external reasons. Increasing living cost in popular textile and apparel producing countries; increases the wage and led to seek option for low production costs. Ethiopia has emerged as an interesting option having a large and cheap workforce.

Ethiopian government has contributed to the growth of the textile and garment industry by prioritizing the industry as a strategic sector. As a result, the government has set ambitious targets for the industry in its Growth and Transformation Plan (2010-2015) (4), which aimed to increase annual earnings from \$160 million in 2007 to \$1 billion by 2016 and increase direct foreign investment by \$1.6 billion in order to build 191 new textile and garment factories. The goal is to increase export from the current 20% of total garment and textile production to 80% of the total garment and textile production by 2020, so that garment and textile exports will eventually account for a total of 22% of all exports (5).

In order to achieve these stated targets, the government created several incentives to attract foreign companies, such as export incentives, low-cost land lease options, and low-interest loans (as low as 3%), corporate tax holidays and custom duty exemptions on imported equipment. In addition, the Ethiopian government established the Ethiopian Industrial Development Zones Cooperation in 2014, which is responsible for the development of several state-of-the-art industrial parks, making it easy for foreign investors to settle in the country. Furthermore, low electricity costs and relatively easy access to the global market due to trade agreements such as the African Growth and Opportunity Act (AGOA) and several bilateral trade agreements make Ethiopia a more attractive sourcing destination (6)

Ethiopia has large number of youth population (about 40% of the total population) and in a fair command of written and spoken English. Due to its location of crossroads between Middle East, Africa and Asia and its large population is an accessible place for local and international markets (3) Since, textile and clothing is labor intensive sector, it is vital for creation of new jobs. It provides employment of more than 300,000 people in 2013 and 400,000 in 2014 in Ethiopia. Even though, the number of new jobs is increasing, as more than half of Ethiopian population is at working age, the level of employment is scant.

Textile industry is the second to have large number of workers next to agriculture. Workers in manufacturing industries like textile and garments are among who highly exposed to different type of occupational hazards such as excessive noise, dust, chemicals and accidents, (7) workplace and individual factors contribute to these.

1.2. Statement of the problem

Injuries in the Textile industries are major public health problem not only affecting the individual who suffer from pain, disability and loss of job, but also other co-workers. It affects not only in economic terms, but also in terms of their physical and emotional wellbeing in the short- and long-term. It affects families, community, enterprises, affecting productivity, leading to potential disruptions of production processes, hampering competitiveness and impacting on the economy and society more widely. Finally, to the development of a country which results from disability, early retirement, exclusion from the labour market and the loss of a worker and poverty (8).

Each year throughout the world millions are affected by occupational injuries and thousands are killed in work-related incidents. According to recent estimates released by the International Labour Organization (ILO), each year 2.78 million workers die from occupational accidents and work-related diseases (of which 2.4 million are disease-related) and an additional 374 million workers suffer from non-fatal occupational accidents. It is estimated that lost workdays globally represent almost 4 per cent of the world's GDP, and in some countries, this rises to 6 per cent or more. Globally 1,000 people are estimated to die every day from occupational accidents and a further 6,500 from work-related diseases. The aggregate figures indicate an overall increase in the number of deaths attributed to work: from 2.33 million deaths in 2014 to 2.78 million deaths in 2017(9).

Fatal occupational injuries were higher in Africa than Asia 16.6 per 100,000 and 12.7 per 100,000 persons in the labour force respectively. In Ethiopia in 2010 non-fatal occupational injury rate was 2.823 per 1000 people and fatal occupational injury was 1.939 per 100,000(10).

Safety and health are important to be competitive in the market. When there is low number of accident at work place, number of absence decreases and productivity increases. Also Competitiveness increases with increasing of production.(11).To be competitive and productive in an investment; capital, labor and technology are necessities. Studies reported that workers in textile industries are low educated, younger, not all of them have health and safety training and limited use of PPE (12).In addition, working environments are too noisy, not comfortable to have free movement. Also, availability of unprotected and high-speed machine increases the risk. Other than the daytime, employers use nighttime to increase production by allowing work shift, which has an association to increase the risk of injury more than expected. So, to increase productivity better to prevent and minimize occupational injuries on workers and implementing occupational safety and health (OSH) should be one of the strategies. But studies show in most of the industries including textile occupational injury are still in considerable amount of existing problem.

On textile and garment industries different studies have been conducted on determinants of occupational injury, prevalence and associated factors of injury and work shift to increase risk of injury but the prevalence of injury during standard and work shift is not separately reflected in

any of the studies. Therefore, this study will fill the gap by providing evidence on prevalence of injury in standard and work shift and add evidence and increase awareness on effect of work shift on injury for employers, professionals and policy to make evidence-based decision and implementation of safe working environment.

1.3. Rationale Of the study

Increasing number of textile industries increase production and make market competition high. As well it insists to use expensive machineries and tools wisely. So, employers use options to use these expensive technology tools by extending working hours. Rotational shift work becomes preferable by employers. Nowadays shift work pattern is common in different manufacturing industries including textile and garments.

In Ethiopia Textile industries accommodate for more than 400,000 employments. Majority of them are of young age populations, unskilled and have low educational level. These workforces are crucial for productivity and economic growth and development. They are also exposed to high risk of occupational injuries due to different reasons. Shift work is among the factors which increases the risk of occupational injury.

Numbers of studies have been carried out regarding shift work and occupational injury among different industries and health areas in the western part of the world including Asia. However, there is less research in Africa and in Ethiopian context regarding shift work. So, this study tries to fill the gaps in literature and shift work in relation to injury.

1.4. Significance of the study

The overall effects of occupational injury and health problems related to work shift are often much greater than immediately perceived. So, studying on the prevalence and associated factors of injury will encourage investment. Because findings from these studies help investors to understand with advantage of work place health and safety which reduces both direct and

indirect costs, decreasing insurance premiums while also improving performance and productivity. It also reduces absenteeism and increases worker morale. Nationally, reduced social security and health care costs, better economic performance and enhanced social benefits.

The finding of this study will be to the benefit of the employee in the first place, who is the direct victim of the injury. Employee understands effects of shifting and will take modification on lifestyle of work and rest. In the second place, employers will analyze risk to benefit of shift work on occupational injury and will act on organizational factors to reduce the risk and health cost, further increase production. In the third place, family, and the community at large which affected indirectly to social and economic loss will be improved. The studies also help researchers by giving an insight for further study in the area of shift work in different occupational activities.

1.5. Research question

- Who is more affected by occupational injury in textile and garment industries shift workers or regular dayworkers?
- What are the main occupational injuries in the textile industry workers and associated factors?

2. Literature Review

2.1 Definition of shift work

Scholars stated shift work in different ways. Shift work is usually referred to as dividing working hours among two or more occupational groups to cover the time needed for duty performance or for production process. Shift workers are those who perform duties outside the regular working hours before 7 am and after 6 pm(13). Shift work is a term that applies to a broad spectrum of non-standard work schedules ranging from occasional on-call overnight duty, to rotating schedules, to steady, permanent night work. It can also apply to schedules demanding an early awakening from nocturnal sleep(14). Shift work is one of work pattern. In the past decades shift work has increased in industries due to demand in continuous production.

2.2. Health problems related to shift work

Shift work has negative health effects on the individual. It decreases ability to eat normally, exercise and develop relationship with others also sleep deprivation impair individual ability to perform effectively and may lead to occupational accident(15). Shift work may lead shift work disorder which is characterized by excessive sleepiness and insomnia(16).

Shift work causes sleep deprivation on an individual. Sleep deprivation create people to become sleepy and reduce alertness. Sleep disorder can lead to development of cognitive performance such as reduced ability to concentrate, increased reaction time, decreased ability to learn and recall new facts, and impaired motor skills Sleep deprivation also can be responsible for irritability, loss of communication skills, and lack of adaptation to the emotional needs in the workplace and increase risk behaviors(17).

Studies also investigated that shift work also increases the risk of GI disorder, peptic ulcer disease (18) and risk of cardiovascular disease(19). Another finding revealed that breast cancer is associated with shift work among women (20). Shift work may also be harmful for reproductive health, it can create prolonged waiting time to pregnancy, low birth weight, increased risk for preterm delivery and spontaneous abortions (18, 21, 22)

Reduction or failure of neurocognitive functions also results in an increase in the number of injuries caused by fatigue and occupational errors (18) Studies show that increase in the accidents and human errors caused by sleep deprivation due to shift work(23).

Shift work was reported to be the main cause of industry related accidents in the last decades such as Chernobly, Three Mile Island, and Bhopal. Chemical spill into Rhine and Valdez also occurred in the mid night and reasons were shift work and human error at operator room(13).

The patterns of fixed shift work feature a higher likelihood of errors and accidents. Compared with the day shift, the risk increases by 15% on the evening shift and by 28% on the night shift. In addition, 10-hour and 12-hour shifts have, respectively, 13% and 28% higher risk in comparison with 8-hour shifts. The risk in consecutive shifts increases by 17% on the third night and 36% on the fourth night of the shift (17).

A study conducted in Bangalore shows, puncture wounds were the most common type of accident (48.3%), followed by incised wounds (28.1%), blunt injuries (13.5%), burns (5.6%) and foreign bodies (4.5%). Incidents of accidents during the study period were 2.49/1000 workers, with about half of those injured being tailors(12).A study in Arbaminch found that Hand was the most affected body part (39.7%), laceration was (55.1%) and cut (30.1 %)(24)

2.3. Factors associated to occupational injury

Causes of accidents in the garment and textiles can be classified as: demographic factors, work environment factors, behavioral factors and ergonomics.

2.3.1. Demographic Factors

Studies have shown that ages below 25 years are at higher risk of developing occupational injury than age greater than 30 years old age (25). In Germany the prevalence of occupational injuries decreases with age of workers. Age 18 -29 have high chance of occupational injury than age greater than 30 years old. However, the main work-related factors are agricultural and manual occupations and physical stress (26). The same result is found in French national railway company survey which is done from 1998 -2000 shows, the injury incidence rate decreased

steadily with increasing age, from 54.1 for workers aged <25 to 24.9 years for those aged 50–55 years (27). Yan Cui on his cross-sectional study in 2013 in Coal Workers of Shanxi Province found similar result (28)

With increasing length of service occupational injury decreased in Germany, Workers having one-year experience have 55.9 % prevalence and workers having 30 years and above experience have 19.0 % prevalence(26). The likelihood of occupational injury was found to be significantly higher (AOR = 1.92 95 % CI: 1.11, 3.31) among respondents with three or less service years(29).

Statistically significant association were found for those with less than high school education with injury (25, 30)

2.3.2. Work condition factors

Work condition factors like information access to health and safety, regular work place supervision, and training on health and safety, found significant in study conducted in Ahmara region and Arbaminch textile and garment workers(24)

Wong IS et al reported that the proportion of injuries among daytime workers (2.9%) was less than those working nights (5.9%) and rotating (3.9%) or other (3.1%) shifts. A distinct difference was also found for occupational physical demands: the majority of daytime workers were employed in non-manual labor (51%), whereas non-day- time workers were primarily in mixed and manual labor (night 85%, rotating 78%, other 64%) In adjusted OR , the risk of injury remained higher among night shift workers (OR 1.92, 95% CI 1.34-2.73) and rotating shift workers (OR 1.48, 95% CI 1.12-1.97)(31).

Alali Hanan et al on the study of relationship between nonstandard work arrangement and work-related accident shows increased injury risk for those performing shift work (OR 1.546, 95% CI 1.074-2.224) But shift work did not show significant association in Occupational injury in Arbaminch(24)

2.3.3. Personal behavior

A study in Canada indicated that smoking, sleep disorder and regular alcohol use also found highly associated with injury(32). .Also in Amhara region of Ethiopia reported personal protective equipment use (COR 1.77, 95% CI 1.18, 2.64), alcoholic drink consumption (COR 1.68, 95% CI 1.11, 2.55), sleeping disturbance (COR 2.26, 95% CI 1.52, 3.36), job dissatisfaction (COR 1.97, 95% CI 1.09, 4.33), and job stress (COR 2.29, 95% CI 1.23, 4.25) had showed significant association with occupational injury(33). But, khat chewing and cigarette smoking did not show significant association with occupational injury

2.3.4. Ergonomics

Study in Kombolcha and India textile factory workers also reveal workers who handle tool manually by pulling, pushing, carrying and lifting tasks contribute for workplace accidents and musculoskeletal disorders.(30, 34)

Hand was reported the most affected body part in textile and garment industries. Puncture wound is common type of injury. Machinery, falling accident, hit by objects and hand tools are causes of injury reported (34).

2.4. Conceptual framework

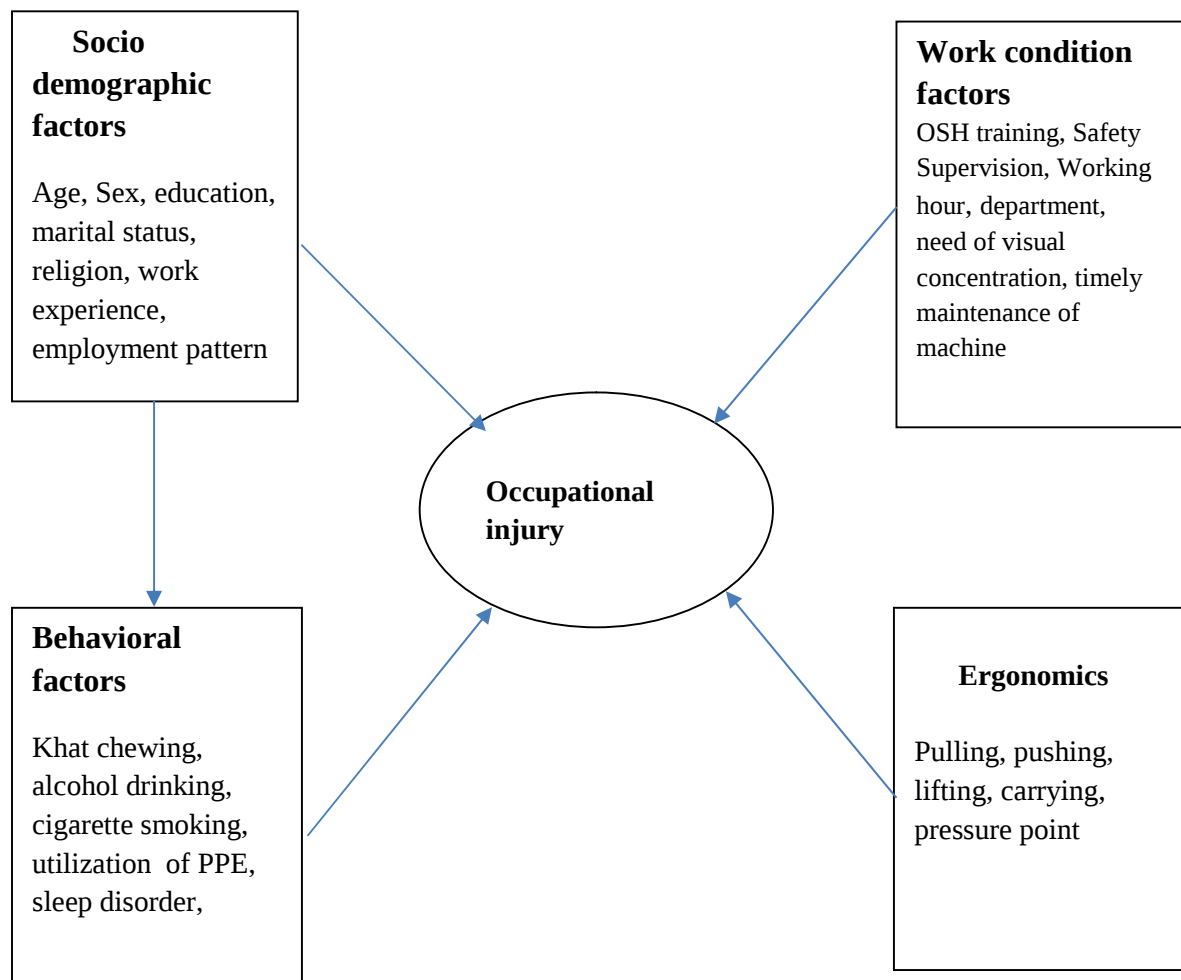


Figure 1. Conceptual frame work of factors associated with occupational injuries among textile and garment workers (35)

3. Objectives

3.1. General objective

- To assess prevalence of occupational injury among textile and garment workers in Adama, Ethiopia

3.2. Specific objective

- To assess prevalence of injury in standard and shift workers of textile and garment industries in Adama, Ethiopia
- To assess factors associated to occupational injury in standard and shift work workers in textile and garment in Adama, Ethiopia

4. Methods

4.1. Study design

Institution based comparative cross-sectional design was carried out from July2020 to September2020 to assess prevalence of injury in the standard and shift work patterns.

4.2. Study area

The study was conducted in selected textile and garment workers in Adama Oromia Region, Ethiopia. Adama is selected because it is one of selected industrial zone where textile industry is expanded in the country and also there is little information about occupational injury in the factories found in Adama. Due to time and financial constraints the study limited to Adama city only. Three garment and textile factories: Adama spinning, Else Addis and Nazareth Garment were selected based on pattern of working time, on availability of shift work and working departments. A total of 1047 workers were present in the three factories at the time of study. Due to COVID-19 number of workers especially those working temporarily were terminated from work. Adama spinning and Else Addis both had rotational shift and regular day work pattern but Nazareth garment had regular day work pattern only.

4.3. Source population

Workers at textile and garment in Adama city were our source of population.

4.4. Study population

Workers in Adama spinning, Else Addis and Nazareth textile and garment industries in Adama city were our study population.

4.5. Inclusion criteria

Worker's age greater than 17 years in both sex and who work for at least one year in different department weaving, spinning, engineering and finishing were involved in the study this is due to the labor law in Ethiopia

4.6. Exclusion criteria

Administrative staffs, workers on annual leave and workers who were absence during data collection period were excluded.

4.7. Study variables

Dependent Variable

- Occupational injury

Independent variables are:

Socio demographic factors:

- age
- sex
- marital status
- level of education
- religion
- work experience

Work condition factors

- employment condition
- work pattern,
- work department
- health and safety training
- Safety supervision

Behavioral characteristics:

- alcohol drinking
- cigarette smoking
- khat chewing
- utilization of PPE

Ergonomics:

- Lifting
- Pressure points
- Pulling
- pushing
- carrying tasks

4.8. Operational definition

Accident: a sudden event that results in an undesired outcome such as body injury.

Injury: a physical damage to body tissues by an accident.

Hazard: any existing or potential condition in the workplace which by itself or by interacting with other variables can result in injury.

Occupational injury: Any physical injuries happen on the work while performing tasks at workplace in the last one year.

Sleep disorder: Any sleep problem that affects workers at workplace and disrupts sleep.

Shift work: dividing working hours among three occupational groups 8 hours each in a day. Shifts can be rotate according to the schedule and can be either continuous, 7 days per week, or semi-continuous, running 3 shifts per day with or without weekends. Workers take turns working on all shifts.

Safety: the absence of danger

Khat chewing: practice of khat chewing daily week for different purpose.

Alcohol drinking: drinking alcohol daily for different purpose.

Cigarette smoking: smoking tobacco daily or occasionally

Occupational safety: risk identification at the workplace and take preventive measures to reduce hazard which leads to injury.

Pressure point: A point on the skin that is sensitive to pressure. Long standing on hard floor, leaning forearms against the hard edge of worktable, contact stress from sitting on hard surface, handling instrument that exert pressure on the skin etc....

Job Satisfaction: Worker positive feeling towards his/her job.

Abortion: Termination of pregnancy without any external interference before 20 weeks.

4.9. Sampling

4.9.1. Sample size determination

To determine the number of participants to be included in the study, double population proportion formula was used. Since the specific objectives are two, sample size calculated for each to take a large sample size.

Specific objective 1

The sample size was determined using double population proportion formula with the following assumptions. Confidence interval of 95% and $Z_{\alpha/2}$ is the value of the standard normal distribution corresponding to a significant level of alpha (α) of 0.05, which is 1.96, taking 19.3 % proportion of occupational injury among shift workers and 10.1% proportion of occupational injury among day workers (33). Formula to calculate sample size is:

$$n_1 = \left[\sqrt{\bar{p}\bar{q}\left(1 + \frac{1}{k}\right)} z_{1-\alpha/2} + \sqrt{p_1q_1 + \frac{p_2q_2}{k}} z_{1-\beta} \right]^2 / \Delta^2$$

$$n_2 = kn_1$$

where p_1, p_2 = projected true probabilities of success in the two groups

$$q_1, q_2 = 1 - p_1, 1 - p_2$$

$$\Delta = |p_2 - p_1|$$

$$\bar{p} = \frac{p_1 + kp_2}{1+k}$$

$$\bar{q} = 1 - \bar{p}$$

Where p_1, p_2 = proportions in the two groups

n_1 = sample size of group 1

n_2 = sample size of group 2

$k = 1$ because, $n_1 = n_2$

$\alpha = 0.05$, $z_{1-\alpha/2} = 1.96$, $z_{1-\beta} = 1.282$

$p_1 = 0.101$, $p_2 = 0.193$

$$\bar{p} = \frac{.101 + 1 \cdot 0.193}{1+1}$$

$$= 0.147$$

$$\bar{q} = 1 - 0.147$$

$$= 0.853$$

$$n_1 = \frac{[\sqrt{0.147 \cdot 0.853(1+1)} \cdot 1.96 + \sqrt{((0.101 \cdot 0.899) + (0.193 \cdot 0.807)/1)} \cdot 1.282]^2}{(0.193 - 0.101)^2}$$

$$n_1 = n_2 = 231$$

Specific objective 2

To determine the required sample size for the second specific objective of this study different factors which are significantly associated with occupational injury were taken and sample size was calculated using two population proportion formula by making the power 90% and confidence level 95%.

Factors	Power (90 %)	95% CI	P ₁ (%)	P ₂ (%)	n ₁	n ₂	12%	n total
Health and safety training	1.282	1.96	25.3	42	166	166	20	372
Safety supervision	1.282	1.96	22.6	36.2	262	262	32	588
Sleep deprivation	1.282	1.96	21.2	34.4	204	204	25	458
PPE use	1.282	1.96	32	55.2	77	77	9	172

So, decision made based on comparison of sample size between specific objective one and two. Finally, sample size calculated for specific objective two that is 588 taken in this study.

4.9.2. Sampling Technique

Textile and Garment factories were selected considering their convenience and willingness from the managers. Factories are stratified based on availability or absence of regular or shift work. There were a total of 503 permanently shift workers and 544 permanently regular day workers in these factories. In Addis Ababa there were 357 shift workers and 270 regular day workers, in Adama Spinning there were 146 shift workers and 98 regular worker and in Nazareth Garment there were 176 regular day workers only. Then samples were stratified to each factory by proportion according to the number of workers in each shift. Level of exposure to injury is not the same to all departments. Therefore, samples stratified to departments weaving, spinning,

engineering and finishing proportionally. Finally, study subjects were selected by random sampling method from each department.

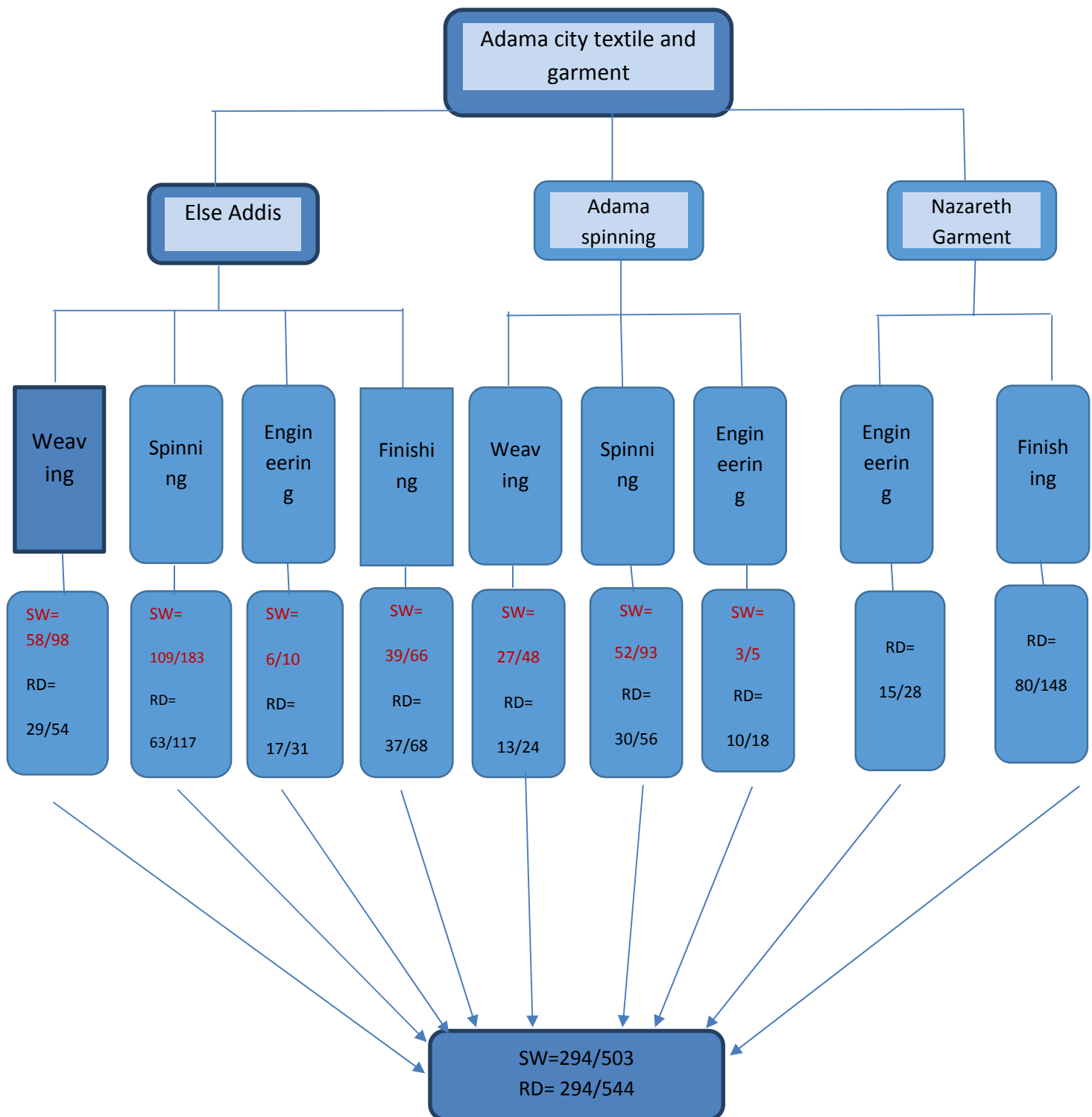


Figure 2. Samples size from the three garment and textiles in Adama city, Adama 2020

4.9.3. Data collection method

Data were collected with structured questionnaire which is adapted from previous studies on occupational injury after made some modification(24). Observation check list was used to assess condition of working environment.

Data were collected by five BSc. nurses after training on the tool and supervised by two MPH professionals. Each of them accomplished their roles and responsibilities. The role of data collector was to clearly describe the study: importance, purpose, confidentiality of the information obtained, keeps privacy of the client and his/her right to participate or not in the study; take informed consent, complete the entire questionnaire and finally check completeness and daily submit to the supervisor. The supervisor facilitated smooth flow of the interview, collect daily data from data collector, check completeness and submit to the PI every other day. Prior to data collection PI communicated with selected institutions after confirmation of ethical clearance, introduce supervisor and data collector to the institute. In between meeting were held with data collector and supervisors to address any gaps and assure consistency of data. PI supervised overall activities. Data were received from supervisor every other day.

4.9.4. Data quality assurance

To assure data quality tools prepared to be friendly to data collectors, supervisors, and interviewee too. Questionnaire reviewed by peers against objective and easiness of communication. Data collectors and supervisors were trained on the tool prior to piloting. This help interviewers better understand the research questions and smooth communication during the interview. The questionnaire was prepared in English and translated to Amharic for easiness of data collection then translated back to English to maintain consistency.

4.9.5. Data processing and management

After data collection, all data were rechecked by data collector, supervisor and PI accordingly daily. Data entered with Epi data version 3.1 software after coding all variables. Two BSc. Information Technology professionals were employed for data entry to keep consistency and completeness of data; all data were cleaned.

4.9.6. Data analysis

SPSS version 25 was used to analyze the data. To analyze socio demographic and personal data, frequency and percentage were computed. Binary logistic regression was used to explore presence of association between dependent variable and independent variable. Finally factors with p value < 0.2 were considered further by multivariate logistic regression computed to find association of factors and controlling confounders. Factors with p value < 0.05 were declared as having significant association with injury.

4.10. Ethical consideration

Ethical clearance and official letter for the survey was obtained from school of public health Addis Ababa University Ethical Review Committee. Based on the official letter willingness of employers to allow workers in participation of the survey obtained. All information regarding the study, advantage, disadvantage, objective, right not to participate, confidentiality, privacy, and omission at any time explained. There is no direct benefit obtained and no direct risk as being participant but findings from the study will help in the prevention strategies of occupational injuries and implementation of safety and health practices. If workers get injured during data collection period advised to go to the clinic after given first aid.

4.11. Dissemination of results

Findings from this study will be disseminated to the textile involved in the study, to students interested on the area, to Addis Ababa University school of Public Health Department, Regional Health Bureau, stakeholders on this program and health care professional to improve service provision and implementation occupational injury preventive activities.

5. Result

5.1. Socio demographic factors

A total of 588 respondents 294 were from rotational shift and 294 were from regular day work participated in the study with 100 % response rate. Majority of them are females [n=234(79.6%), n=215(73%)] and age less than thirty years [n=272(92.5 %), n=256(87.1 %)] respectively in rotating shift work and regular day work. Above 90% of workers attended secondary school in both work patterns. Concerning age, above 56 % in both work pattern has age between 17- 24. Mean age is 24.31 with standard deviation of 3.57 in rotating shift workers and 25.13 mean age with standard deviation of 5.21 in regular day workers. Majority of respondents were orthodox religion followers [n=184(62.6%), n=196(66 %)] in rotating and regular shift patterns respectively. Marital status showed never married employees take major part in both groups. Most workers employment status was permanent in both in rotating shift work 76(93.9%) and regular day work 280(95.2%) respectively. Work experience between 2-5 years accounts higher than other work experience category in both work patterns 225(76.5%) in rotating shift and 216(73.5 %) in regular day workers.

Table 1.Socio demographic characteristics of Textile and Garment workers in Adama city, Adama 2020

Socio demographic factor	Rotating Shift work		Regular day work	
	Frequency	Percent	Frequency	Percent
Sex				
Male	60	20.4	79	26.9
Female	234	79.6	215	73.1
Age				
<= 29	272	92.5	256	87.1
>=30	22	7.5	38	12.9
Educational status				

Primary	20	6.8	22	7.5
Secondary	179	60.9	153	52.0
Collage and above	95	32.3	119	40.5
Marital Status				
Never married	194	66.0	200	68.0
Married	100	34.0	94	32.0
Religion				
Orthodox	184	62.6	196	66.7
Muslim	46	15.6	44	15.0
Protestant	57	19.4	53	18.0
Other	7	2.4	1	0.3
Work experience				
<= 5 years	225	76.5	216	73.5
> 5 years	69	23.5	78	26.5
Employment pattern				
Temporary	18	6.1	14	4.8
Permanent	276	93.9	280	95.2

5.2. Work environment factors

Workers in rotational shift 211(71.8%) had health and safety training and workers in regular day work 195(66.3%) had health and safety training. In both work patterns 66% and above workers had health and safety supervision. Large number of workers are assigned in spinning department 161(54.8%) in rotational shift work and finishing 117 (39.8%) in regular day work. Working hours for most of workers is 48 hours per week in both work patterns.

Table 2. Work condition factors of textile and garment workers in Adama city, Adama 2020

Environmental factors		Rotating Shift work		Regular day work	
		Frequency	Percent	Frequency	Percent
Working hour per week	<= 48 hours	251	85.4	242	82.3
	> 48 hours	43	14.6	52	17.7
safety training	Yes	211	71.8	195	66.3
	No	83	28.2	99	33.7
safety supervision	Yes	199	67.7	194	66.0
	No	95	32.3	100	34.0
Visual concentration	Yes	268	91.2	257	87.4
	No	26	8.8	37	12.6
Machine maintained timely	Yes	213	72.4	218	74.1
	No	81	27.6	76	25.9
Working department	Weaving	85	28.9	42	14.3
	Spinning	161	54.8	93	31.6
	Engineering	9	3.1	42	14.3
	Finishing	39	13.3	117	39.8

5.3.Occupational injury

The prevalence of occupational injury among rotational shift workers 62 (31.6%) were higher than regular day workers 39 (20.1%) in the last one year. The difference in prevalence is significant ($X^2 = 10.257$; $P < .001$). Main type of injury was laceration 43(46.2%) and 25(42.4%) in rotational shift work and regular day work respectively. Cut is second type of wound explored 26(28.0%), 19(32.2%) respectively in rotational shift work and regular day work. Main cause of injury is machinery 52(55.9%) and 31(52.5 %) in rotating shift and regular day work pattern respectively. Falling accident 18(19.4%), 13(22.0%), hit by object 8(8.6%), 4(6.8%), electricity 3 (3.2%), 1(1.7%) and heavy objects 3(3.2 %), 2(3.4%) are findings from this study in rotating and regular day work pattern respectively. Hand was most affected part of the body 57(61.3%) and 35(59.3%) in rotating shift and regular day works, respectively. Leg is affected in about 15(16.1%) and 9(15.3%) workers of rotating shift and regular day, respectively. In rotating shift work most injuries occurred during night and evening time 31(33.3%), 27(29%) respectively. In regular day work 30 (50.8%) injury occurred in the morning. Workers were absent from work due to injury from 3-5 days 64 (68.8%) in rotating shift and 39(68.4 %) in regular day.

Table 3. Occupational injury characteristics of workers in Textiles and garments of Adama city, Adama 2020

Occupational injury	Rotating Shift work		Regular day work	
	Frequency	Percent	Frequency	Percent
Occupational injury in 1 year				
Yes	93	31.6	59	20.1
No	201	68.4	235	79.9
Location of injury				
Head	8	8.6	6	10.2
Neck	6	6.5	4	6.8
Trunk	6	6.5	2	3.4
Hand	57	61.3	35	59.3
Leg	15	16.1	9	15.3
Other	1	1.1	3	5.1

Type of injury				
Laceration	43	46.2	25	42.4
Cut	26	28.0	19	32.2
Contusion	8	8.6	2	3.4
Sprain	2	2.2	4	6.8
Dislocation	6	6.5	5	8.5
Eye injury	3	3.2	3	5.1
Burn	4	4.3	1	1.7
Other	1	1.6	0	0.0
Causes of injury				
Machinery	52	55.9	31	52.5
Falling accident	18	19.4	13	22.0
Hit by object	8	8.6	4	6.8
Hand tools	8	8.6	8	13.6
Heavy objects	1	1.1	0	0
Electricity	3	3.2	2	3.4
Time of injury				
Morning	22	23.7	30	50.8
Afternoon	13	14.0	29	49.2
Evening	27	29.0	0	0.0
Night	31	33.3	0	0.0
Absent from work				
Yes	64	68.8	39	68.4
No	29	31.2	18	31.6
Number of absents				
3 days	24	37.5	17	41.5
4-5 days	11	17.2	10	24.4
>5 days	29	45.3	14	34.1

5.4. Behavioral factors

In our observation more negative behavioral factors were seen in rotational shift workers than regular day workers. Workers in rotational shiftwork 42(14.3%) used alcohol for different reason than workers 28(9.5%) in regular day work. Khat chewing accounts 12(4.1%) in rotational shift workers and 8(2.75) in regular day workers. Sleep disorder is seen more in rotational shift workers 52(17.7 %) than regular day workers 41(13.9%). Regular day workers use PPE 241(82%) than rotational shift workers 227(77.2%).

Table 4. Behavioral characteristics of textile and garment workers in Adama city, Adama 2020

Behavioral factors		Rotational shiftwork		Regular day work	
		Frequency	Percent	Frequency	Percent
Alcohol drinking	Yes	42	14.3	28	9.5
	No	252	85.7	266	90.5
Khat chewing	Yes	12	4.1	8	2.7
	No	282	95.9	286	97.3
Cigarette smoking	Yes	3	1.0	4	1.4
	No	291	99.0	290	98.6
Sleep Disorder	Yes	52	17.7	14	4.8
	No	242	82.3	280	95.2
Job satisfaction	Yes	256	87.1	253	86.1
	No	38	12.9	41	13.9
Utilization of PPE	Yes	227	77.2	241	82.0
	No	67	22.8	53	18.0

5.5. Ergonomics

Among the ergonomic factors pulling 229(77.9%), pushing 223(75.95) and heavy lifting140 (47.6%) were more practiced at work place by rotational shift workers than regular day workers. In regular day work pulling 201(68.4%), pushing 194(66%) and heavy lifting 119(40.5%) were practiced in less percentage than rotational shift workers. Handling pressure points and carrying objects were equal in

percentage and higher in regular day workers 78 (26.5%) than handling pressure points 70 (23.8%) and carrying objects 42 (14.3%) in rotational shift workers.

Table 5. Ergonomics characteristics of textile and garment workers in Adama city, Adama 2020

Ergonomics		Rotational shiftwork		Regular day work	
		Frequency	Percentage	Frequency	Percentage
Pulling	Yes	229	77.9	201	68.4
	No	65	22.1	93	31.6
Pushing	Yes	223	75.9	194	66.0
	No	71	24.1	100	34.0
Heavy lifting	Yes	140	47.6	119	40.5
	No	154	52.4	175	59.5
Pressure point	Yes	70	23.8	78	26.5
	No	224	76.2	216	73.5
Carrying	Yes	42	14.3	78	26.5
	No	252	85.7	216	73.5

5.6. Effect of shift work on health

Among female participants 5(2.2%) of rotational shift workers and 3(1.4%) of regular day workers had abortion in the last one year. Premature delivery also reported in 10(4.5%) of workers of regular day and 9(3.9%) of workers in rotational shift.

Table 6. Health effects of shift work among workers in textile and garments in Adama city, Adama 2020

Health effects of shiftwork		Rotational shiftwork		Regular day work	
		Frequency	Percentage	Frequency	Percentage
confirmed cancer	Yes	0	0	4	1.4
	No	294	100.0	290	98.6
Confirmed Cardiovascular disease	Yes	4	1.4	12	4.1
	No	290	98.6	282	95.9
Abortion	Yes	5	2.2	3	1.4
	No	224	97.8	218	98.6
Premature delivery	Yes	9	3.9	10	4.5
	No	220	96.1	211	95.5

5.7. Bivariate analysis

Several steps have taken to identify factors associated to occupational injury among textile workers of Adama city working in rotating shift work and regular day patterns. In first place cross- tabulation of main covariate with occupational injury was made for the two groups. Then, for identifying factors associated with occupational injury binary logistic regression is used. Crude odds ratio with their 95% confidence interval is taken.

5.7.1. Socio demographic factors

In bivariate analysis of socio demographic factors only sex has significant association with Occupational injury in both rotational shift work [OR: 1.91 (1.06, 3.42)] and regular day work patterns [OR: 2.46 (1.35, 4.49)]. Other socio demographic factors did not show association.

Table 7. Bivariate analysis of socio demographic factors associated with occupational injury among textile and garment workers in Adama, Adama 2020

Socio demographic factors		Rotating shift workers			Regular day workers		
		Frequency	COR	P-value	Frequency	COR	P-value
Sex	Male	60	1		79	1	
	Female	234	1.91(1.06, 3.42)	0.030	215	2.47(1.35, 4.49)	0.003
Age group	17-29	272	1.26(0.51, 3.11)	0.620	256	1.51(0.69, 3.31)	0.305
	30-60	22	1		38	1	
Education al status	Primary	20	0.92(0.34, 2.45)	0.860	22	0.57(0.21, 1.55)	0.270
	Secondary	179	1.62(0.95, 2.75)	0.074	153	1.24(0.67, 2.28)	0.485
	diploma and above	95	1		119	1	
Marital status	Never Married	194	2.32 (1.39, 3.88)	0.001	200	1.48(0.81, 2.67)	0.198
	Married	100	1		94	1.000	
Religion	Orthodox	184	0.91 (0.17, 4.86)	0.916	196	0.000	1.000
	Muslim	46	0.62 (0.11, 3.56)	0.594	44	0.000	1.000
	Protestant	57	0.94 (0.17, 5.34)	0.945	53	0.000	1.000
	Other	7	1		1		
Work experience	<= 5 years	225	1.55(0.88, 2.72)	0.127	216	3.34(1.84, 6.08)	0.000
	> 5 years	69	1		78	1	
Employment pattern	Temporary	18	0.92 (0.34, 2.53)	0.873	14	0.61(0.19, 2.02)	0.420
	Permanent	276	1		280	1	

5.7.2. Work condition factors

In this section of the study safety training, availability of safety supervision and machine maintained timely were significant factors identified in both work patterns which have association with occupational injury in textile and garment factories. Risk of injury was higher among shift workers if workers did not take health and safety training as well if machine is not maintained timely. The odds occupational injury among workers who did not take healthy and safety training in rotational shift work were fifteen times [OR: 15.510(8.379, 28.708)] higher than workers who took health and safety training. But the odds of occupational injury among workers who did not take health and safety training in regular day workers were nine times [OR: 8.590(4.495, 16.417)] higher than workers who took health and safety training. .If machine is not maintained timely risk of injury were 14 times higher among worker in rotational shift workers [OR: 14.119(7.659, 26.029)]. And if machine is not maintained timely risk of occupational injury were 9 times [OR: 9.381(4.966, 17.721)] higher among workers in regular day. Working in the departments of weaving [OR: 12.909(5.234, 31.838)] and spinning [OR: 7.212(3.302, 15.751)] in rotational shift work showed significant association with occupational injury.

Table 8. Bivariate analysis of work environment factors associated with occupational injury among textile and garment workers in Adama, Adama 2020

Work condition factors		Rotating shift workers			Regular day workers		
		Frequency	COR	P-value	Frequency	COR	P-value
Working hour per week	<= 48 hours	251	1		242	1	
	> 48 hours	43	0.84(0.43, 1.67)	0.620	52	0.92(0.44, 1.93)	0.829
safety training	Yes	211	1		195	1	
	No	83	15.51(8.38, 28.71)	0.000	99	8.59(4.49, 16.42)	0.000
safety supervision	Yes	199	1		194	1	
	No	95	5.02(2.94, 8.55)	0.000	100	4.59(2.52, 8.38)	0.000
Visual concentration	Yes	268	2.05(0.75, 5.63)	0.162	257	0.54(0.25, 1.17)	0.121
	No	26	1		37	1	
Machine maintained timely	Yes	213	1		218	1	
	No	81	14.12(7.66, 26.03)	0.000	76	9.38 (4.97, 17.72)	0.000
Working department	Weaving	85	12.91(5.23, 31.84)	0.000	42	0.51(0.22, 1.20)	0.124
	Spinning	161	7.21(3.3, 15.75)	0.000	93	0.81(0.39, 1.68)	0.576
	Engineering	9	0.000	0.999	42	0.41(0.18, 0.93)	0.032
	Finishing	39	1		117	1	

5.7.3. Behavioral factors

In behavioral factors binary analysis, alcohol drinking, sleep disorder and use of PPE were factors identified as having significant association with occupational injury in rotational shiftwork. The odds of occupational injury among workers who drank alcohol were three times [OR: 2.804(1.442, 5.452)] and who did not use PPE two times [OR: 2.292(1.306, 4.020)] more among non-alcohol consumer and proper PPE users respectively in rotational shiftwork. Sleep disorder was one of identified factor having association with occupational injury. The odds of injury among shift workers who had sleep disorder were three times more [OR: 3.177(1.718, 5.875)] than who didn't have sleep disorder but association was not observed among regular day workers.

Job satisfaction and used of PPE are two factors identified having association in regular day workers. The odds of occupational injury among workers who did not satisfied with their job was two times [OR: 2.397(1.165, 4.931)] and who did not use PPE was two times more [OR: 2.237(1.150, 4.355)] than workers who satisfied and use PPE in regular day work.

Table 9. Bivariate analysis of behavioral factors associated with occupational injury among textile and garment workers in Adama city, Adama 2020

		Rotating shift workers			Regular day workers		
Behavioral factors		Frequency	COR	P-value	Frequency	COR	P-value
Alcohol drinking	Yes	42	2.80(1.44, 5.45)	0.002	28	1.09(0.42, 2.84)	0.850
	No	252	1		266	1	
Khat chewing	Yes	12	2.24(0.70, 7.15)	0.172	8	2.46(0.57, 10.62)	0.226
	No	282	1		286	1	
Cigarette smoking	Yes	3	3607897333.86(0.000)	0.999	4	4.09(0.56, 29.64)	0.164
	No	291	1		290	1	
Sleep Disorder	Yes	52	3.18(1.72, 5.88)	0.000	14	2.33(0.75, 7.22)	0.144
	No	242	1		280	1	
Job satisfaction	Yes	256	1		253	1	
	No	38	1.69(0.84, 3.39)	0.140	41	2.39(1.17, 4.93)	0.018
Use of PPE	Yes	227	1		241	1	
	No	67	2.29(1.31, 4.02)	0.004	53	2.24(1.15, 4.36)	0.018

5.7.4. Ergonomics

Only manual handling of pressure points in rotating shift work has significant association with occupational injury from ergonomics factors in binary analysis with odds ratio [OR: 2.641(1.516,4.601)].

Table 10. Ergonomics factors associated with occupational injury among textile and garment workers in Adama city, Adama 2020

		Rotating shift workers			Regular day workers		
Ergonomics factors		Frequency	COR	P- value	Frequency	COR	P- value
Pulling	Yes	229	1.05(0.58, 1.91)	0.865	201	1.07(0.56, 1.98)	0.835
	No	65	1		93	1	
Pushing	Yes	223	1.14(0.65, 2.01)	0.652	194	0.67(0.36, 1.26)	0.213
	No	71	1		100	1	
Heavy lifting	Yes	140	0.87(0.53, 1.42)	0.566	119	1.13(0.62, 1.97)	0.740
	No	154	1		175	1	
Pressure point	Yes	70	2.64(1.52, 4.6)	0.001	78	1.41(0.76, 2.64)	0.271
	No	224	1		216	1	
Carrying	Yes	42	1.77(0.97, 3.45)	0.094	78	1.16(0.61, 2.18)	0.657
	No	252	1		216	1	

5.8. Multivariate analysis

After identifying significant factors associated with occupational injury in textiles and garments by binary logistic regression, factors which have p- value < 0.2 further analyzed by multiple logistic regression to control confounders.

In multivariate analysis of factors among rotational shift workers sex, training on health and safety, Health and safety supervision, timely maintenance of machine, departments like weaving and spinning, alcohol drinking, sleep disorder, use of PPE and handling pressure point are among factors identified as having significant association with occupational injury holding other factors constant..

Multivariate analysis of associated factors in regular day work; sex, work experience, health and safety training, Health and safety supervision, timely maintenance of machine, alcohol drinking, and job satisfaction were among factors identified as having significant association with occupational injury holding other factors constant in binary analysis.

Among the socio demographic factors sex has significant association with occupational injury. Female workers in both rotational shift and regular day were two times [AOR=1.85: 1.17, 3.373] and [AOR= 2.19: 1.189, 4.603] higher odds of developing occupational injury than males respectively.

Workers in regular day work and who have working experience 5 and less years were 4 times [AOR= 4.03: 1.725, 9.452] more likely to have occupational injury than workers who have work experience 6 years and more. Workers in rotating shift patterns and worked in spinning department were 7times [AOR= 7.22: 2.020, 25.838] more likely to develop occupational injury than workers in other departments. Workers in weaving department and rotating shift were 3times [AOR= 3.06: 1.002, 9.385] more likely to have occupational injury than workers in another department. Workers who have no health and safety training were 7times [AOR= 7.01: 3.237, 15.204] in rotational shift and 5 times [AOR= 5.27: 2.169, 12.834] in regular day workers higher odds of developing occupational injury than those had health and safety training, respectively. Workers who have no health and safety supervision in rotating shift pattern were 3 [AOR= 3.13:1.692, 5.813] more likely to increase risk of occupational injury while in regular day pattern 4[AOR= 3.81: 1.967, 7.381] times more likely increase risk of occupational injury than those had safety supervision. If machines were not maintained timely the risk of

injury increased 6 times [AOR= 5.74: 2.611, 12.628] more likely in rotating shift work and 10 times [AOR=10.43: 4.484, 24.294] in regular day work pattern than machine maintained timely controlling other factors.

In multivariate analysis of behavioral factors sleep disorder, use of PPE and manual handling of pressure points were found to have significant association with occupational injury. Workers who had sleep disorder were 3times [AOR= 3.12: 1.680, 5.806] more likely increase risk of occupational injury in rotating work pattern and no significant association seen in regular day workers. Not using PPE at work place more likely increase risk of occupational injury 2 times [AOR= 2.15: 1.179,3.934] in rotating shift work and 2 times [AOR= 2.1: 1.054,4.221] in regular day work pattern than those using PPE. Manual handling of instruments of pressure points increases more likely risk of injury 3 [AOR= 2.62: 1.505, 4.588] in rotating shift work than those who did not handle pressure points at workplace.

	Rotational shift			Regular day		
Factors	COR (CI)	AOR (CI)	P value	COR (CI)	AOR (CI)	P value
Sex						
Male	1	1		1	1	
Female	1.9(1.06, 3.42)	1.85(1.01, 3.37)	0.044	2.46(1.35, 4.48)	2.19(1.19, 4.06)	0.012
Health and Safety training						
Yes	1	1		1	1	
No	15.5(8.38, 28.71)	7.01(3.23, 15.20)	0.000	8.59(4.49, 16.42)	5.27(2.16, 12.83)	0.000
Health and safety supervision						
Yes	1	1		1	1	
No	5.01(2.943, 8.548)	3.13(1.69, 5.8)	0.000	4.59(2.52, 8.38)	3.81(1.97, 7.38)	0.000
Machine maintained timely						
Yes	1	1		1	1	
No	14.11(7.65,26.03)	5.74(2.61, 12.63)	0.000	9.38(4.97, 17.72)	10.43(4.48, 24.29)	0.000
Department						
Weaving	12.9(5.23, 31.84)	7.22(2.02, 25.84)	0.002	0.51(0.22, 1.20)	0.36(0.11, 1.2)	0.096
Spinning	7.21(3.30, 15.75)	3.06(1.00, 9.39)	0.050	0.81(0.39, 1.68)	0.87(0.29, 2.56)	0.802
Engineering	.000(.000)	0.000(0.000)	.999	0.41(0.18, 0.93)	0.22(0.07, 0.07)	0.09
Finishing	1	1		1	1	
Alcohol drinking						
Yes	2.8(1.44, 5.45)	2.63(1.33, 5.2)	0.005	1.09(0.42, 2.84)	1.05(0.40, 2.75)	0.920
No	1	1		1	1	

Sleep disorder						
Yes	3.17(1.72, 5.88)	3.12(1.68,5.81)	0.000	3.12(1.54, 6.35)	2.53 (0.90, 7.07)	0.080
No	1	1		1	1	
Use of PPE						
Yes	1	1		1	1	
No	2.29(1.31, 4.02)	2.15(1.18, 3.93)	0.013	2.23(1.15, 4.36)	2.1(1.05, 4.22)	0.035
Pressure point						
Yes	2.64(1.52, 4.6)	2.62(1.51, 4.589)	0.001	1.41(0.76, 2.64)	1.27(0.67, 2.42)	0.459
No	1	1		1	1	

Table 11.Multivariate analysis of factors associated with occupational injury among textile and garment workers in Adama city, Adama 2020

5.9. Analysis of injury

Overall, injury in each work pattern was analyzed using logistic regression. Shift workers are 1.84 [OR= 1.84: 1.27, 2.69] times more likely acquire occupational injury than regular day workers. But when this is adjusted for the factors which were significant for occupational injury like sex, health and safety training, health and safety supervision, sleep disorder and use of PPE significant difference was observed. That was shift workers were 2.79[OR= 2.79: 1.75, 4.48] times more likely to develop injury than regular day workers with P- value less than 0.000.

During the comparison of injury type laceration was found to have significant association with injury($X^2= 5.39$, P-value= 0.02). Hand from location of injury has significant association with occupational injury among textile workers ($X^2=6.24$, P-value = 0.01). Among causes of injury, machinery showed significant association with injury($X^2=6.72$, P-value = 0.01). But other factors from type, location and causes of injury did not show significant associations.

Table 12. Chi -square analysis of type of injury and causes of injury among textile and garment workers in Adama city, Adama 2020.

Occupational injury	Rotational shift work	Regular day work	Chi-square	P-value
	N (%)	N (%)		
Location of injury				
Head	8(8.6)	6(10.2)	0.29	0.59
Neck	6(6.5)	4(6.8)	0.41	0.52
Trunk	6(6.5)	2(3.4)	2.03	0.15
Hand	57(61.3)	35(59.3)	6.24	0.01
Leg	15(16.1)	9(15.3)	1.56	0.21
Other	1(1.1)	3(5.1)	1.00	0.32
Type of injury				
Laceration	43(46.2)	25(42.4)	5.39	0.02
Cut	26(28)	19(32.2)	1.18	0.29
Contusion	8(8.6)	2(3.4)	3.66	0.06

Sprain	2(2.2)	4(6.8)	0.674	0.41
Dislocation	6(6.5)	5(8.5)	0.093	0.76
Eye injury	3(3.2)	3(5.1)	0.20	0.65
Burn	4(4.3)	1(1.7)	1.82	0.18
Other	1(1.6)	0(0)	1.00	0.32
Cause of injury				
Machinery	52(55.9)	31(52.5)	6.72	0.01
Falling accident	18(19.4)	13(22)	0.85	0.36
Hit by object	8(8.6)	4(6.8)	1.36	0.24
Hand tools	8(8.6)	8(13.6)	0.00	1.00
Heavy objects	1(1.1)	0(0)	1.00	0.32
Electricity	3(3.2)	2(3.4)	0.20	0.65

6. Discussion

This work place based cross- sectional study was done among Adama city textile and garment factory workers. We found that prevalence of occupational injury among rotational shift workers were higher than regular day workers (31.6 %, 20.1 %) respectively. Studies in different countries show that prevalence of injury among rotational shift workers and regular day workers is different. Studies in south Korea, New Zealand and Massachusetts showed prevalence of occupational injury among rotational shift workers and regular day workers were (3.0 %, 0.9%), (15.3 %, 7.9%) and (19.3%, 10.1%) respectively (31,33,36).

In our study shift workers are 1.84 times [OR= 1.84: 1.27, 2.69] more likely exposed to occupational injury than regular day workers. In line with this result, a study in Massachusetts reported that shift workers are 1.97 times [OR=1.97: 1.07, 3.63] more likely to have occupational injury than regular day workers(33). Studies from New Zealand showed shift workers are 2.10 times [OR=2.10: 1.74, 2.53] more likely to have occupational injury than regular day workers(36). Also, findings from Korea electronics factory and Korea workers show shift workers are more likely to have occupational injury than regular day workers [(OR=2.65: 1.49,4.7.), (OR=2.40: 1.65,3.48)] respectively(37). Findings from Canada revealed that shift workers are 1.484 times [OR= 1.484: 1.12, 1.97] more likely to have occupational injury than regular day workers (31).There were limited published studies on occupational studies in low-income countries regarding work patterns so, comparison was not possible. Our finding gives an insight to researchers in our country to investigate more on shift work effect on occupational injury. This difference may be seen due to that rotating shift workers may developed sleep deprivation which made them sleepy and reduce alertness. Sleep deprivation also may lead to sleep disorder and may decrease ability to learn and recall new facts, loss of communication and lack of adaptation in emotional need to work- place. So, this increases risk behavior to injury (38). Our result leads to similar conclusion where workers having sleep disorder were three times [OR= 3.17: 1.72, 5.88] increased risk of occupational injury than workers who had no sleep disorder. Based on a systematic review and meta-analysis on sleep problem and work injury workers with sleep problems had 1.62 times [OR= 1.62: 1.3, 1.84] increased risk of occupational injury than workers who had no sleep problem (39). Similar findings reported in Canada that

workers who had sleep disorder were more at risk to injury than workers who had no sleep problem(23).

Sleep problem is found to be one of major factors for accidents at work- place. Around 13% of injury at work place was caused by sleep problem.(39). Our study revealed that shift workers were 17.7% more exposed to sleep disorder than regular day workers 4.8%. Compared to regular day workers shift workers had odds of 4.298 times sleep disorder [OR= 4.29: 2.32, 7.95] than regular day workers. Study among America nurses showed rotational workers were 2.82 times [OR= 2.82:1.79, 4.45] at risk to sleep problem compared to regular day workers(33).

Sex is one of significant associated factor identified in occupational injury. In our study female workers in rotational shift exposed to occupational injury 1.85 times [AOR=1.85: 1.17, 3.373] more likely than males and female workers in regular day exposed to occupational injury 2.19 times [AOR= 2.19: 1.18, 4.60] more likely than males. A study conducted in Canada found the odds of female to occupational injury was [OR=2.29: 1.37, 3.82](31).On the other hand Studies conducted in different countries like India, German and Amhara region of Ethiopia found that males are more exposed to occupational injury than females(23). The difference may be explained by difference in work environment, status and sample size. In addition, above 73 % of our study participants were females this may contribute to increase risk in female than male. Our observation also supported the finding. Greater number of females were employed in machine operating areas which increased exposure to injury.

Our study result confirms that workers who had no health and safety supervision were 3.13 [AOR= 3.13:1.69, 5.81] times more likely increased risk of occupational injury in rotating shift work and 3.81 [AOR= 3.81: 1.97, 7.38] times than workers who had health and safety supervision in regular day workers. A systematic review in Ethiopia occupational injury showed that workers who were not supervised were 1.6 times [OR=1.6: 1.08,2.37] more likely at risk of developing occupational injury than supervised workers(38).

Health and safety training was one of associated factor for occupational injury in textile and garment factories work environment. Slightly superior result is achieved in our result in health and safety training compared to previous studies. The difference may be explained by difference

in quality of training, decrease follow up and work supervision and individual difference in acceptance and implementation of what is learnt.

The odds of workers who had no health and safety training was 7 times [AOR= 7.01: 3.24, 15.20] more likely to develop occupational injury in rotating shift work and 5.27 times [AOR= 5.27: 2.17, 12.83] more likely in regular day workers in our study than workers had health and safety training. This finding was different from findings of Amhara regional state. The report showed that workers who had no health and safety training were 1.85 times [AOR= 1.85: 1.17, 2.91] more likely to have occupational injury than workers who had health and safety training (25).

Use of PPE was among behavioral factors explored to have significant association with occupational injury in our study. Not using PPE at workplace more likely increase risk of occupational injury 2.15 times [AOR= 2.15: 1.18, 3.93] in rotating shift work and 2.1times [AOR= 2.1: 1.05, 4.22] in regular day work pattern. These are higher when compared with what has been found in previous studies. This difference may be seen due to operational definitions variation among studies. Amhara region, Kombolcha, reported the odds of injury increases 1.3 times [AOR= 1.3: .82, 2.10], in workers who did not use PPE than workers who used PPE. Also study report from kombolch showed the odds of workers who did not use PPE increases 1.40 times [AOR= 1.40: .83, 2.37] more likely to develop occupational injury than who used PPE(25).

In all investigated factories, workers were observed for wearing of PPE like eye goggle, hand/ finger protector, mask and protecting cloths. Wearing uniform observed in all factories but other protective materials were not utilized by workers according to their exposure. The reason they responded is availability and supply of PPE is not consistent so, practice of PPE depends on availability.

There were also some important differences in the result like age < 25 years(27) and working > 48 hour per week were associated with occupational injury in different studies(25). Contrary to the mentioned finding, we did not find workers age below 25 and working >48 hours per week as significant factors in this study. This may be explained by variation in engagement of work that a smaller number of workers engaged in 48 hours and above.

Limitation

Although this study finds out prevalence and factors associated with occupational injury, some workers who worked less years were terminated from work due to current pandemic (COVID 19) this may affect the prevalence, may undermine, or exaggerate the reality. Since we applied cross sectional study and used questionnaire recall bias may limit result of the study.

7. Conclusion

The one-year prevalence of occupational injury among rotational shift workers found to be higher than regular day workers. The prevalence in this study seems lower than previous studies but still significant number of workers were affected. Sleep disorder was among the significant factors in rotational shift workers which increase the risk of injury. Disturbed sleep brings different consequences and leads to increased risk of injury due to decreased alertness. Most of injuries in rotational shift workers were also occurred during nighttime. Health and safety supervision and training, machine maintenance and use of PPE were significant factors associated with occupational injury in both work patterns.

8. Recommendation

This study found factors which have significant association for occupational injury in textile and garment factories were more of behavioral which can be preventable if all stake holders integrated and act their responsibilities accordingly.

Employers

- Consistent follow up of employees on consistent utilization of PPE at work place.
- Arrange health and safety training before engaged to work for newly higher employees as well for those who did not have health and safety training but who are working now.
- Regular and consistent supervision by company's health and safety officers at working places.

- Disturbed sleep brings different consequences and leads to increased risk of injury due to decreased alertness. So, employers are expected to dedicate spaces for short naps and help workers to use properly.
- Companies' health and safety officers should strengthen educating workers on sleep problems related to accidents and advantages of PPE.
- On the other hand, employers should understand cost of production loss when employees absent from work due to injury. That is why occupational health and safety should be incorporated at workplace. So intensified and structural intervention should be required in improving work environment and decrease occupational injuries.

Employees

- Workers should use all PPE accordingly in consistent manner.
- Workers should avoid any destructors before going to sleep like using caffeine, to ensure enough amount of rest.
- Workers should have to take enough rest after night works.
- Workers should take nap in between at nighttime if sleep disturbs their work.
- Workers should struggle for their right to work place health and safety through their union.

Government

- Regular visit and inspection by Bureau of Labour and Social Affairs at regional and zonal level.
- Regional and zonal Bureau of Labour and Social Affairs are expected to encourage workers all health and safety issues and facilitate their implementation.
- Regional and zonal Bureau of Labour and Social Affairs: educate and train workers and employers on occupational health and safety.
- General awareness creation of work place safety and occupational injury through mass media.

- Collaborative discussion and activities with all stake holders help in understanding the magnitude of occupational injuries and implementing prevention measures.
- The study found the difference in prevalence of injury among shift workers and regular day workers. A little is observed about effects of shiftwork on health. So further studies required in our country to address this question.

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Annexes

I. Participant Information Sheet (English)

Institution: Addis Ababa University, College of Health Sciences, School of Public Health

Name of the Principal Investigator: Seble Fekadu

Participant Identification Number: _____

Participants Information Sheet

Hello, my name is _____. I am collecting a data for a research entitled ‘Assessing the prevalence of occupational injury in standard and shift work among textile and garment workers in Adama, Ethiopia.

We would like to invite you to participate in this study. Your participation in this study will only be based on your willingness. Your decision not to participate in the study will not affect any of the activities in your company. Before deciding, please take a little time to understand the following information. Thank you for your time.

Study objective: The objective of the study is to assess effects of shift work on occupational injury in textile and garment industries.

Procedures: You are invited to participate in this study because you are working in one of the textiles and garment industry selected for this study. If you are willing to participate in the study after you have understood all the information, you will sign on the informed consent form as a confirmation of your agreement. You will then be requested to provide your response for the questions you will be asked from a questionnaire. These will be mainly questioning regarding your background information, information related to work environment safety and any occupational injuries.

Benefits of participation: Your participation will be useful to give insight in support of efforts being made to improve occupational safety and health program based on evidence.

Risks/discomfort of participation: Participation in this study does not cause any notable harm. The questionnaire will take about 30 minutes of your time. Some questions might be personal in nature. We hope that you will answer all the questions in the questionnaire since your responses are very important to us. However, you can still refrain from answering any question you don't want to respond.

Confidentiality: the information you provide will be kept strictly confidential and will not be shared with anyone. We will be using code numbers on the questionnaire instead of your name. The filled questionnaires will be locked, and access will be restricted only to the study team members.

Result Dissemination: the results of this study will be used for the purpose of partial fulfilment of the master's degree in General Public Health. Results of the research will be disseminated in conferences or published in journals. You will not be identified in any report or publication. Your institution will not be identified in any report or publication. If you wish to be given a copy of any reports resulting from the research, please ask us to put you on our circulation list.

Right to withdraw: Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate all the services, you receive at this Centre will continue and nothing will change. OR The choice that you make will have no bearing on your job or on any work-related evaluations or reports. You may change your mind later and stop participating even if you agreed earlier.

In case of injury: if any injury happens on the time of data collection, the data collector will assist you for immediate help to the clinic in the organization.

Contact: If you have any question, you can contact the principal investigator using the following address:

Seble Fekadu, Tel.: - +251-911-482-843

Email address: seblefekadu2006@yahoo.com

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ንጥያቄዎቻቸውን በመለይ መለሰልናል፡፡ ስለዚህም ተስፋፋይና ደርጋለን፡፡ ሆኖም ገንዘብ መለሰያል ወደዱትን የትኛውንም ጥያቄ አለመለይ መለይቻለሁ፡፡

መረጃውን ት፡ እርስዎም መረጃውን ማረጋገጥ ተብሎ ተገቢ ይሆናል፤ ለመገንጠል ሳልፈን የምንሰጠው ይህንንም፡ በመገንጠል ይሰጥን ሳይሆን መለያ ቁጥር የምንጠቀም ይሆናል፡፡ የተገኘውን መገንጠል ማረጋገጥ ይቻላል፤ ከጥናት በፊት ወጪዎችንም መገንጠልን ሊያገኝ ይችላል፡፡

መግኛ አድራሻ፡ መግኛውን ይገኝ ትጥያቄ ካለዎት ዋና አጥኚውን በመግለጽ ወደ አድራሻው መግኛ ትችላላሉ፡፡

ስልክ፡ ቃዳጋስክ ቁጥር +251-911-482-843

የኢሜል አድራሻ፡ seblefekadu2006@yahoo.com

III. Consent form (English)

Work shift and injury research

I _____ agree to participate in the research titled Assessing Prevalence of Occupational injury in standard and shift work worker in Adama, conducted by Seble Fekadu.

I have received, read and kept a copy of the information sheet written in Amharic form. I have had the opportunity to ask questions about this research and I have received satisfactory answers. I understand the general purposes, risk and method of this research.

I agreed to participate in the research and the following has been explained to me:

- my participation is completely voluntary
- what I am expected and required to do
- the research may not be direct benefit to me
- the risks including any possible inconvenience, discomfort or harm
- the steps that have been taken to minimize any possible risks
- my right to withdraw from the study at any time without any implication to me
- Security and confidentiality of my information
- whom I should contact for any complaints with the research
- I am able to request a copy of the research findings and reports

Participant Signature _____ Date _____

Witness name _____ Signature _____ Date _____

Data collector name _____

Signature _____

Date _____

IV. Consent form Amharic

የፈቃድ ማስቀመጫ ቅጽ

የፈረቃሥናክዲጋወንየ ሚላከትጥናት

እኔ _____ ወርሰ-ጠፍቃዩ ሥላሴአዲጋበሚኒርዕስበምታዘጋ

ጀመጥናትላይለመቀተፍየ ተስማሚመሪኔ ንእገ ልጻለሁ ፡ ለዚህምገለሚኒኛቋንቋየ ተዘጋጀውየ ሚጃወረቀትቅጂእ

ንጠናአረጋግጪቀብዩለሁ ፡ ይህንጥናትበተመለከተጥያቄዎችንየ መዞየ ቅዕደለአግኝቴአጥጋቢመልሶቸንአግኘቻ

ለሁ ፡ የዚህንጥናትአጠቃላይዓላማ ያለውንአዲጋናየ ጥናቱንዘዴበሚ ባተገንዝበአለሁ ፡ ከዚህበታችየ ቀረበት

ጉዳዮችተብረርተወልኝበጥናቱላይለመቀተፍተስማማለሁ -

- የእኔ ተሳትፎ ማሰብ ማሰብ ፈቃደኝነት ሳይሆን ተመሳሳይነት ያለኝ
- የሚከበሩ ሰዎችንና የምሳሌ የቀረጠ ማረጋገጫ ያለኝ ያለኝ
- ጥናታዊ እና የሰው ጥንቃቄ ሆኖ ማረጋገጫ ያለኝ ያለኝ
- ለየጋጣሚ ሰዎች ለሰዎች፣ ሰዎችን ማረጋገጫ ያለኝ ያለኝ
- ችግሮችን ለመቀነስ ሰዎችን ማረጋገጫ ያለኝ ያለኝ
- ከጥናቱ ለምን ምን ጽኑ ፍላጎት ማረጋገጫ ያለኝ ያለኝ
- የምስጢር ማረጋገጫ ያለኝ ያለኝ
- ከጥናቱ ጋር በተገናኝ ማረጋገጫ ያለኝ ያለኝ
- የጥናቱን ውጤት ማረጋገጫ ያለኝ ያለኝ

የተገታኝውም

የምክርሥት ፊርማ ቀን

የሚጀቡበትበውም ፊርማ ቀን

ဝိသုဒ္ဓိပုဂ္ဂိုလ်များ၏အားကိုးစရာအဖြစ်

V. Questionnaire (English)

Date: _____

Name of textile: _____

I. Socio-demographic and Economic Factors			
No	Questions	Response	Remark
101	Age in complete years	_____	
102	Sex	1. Male ☐ 2. Female ☐	
103	Educational Status	1. Illiterate (can't read and write) 2. Literate but no formal education 3. Primary school (grade 1-8) 4. Secondary school (grade 9-12) 5. Some college or technical school 6. Diploma 7. BSc/ BA 8. MSc/MA and above	
104	Marital status	1. Never Married 2. Married 3. Living together 4. Divorced /Separated 4. Widowed	
105	Religion	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Other (specify _____)	
106	Work experience	1. ≤2years 2. 2- 5 years 3. 6-10 years 4. >10 years	
107	Employment pattern	1. Temporary 2. Permanent	
II. Work environment			

201	Work hours per week	1. ≤ 48 hrs 2. > 48 hrs	
202	Current work pattern	1. Shift work 2. Regular day worker	
203	Ever engaged in shift work	1. Yes 2. No	
204	Have occupational Safety training	1. Yes 2. No	
205	Safety supervision present	1. Yes 2. No	
206	Does your work need visual concentration	1. Yes 2. No	
207	Machines maintained timely	1. Yes 2. No	
208	Working department	1. Weaving 2. Spining 3. Engineering 4. Finishing	

III. Occupational injury			
301	Have you encounter any type of injury in the last 12 months	1. Yes 2. No	If response is no go to Q #401

302	Location of injury	1.Head 2. Neck 3. Trunk 4. Hand 5. Leg 6.Other	
303	What type of injury	1. Laceration 2. Cut 3. Contusion 4. Sprain 5.Dislocation 6. Eye injury 7. Burn 8. Other	
304	Any absence from work due to injury	1. Yes 2. No	
305	Number of days absence from work due to injury	1. 3 days 2. 5 days 3. >5 days	
306	Causes of injury	1.Machinery 2. Falling accident 3. Hit by object 4. Hand tools 5. Splinting 6.Heavy objects 7.Electricity	
307	Time of injury occurrence	1. Morning 2. Afternoon 3. Evening	

		4. Night	
IV. Personal behavior			
401	Alcohol drinking	1. Yes 2. No	
402	Khat chewing	1. Yes 2. No	
403	Cigarette smoking	1. Yes 2. No	
404	Sleep disorder	1. Yes 2. No	
405	Job satisfaction	1. Yes 2. No	
406	Use of PPE	1. Yes 2. No	
V. Ergonomics			
501	Pulling	1. Yes 2. No	
502	Pushing	1. Yes 2. No	
503	Heavy lifting	1. Yes 2. No	
504	Pressure points	1. Yes 2. No	
505	Carrying	1. Yes 2. No	
VI. Effect of shift work			
601	Confirmed cancer by health worker	1. Yes 2. No	client self-report
602	Confirmed cardiovascular disease	1. Yes 2. No	

603	Abortion	1. Yes 2. No	If participant is female, ask
604	Premature delivery	1. Yes 2. No	If participant is female, ask

Name of data collector: _____ Signature: _____

Name of data supervisor: _____ Signature: _____

VI. Questionnaire (Amharic)

መጥይቅ (አመራር)

ቀን: _____

የጨቋጨቅፋብሪካስም: _____

1. የመሀበሪዊ እና የአካላዊ መረጃ			
ተ.ቁ.	ጥያቄ	ምላሽ	ምረመራ
101	እድሜ	_____	
102	ጾታ	1. ወንድ ☐ 2. ሴት ☐	
103	የትምህርት ደረጃ	1. ምንም አልተማረም (መግቢያ ተጠቅሞ መገኘት) 2. መግቢያ ተጠቅሞ መገኘት ምህርት ቤት ለኛም 3. አንደኛ ደረጃ (1ኛ-8ኛ ክፍል) 4. ሁለተኛ ደረጃ (9ኛ-12ኛ ክፍል) 5. ጥቂት የኮሌጅ ወይም ቴክኒክና መምህራን ህርት 6. ዲፕሎማ 7. የመጀመሪያ ዲግሪ 8. ሁለተኛ ዲግሪ እና ከዚያ በላይ	
104	የትምህርት ሁኔታ	1. ያላገባች	

		2. በትዳርላይያለች 3. ያለህጋዊጋብቻኢብራያ ምትኖር 4. (በፍቺ) የተለየ ያች 5. በግዛቱ ተለያየች	
105	ሀይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት 5. ሌላ (ይገለጽ _____)	
106	የስራልማድ	1. 2 ዓመት እና ከዚያ በታች 2. ከ2- 5 ዓመት 3. ከ6-10 ዓመት 4. ከ10 ዓመት በላይ	
107	የቅጥርህኔታ	1. ጊዜያዊ 2. ቋሚ	
2. የስራ አካባቢ			
201	በሳምንት ውስጥ ምን ያህል ይሰራሉ	1. ከ48 ሰዓት በታች 2. ከ48 ሰዓት በላይ	
202	አሁን ያለበት የስራህኔታ	1. በፈረቃ 2. መደበኛ ቀን	
203	የፈረቃ ስራ ሰርተዎት ወቅት	1. አዎ 2. አላወቅም	
204	የስራ ታደህንን ትስልጠኖት ወስደዋል	1. አዎ 2. አልወስደህም	

205	የስራቦታየደህንነትከትልናቁጥጥርአለ	1. አዎ 2. የለም	
206	ስራዎችእይታትከረትንይፈልጋል	1. አዎ 2. የለም	
207	ማሽኖችበጊዜወጣናያገኛሉ	1. አዎ 2. የለም	
208	የስራክፍል	1. ሽማግሌ 2. ፈትልክፍል 3. አንጂ ሪንግ 4. ፊኒሺንግ	
3. የስራላይአደጋ			
301	ባለፉት 12 ወራትስራላይማኖትዎይነትአደጋአጋጥሞ ዎትያወቃል	1. አዎ 2. የለም	የለምከሆነ ወደተ ራ.ቁ 401
302	ምንዳይነትአደጋ	1. መቀርደድ/መላላጥ 2. መቆረጥ 3. ግጭት/ሰንበር 4. ወላምታ 5. ወላቃት 6. የዐይንላይአደጋ 7. ቃጠሎ 8. ሌላ	
303	ስራላይበአጋጣሚዎችአደጋከስራቀርተዎትዎ ቃሉ	1. አዎ 2. የለም	

304	በአዲጋግከንያትከስሪየ ቀሩባቸውቀናትብዙ ት	1. 3 ቀናት 2. 5 ቀናት 3. ከ5 ቀናትበላይ	
305	አዲጋዩ ደረሰብዎትዩ ሰው ትክፍል	1. ራስ 2. አንገት 3. ዐይን 4. እጅ 5. እግር 6. ለላ	
306	የአዲጋውማስኤ	1. ከማሽንጋርበተያያዘ 2. የመደቅአዲጋ 3. በነገሮችመጣት 4. በእጅመሳሪያዎች 5. መሸራተት 6. ከባድእቃማሳት 7. አለክትሪክ	
307	አዲጋው ተፈጠረበትሰዓት	1. ጠዋት 2. ከሰአት 3. ምሽት 4. ለሊት	
4. ግለሰባዊጠባይ			

401	አልኮል፣ጠቃሚ	1. አዎ 2. የለም	
402	ጫዳቅሚ	1. አዎ 2. የለም	
403	ሲጋራ ያጸጸ	1. አዎ 2. የለም	
404	የእንቅልፍ መባታት ግርዛብ	1. አዎ 2. የለም	
405	በስራ ያረጋገጠ	1. አዎ 2. የለም	
406	የአደጋ መከላከያ መሳሪያ ያገኘ	1. አዎ 2. የለም	
5. የስራ ሁኔታ ስነ ምዕኛ			
501	መብት	1. አዎ 2. የለም	
502	መገፋት	1. አዎ 2. የለም	
503	ከባድ እቃ መግሳት	1. አዎ 2. የለም	
504	መጫ	1. አዎ 2. የለም	
505	መክከም	1. አዎ 2. የለም	
6. የፈረድ ስራ ተጽዕኖ			
601	በሰው ምኞት ተረጋገጠ	1. አዎ 2. የለም	
602	በሰው ምኞት ተረጋገጠ	1. አዎ 2. የለም	
603	በሰው ምኞት ተረጋገጠ	1. አዎ 2. የለም	ለሰው ምኞት ተረጋገጠ
604	ወርቅ/ ከዘመን ወርቅ ተረጋገጠ	1. አዎ 2. የለም	ለሰው ምኞት ተረጋገጠ

የሚገኝበት ቦታ ስም: _____ ፊርማ: _____

የሰው ምኞት ተረጋገጠ ስም: _____ ፊርማ: _____

VII. Observation Checklist

Safety Health environment				
		Yes	No	Remark
1.	Lighting and ventilation	☐	☐	
2.	Designs-walkways, factory, lifts	☐	☐	
3.	Provision of clean water, changing room/shower, sanitary facilities	☐	☐	
4.	First Aid facilities-existence and accessibility	☐	☐	
5.	Availability and use of personal protection equipment and clothing	☐	☐	
6.	Safety in working area-furniture arrangement, electric wiring, lighting, ergonomics	☐	☐	
7.	Display of safety instructions	☐	☐	
8.	Storage of hazardous items	☐	☐	
9.	Disposal of Waste	☐	☐	
10.	Drainage	☐	☐	
11.	Policy guidelines and procedures	☐	☐	

CURRICULUM VITAE

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EDUCATION AND QUALIFICATIONS

Degree Public Health Officer from Alkan University College

Degree Management Information System from Microlink Information College

Diploma Nursing from Gondar college of medical science

PROFESSIONAL EXPERIENCE

Linkage and Testing Officer – AIDA Health care Foundation Ethiopia since December 2017
till now

Monitoring and Evaluation officer – **ESOG** Expanding PMTCT Service in Private Health
Facilities in Ethiopia project May 2014 – Dec 2016.

Monitoring and Evaluation coordinator - May13/2008 to January1/2014: Johns Hopkins
University TSEHAI International NGO,

As Medical Senior Clinical Nurse - From 1997- April 2008

TRAINING AND WORKSHOPS

Certificate TOT on Health Management Information System (HMIS) organized by Addis Ababa City Administration Health Bureau in collaboration with Tulane International Ethiopia.

Certificate TOT in Mother Baby Pair Cohort Follow Up and Continuous Quality Improvement Approach organized by Federal Ministry of Health in collaboration with ICAP Columbia University program in Ethiopia

Certificate Monitoring & Evaluation of Health Programs for M & E Experts and HIV/AIDS Program managers organized by Johns Hopkins University/TSEHAI in collaboration with Jimma University.

Certificate Monitoring & Evaluation of ART- in collaboration with Federal HIV/AIDS Prevention and Controlled program, A.A Health Bureau and Johns Hopkins University/TSEHAI/

Certificate Data Analysis Work Shop using Epi Info Software- Johns Hopkins University/TSEHAI/

Certificate Prevention of Mother To Child Transmission /PMTCT/ Training Johns Hopkins University/TSEHAI in collaboration with A.A Health Bureau.

Certificate Management of HIV/AIDS Care and Treatment for Children, Adolescents and Adults in collaboration with A.A Health Bureau and Johns Hopkins University/TSEHAI/.

Certificate TB/HIV

Certificate Nurse Counselor on VCT- FHI in collaboration with A.A Health Bureau

Certificate Refresher Training on VCT- FHI in collaboration with A.A Health Bureau & CARE Ethiopia

Certificate Condom Promotion- HAPCO in collaboration with A.A Health Bureau

Certificate TOT on Comprehensive Home Based Care (CHBC) - Rotary International in collaboration with A.A Health Bureau.

REFERENCES

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Declaration

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources in this document. Every serious effort been made to avoid any plagiarism in the preparation of this thesis.

This thesis is submitted in partial fulfillment of the requirement for Master of Public Health degree to Addis Ababa University Health Science College, School of Public Health. I would like to declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

Name: _____ Signature _____ Date _____