

**JIMMA UNIVERSITY**  
**COLLEGE OF HEALTH SCIENCES**  
**DEPARTMENT OF EPIDEMIOLOGY**

Prevalence and Associated Factors of Work Related Injuries in Iron and Steel Factories in Bishoftu and Dukem Towns, Oromia Regional State, Central Ethiopia

BY

Bereket Worku

A thesis report submitted to department of Epidemiology, College of Health Sciences of Jimma University in partial fulfillment of the requirements for the degree of master in Public health

April 2016

Bishoftu, Ethiopia

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## **Abstract**

**Background:** The risk of occupational diseases and injuries has become by far the most prevalent and major health problem. Particularly, steel industries continued to be dangerous for the health of workers. This study aimed to produce relevant and up to date information on work-related injuries that could be used in the development of preventive measures and intervention priorities to safeguard the health and safety condition of the work force in industries.

**Objective:** To assess the prevalence of work-related injuries and associated risk factors among production workers in iron and steel industries in Bishoftu and Dukem Towns, Oromia regional state, Central Ethiopia.

**Methods:** Institution based cross-sectional study was carried out in November, 2015. Production workers in five iron and steel industries were first stratified by working sections and a total of 359 workers were selected using simple random sampling. Data were collected using pretested, questionnaire and observational checklist. Data were entered using Epi Data version 3.1 and analyzed using SPSS version 16.0. The magnitude and characteristics of work-related injuries, and the socio-demographic, work environment and behavioral characteristics of the respondents were analyzed by descriptive statistics. Bivariate and multivariate logistic regression analyses were done to identify the associated risk factors of injuries.

**Results:** The injury prevalence rate was 36.5% per year and the most common causes of injury were Hot metal contact (18.6%), fire and explosion (16%), splintering objects (15.5%), machinery (14.4%), and hit by falling objects (12.4%). Working in maintenance section [AOR=2.6, 95% CI: (1.4, 4.6)], lack of health and safety training [AOR=2.9, 95% CI: (1.7, 5.1)], night shifts [AOR=3.6, 95% CI: (1.5, 8.5)], and job dissatisfaction [AOR=2.7, 95% CI: (1.6, 4.5)] were found to increase the risk of work-related injury compared with the respective counterparts.

**Conclusion:** Work-related injuries were high among iron and steel industries workers. A significant relationship between work-related injuries and job category, health and safety training, night shift and job satisfaction were found. Emphasis should be given to provision of appropriate health and safety training, interventions to help workers in maintenance section and night shift and to increase job satisfaction using different motivational factors.

## **Acknowledgements**

First of all, I would like to thank my advisors for their comments, valuable inputs, and follow up from the start to the finalization of this research.

My gratitude also goes to the department of Epidemiology, College of Health Sciences, Jimma University, for giving me this opportunity and all the coordination and facilitation services.

I would also like to thank all data collectors, data clerks, my friends and all other individuals involved in this research.

Finally I would like to thank all of the managers in the companies selected for this study, in the respective government offices, the study participants and all other individuals who contributed through their cooperation and valuable information for the success of this research.

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## **Acronyms**

AOR	Adjusted odds ratio
BOLSA	Bureau of labor and social affairs
COR	Crude odds ratio
GNP	Gross national product
ILO	International labor organization
MOLSA	Ministry of Labor and Social Affairs
PPE	Personal protective equipment
SPSS	Statistical package for social sciences

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## **Introduction**

Occupational health and safety is one of the most important aspects of human concern. It aims an adaptation of work to man and each man to his job for the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. An occupational health service has to meet the special needs of the undertaking concerned and the people employed. The needs of the undertakings with respect to working population should be well identified and properly addressed(1).

The discipline covers the following key components: the availability of occupational health and safety regulations at workplace; the availability of active and functional occupational health and safety committee at workplace; monitoring and control of factory hazards to health; supervision and monitoring of hygiene and sanitary facilities for health and welfare of the workers; inspection of health safety of protective devices; pre-employment, periodical and special health examination; performance of adaptation of work to man; provision of First Aid; health education and safety training to the worker; advice to employers on the above mentioned items; and reporting of occupational deaths, diseases, injuries, disabilities, hazards and their related preventive measures at working (2).

The benefit of occupational health service in developing countries is seen locally as well as on a national level. The positive impact of occupational health service locally may be observed in reducing morbidity and work-related injuries. In addition, this means fewer losses to employer and worker as there will be a reduction of wage losses and decreased compensation costs. The reduction of absenteeism is of great importance concerning skilled labor, especially in countries where there is a shortage of skilled labor (1).

Work related injuries are costly to the community as a whole; they represent a burden which is constantly growing and which affects the standard of living of every one. Work related injury involves for the worker temporary or permanent adverse consequences of an objective or subjective nature, at both the personal and occupational level. The psychological impact of injuries cannot be ignored as well (2).

## Statement of the Problem

The risk of occupational diseases and injuries has become by far the most prevalent and major health problem. According to the International Labour Organization (ILO), approximately 2.3 million people die from accidents and diseases related to work each year. In stark terms this is equivalent to killing the entire population of a small country. The daily death toll amounts to some 6,300 persons. The vast majority of these deaths are avoidable and preventable – morally, politically, socially and economically these deaths are unacceptable. The ILO estimates that approximately 337 million occupational accidents occur annually that result in a 3+ day absence from work and work-related diseases affecting an additional 160 million people around the world(3).

The workplace fatal injury rates are 3–4 times higher in developing countries than the developed ones (4). Compensation, work time loss, production interruption, training and retraining, medical expenses and social assistance accounts for 5% of the global gross national product (GNP) (5). In Africa, where traditional hazards, such as workplace dusts and noise levels have not been dealt adequately, introduction of new technologies, chemical substances and materials have led to new and extra increased burden of occupational injuries and diseases. In Sub-Saharan Africa, more than 257,000 total work-related fatalities, and 55,000 injuries resulted in a loss of about 4% of GNP (4).

Many developed countries have extensive and comprehensive occupational safety and health management systems, which improved worker safety. However, in developing countries having 60% of the global workforce with 80% employed in heavy and dangerous work, only 5–15% of them have access to occupational health service (6). Unregulated exposures to chemical and physical hazards, beginning work in childhood, poverty, hunger, and scarce workplace health and safety resources contribute to high incidences of occupational injuries. These injuries along with occupational health remained a neglected public health problem, received little attention, remained low at the national priorities list (7) and had low commitment level in developing countries (8).

Historically, steel industries continued to be dangerous. Employed workers in basic steel industries are at greater risk for non-fatal injuries and illnesses due to very complex nature of production processes, material handling and other related functions of iron and steel making (9).

Ethiopia has been a member state of ILO and signed conventions related to health and safety of factory workers since 1923. However, the national occupational safety and health policy is not issued though it is required by the country as a result of ratifying occupational safety and health convention no. 155/1981 (10). Currently to prevent occupational injury and to promote health and safety at work places, the Federal Ministry of Labor and Social Affairs, Oromia Regional Bureau of Labor and Social Affairs and affiliated representative offices have taken responsibilities for occupational safety and health services of workers according to labor proclamation no 377/2003 (11).

In Ethiopia, like other developing countries, different industries are coming up at a fast rate; however, the country is relatively unclear regarding work related injuries and hazards because of inadequate accident and disease recognition, poor recordkeeping and reporting mechanisms. As a result the work related injuries are more and more likely to rise among industry workers (12, 2).

## **2.1 Significance of the Study**

This study aimed to produce relevant and up to date information on magnitude, characteristics and factors related to work related injuries among steel industry workers in Dukem and Bishoftu Towns, Oromia regional state. Such information can be used to develop preventive measures and effective intervention priorities to safeguard the health and safety conditions of the work force in industries. The study results may also be valuable for policy makers to formulate injury prevention programs in order to inform, plan, implement and evaluate health promotion policies and strategies in the steel industries nationwide.

## **Literature Review**

Development and industrialization in particular, have made immense positive contributions, to health, social wealth and improved education service. However, industrialization has also had adverse health consequences on work places. These effects have been caused either directly by exposure to safety hazards and harmful agents or indirectly through environmental degradation (13).

An occupational injury is any physical injury condition sustained on a worker in connection with the performance of his or her work in the industry. Employed people in industries spend at least one third of a day at work which have a strong effect on their health and safety due to work and work-related injuries (14). These occupational injuries pose a major public health and developmental problems which result in a serious health, social, and economic consequences on workers and their employers (15, 16). In developing countries like Ethiopia, the experience in the practice of occupational health is limited. Records of work-related injuries and diseases are lacking (2).

### **3.1. Magnitude of work related injuries**

Study carried out in Thailand reported that there were 189,621 cases of occupational injuries. Of this number, 607 were deaths, 20 cases of disability, and 48,078 cases of over 3 days lost from work (17). Results from US study showed rate of 75 per 1000 exposed workers per year (18).

Studies that are available on industrial injuries indicated that work related injuries occur with great frequency and much greater severity in developing countries. The injury rate among small-scale industrial workers in Zimbabwe was 131 per 1000 exposed workers per year (19). The injury rate in Nigerian factories was 22 per 1000 exposed workers per year (20). In another public sector industry, Indian Oil Corporation limited, prevalence of work related injuries are 35% among all injuries reported in their hospital and burn injuries were about 6% of all injuries (12).

Limited studies in the field of occupational health hazards have indicated that the magnitude of occupational injury is grave in Ethiopia (21). Few attempts have been made to identify work-related injuries and their determinants among industrial workers. The injury rate among 4,462 industrial workers in Addis Ababa was 80 per 1000 exposed workers per year (22). A study done among 3,100 textile factory workers in Addis Ababa reported cumulative incidence of 200 injuries per 1000 exposed workers per year (23). Reports from Department of Environmental Health of Federal Ministry of Health of Ethiopia revealed that among 16,610 industry workers in Addis Ababa cumulative incidence of 723 injuries per 1000 exposed workers (24).

In a study conducted on small and medium scale industries in North Gondar zone, the annual and two weeks prevalence rate of work-related injury were 335 and 120 per 1000 exposed

workers, respectively. Fifty five (17.1%) of the injured respondents were hospitalized, accounting for 40% hospitalization more than 24 hours. One hundred and three (53.9%) of the injured respondents were absent from work for more than 3 days. There were 2 deaths as result of work related injuries in the last 12 months (2).

Another study conducted among steel factory workers in Addis Ababa shows injury prevalence rate of 33.3% per year (25). In a study conducted in Tendaho Agricultural S.C., Afar, the overall occupational injury cumulative incidence was 783 per 1000 exposed workers per year. Seventy (11%) injured workers were hospitalized. Most (90%) of hospitalization was for more than 24 hours, where one death was reported in the preceding one year prior to the study. A total of 6153 work-days were reported to have been lost, at an average of 11.4 days per an injured worker per year (26).

## **3.2 Injury Characteristics**

### **3.2.1 Causes**

The studies conducted in Ethiopia indicated that there were different causes of occupational injury. According to a study done in eleven urban industries in Addis Ababa, it was indicated that being hit by or against objects and falling were the commonest causes of work-related injuries (22). Findings of a study done among textile factory workers in Addis Ababa demonstrated that the most frequent causes of occupational injury were machinery 42 (29.4%), and being hit by or against objects 29 (20.3%) (23). Department of Environmental Health in Ministry of Health in Ethiopia reported that striking (25.5%), falling (12.8%), and flying objects from machines (8.5%) were the major causes of occupational injury (24). Similarly the Amahara regional BOLSA reported that machinery (36.7%), mishandling (15.3%), falling (14.5%), and hand tools (6.2%) were the commonly complained occupational injury types among manufacturing industrial workers (27).

In a study conducted among steel and iron industries in Addis Ababa, the most common causes of injury on the workers were splitting and flying objects (16.4%), hit by falling objects (13.7%) and machinery (12.6%). Workers were exposed to preventable workplace hazards such as to excessive noise, fumes and dusts and to old and unguarded machines, splitting materials and sparking of metals (25).

### **3.2.2 Types**

In most studies, abrasions, cuts, burns, puncture, and fracture were the common injury types among manufacturing industrial workers (2, 27). The Amahara regional BOLSA 2007/2008 report also indicated that abrasion (62.5%), cuts (12.2%), and punctures (6.7%) were the commonest occupational injury types (27).

### **3.2.3 Part of body affected**

Work-related injuries affect different parts of the body. The commonest parts of body affected among Brazilian steel workers were hands, arms and eye (28).

The common affected body parts among eleven industrial workers in Addis Ababa were fingers (37.3%) and hands (11.6%) (22). A study done in Addis Ababa among textile factory workers reported that the most common affected body parts due to work-related injuries were fingers (42%), lower leg (18.95%), and hands (13.3%) (23). Reports from Department of Environmental Health of Ministry of Health of Ethiopia listed eyes, hands and fingers as the most commonly affected parts of the body (24). Similarly, a study done among small- and medium scale factory workers in North Gondar Zone indicated that hands were with the highest frequently affected body parts (30%) followed by fingers (24%) and eyes (19%) (2).

Regarding the distribution of work-related injuries by the days of the week, most studies revealed that the highest injury rates occurred on Monday's and the lowest on Thursday's and Friday's. Absenteeism is higher on Monday's than other days of the week in most industrialized countries, which results in workers to stand in for absent workers and undertake unfamiliar jobs on that day. The most common time of injury is from 8 am to 10 am. It was suggested by the investigators that this could have been due to fatigue or the speeding up of production at these times in an effort to meet a target before break (22, 23, 29).

### **3.3 Factors Affecting**

Many authorities believe that work-related injuries result from a complex interplay of multiple risk factors. Exposure to physical, mechanical and chemical hazards and the performance of unsafe practices by workers are the leading causes of work-related injuries. Similarly, psychosocial factors, work organization, socio demographic characteristics of workers and environmental and social conditions are other potential risk factors as depicted in Figure 1 (15, 30, 18, 31, 32, 33).

Reports from France, U.S and China revealed that men have the highest rates of work related injuries than women. These studies explained that the difference would be in part by the difference in jobs for the same job category and possible by the difference in the perception of risk and in behavior (15, 34, 35). However, studies conducted in eleven urban industries and textile factory in Addis Ababa and also a study conducted among small and medium scale factory workers in North Gondar Zone reported that gender has no association with the prevalence of work-related injuries (22, 23, 2).

Different investigators reported that there is difference in the rate of work related injuries in age groups with a higher rate among younger workers (1, 22). Study done in eleven urban factories in Addis Ababa revealed that the highest rate of work-related injury was observed in

the age group 15-19 years(22). Age groups less than 30 years were more affected by work-related injuries according to textile factory study in Addis Ababa (23). Ministry of Labor and Social Affairs of Ethiopia has reported that the majority (18 %) of work related injuries were observed in the age group of 25-29 (36). The study done in North Gondar Zone small and medium scale industries also showed that the prevalence of work and work-related injury increased with young age (<30 years) (2). These studies emphasized that work-related injuries in young subjects were more common due to lack of experience, lack of job knowledge and know-how than in other subjects. Furthermore, many workers begin working at an early age and often without safety training (37).

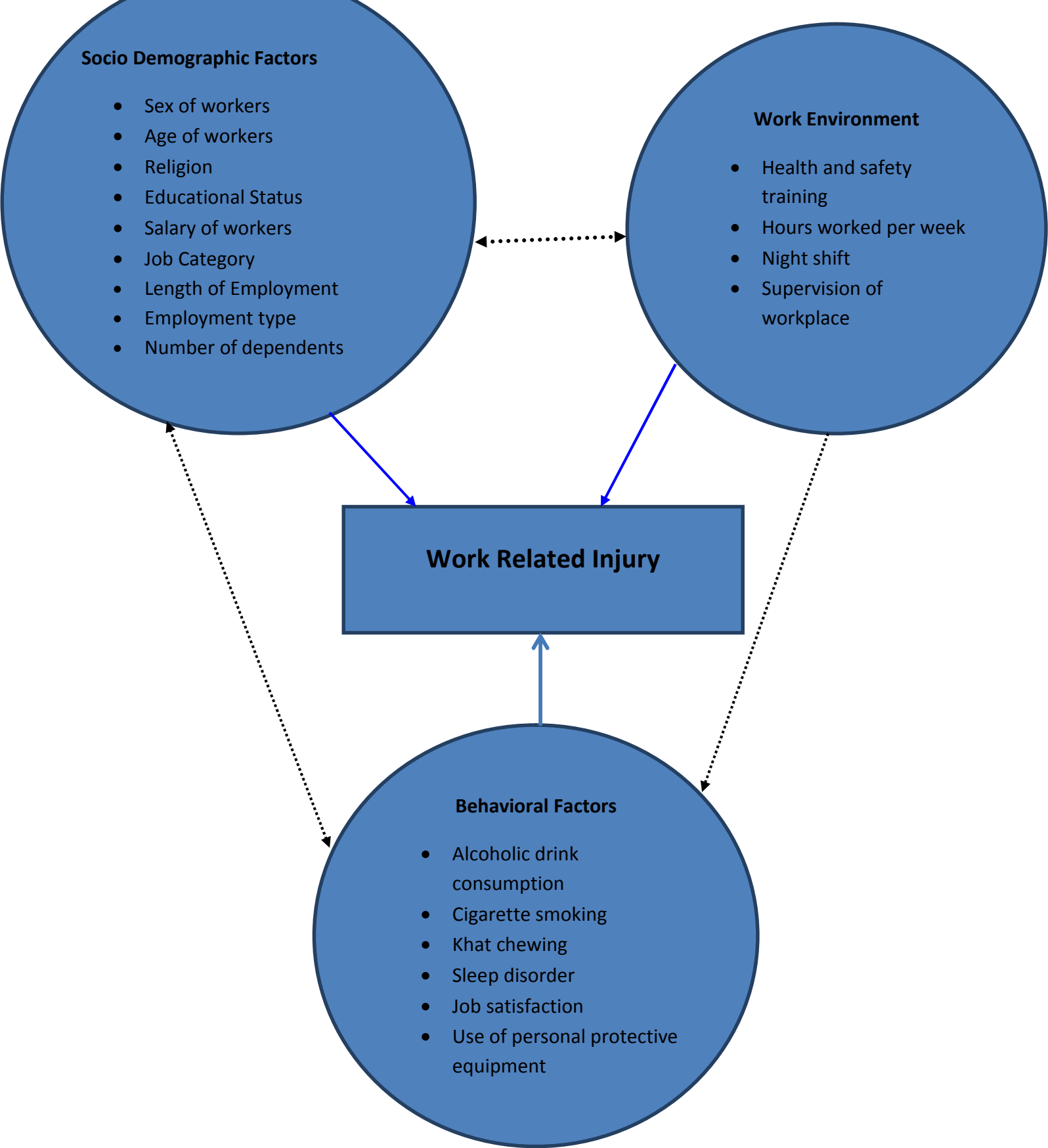
Most studies in different countries revealed that sleeping disorder, job stress and job dissatisfaction are the major risk factors for the occurrence of occupational injuries among industrial workers (24, 12). A case control study among coal mining factory workers in India reported that workers who were highly satisfied with the existing jobs have lower risk of occupational injury. This can be explained that workers who were not injured have positive thinking about the physical environment and always take necessary safety precautions. This study also indicated that work injuries were caused by a poor person environment fit which leads to increased job stress. Such stresses increased occupational injury risks, and stressed individuals were more likely to get occupational injuries (23). A case control study done among Railway workers in France indicated that workers with sleeping disorder problem sustained more occupational injury compared with their counterparts (24).

Different investigations showed that low educational status, low monthly salary, low working experience (5 years or less) in present job, lack of health and safety training, sleep disorders, job category and alcoholic drink consumption were common risk factors for work-related injuries (15, 30, 22, 23, 29, 31, 32). Most occupational health and safety studies conducted in developing countries revealed that increased educational levels in the factory have been associated with decreased work-related injuries (2, 1, 1, 23, 24). Working more than 48 hours per week, job dissatisfaction, job stress and absence of protective devices, were significant factors that contributed to the prevailing occupational injuries (26, 37, 2). Workers consuming alcohol during working days, without spouse, perceiving their work highly stressful and not using personal protective equipment (PPE) were more likely to be injured than their counterpart (26). A study done in Ethiopia revealed that there was no significant association between khat chewing and cigarette smoking with occurrence of occupational injuries (2). A study in India indicated that work accidents have been associated with alcohol consumption (12). A study done in Ethiopia North Gondar Zone among small- and medium-scale factory workers indicated that hours worked per week, workplace supervision, health and safety training showed a significant association with work and work-related injuries (2).

The use of outdated machinery, poor maintenance and little safety guarding of machinery, inadequate training of workers; poor design of equipment and workstations; and lack of



personal protective equipment are also some of the various reasons mentioned for the poor occupational safety situation in developing countries (38). While unsafe working environments commonly cause most workplace injuries, human factors such as young age, sex, lack of experience, job dissatisfaction, sleep disorders, smoking habit, excess alcohol use, and lack of physical activity are inherent factors (15, 31, 39).



**Figure 1: Determinants of work related injuries: A conceptual frame work for study of work related injury prevalence (18).**

## **Objectives**

### **General Objective**

To assess the prevalence of work related injuries and associated risk factors among production workers in iron and steel industries in Bishoftu and Dukem Towns, Oromia Regional State, Central Ethiopia.

### **Specific Objectives**

- To determine the magnitude of work related injuries in the last twelve months among workers in five iron and steel industries in Bishoftu and Dukem Towns
- To characterize work related injuries among workers in five iron and steel industries in Bishoftu and Dukem Towns in the last twelve months
- To identify associated factors of work related injuries among workers in five iron and steel industries in Bishoftu and Dukem Towns in the last twelve months

## **Methods and Materials**

### **5.1 Study Area**

The study was conducted in Bishoftu and Dukem Towns which are located about 50 km and 40 km from Addis Ababa respectively.

The industries selected for the study were East Steel PLC, Habesha Steel Mills PLC, Abyssinia Integrated Steel PLC, Metal and Engineering Corporation Steel Processing and C&E Brothers Steel Factory PLC. The first two are located in Dukem Town while the rest three are in Bishoftu Town. There were a total of 3312 workers in the companies. The main product of all the factories is reinforcement bar and wire rod.

### **5.2 Study Design**

Institution based cross-sectional study was carried in November, 2015 in five iron and steel industries workers in Dukem and Bishoftu Towns, Oromia Regional State, Ethiopia.

### **5.3 Source Population**

All workers employed in five steel factories in Bishoftu and Dukem towns.

### **5.4 Study Population**

Inclusion Criteria: All employees who were directly engaged in the production process in the selected industries were included into this study.

### **5.5 Sample Size**

The sample size was calculated using sample size determination formula for single population proportion with the following assumptions.

$$n = \frac{1.96^2 p(1-p)}{d^2}$$

#### *Assumptions*

- Based on a previous study conducted on work-related injuries among large scale metal manufacturing industries in Addis Ababa (40), the prevalence of work-related injuries was 48.9%, implying, P=0.49
- Z score of 1.96 corresponding to 95% certainty and a 5% margin of error
- 10% contingency for non-response and correcting for finite source population

Based on these assumptions, the total calculated sample size was 378.

## 5.6 Sampling Procedure

First, the calculated sample size ( $n = 378$ ) was allocated proportionally according to the staff size of each of the five iron and steel industries. Then production workers in the industries were stratified by working sections; the sample size of each industry was proportionally allocated to the working sections and workers were selected from employees list in each section using simple random sampling.

## 5.7 Data Collection Procedure

A structured questionnaire was pretested and then used to collect socio-demographic, work environment, behavioral characteristics and work-related injuries among workers in the last twelve months prior to the survey. Inspection was done to identify affected body parts and types of injuries. Occupational health and safety plans and programs were observed and observational checklist was used to assess the workplace environment and hazards. Five data collectors participated in the study (One diploma and four bachelor degree holders). Principal investigator and one supervisor supervised the data collection process and checked completeness and consistency of the questionnaire.

## 5.8 Study variables

**Dependent variable:** work-related injuries

**Independent variables:**

1. *Socio demographic variables* : Sex, age, religion, educational level, marital status, monthly salary, working experience, job category, area of residence.
2. *Work environment variables*: hours worked per week, night shift work, workplace supervision, health and safety training.
3. *Behavioral variables*: alcoholic drink consumption, chat chewing, cigarette smoking, sleep disorder, job satisfaction, and use of personal protective equipment.

## 5.9 Operational definitions:

**Work related injury** for the purpose of this study was defined as any personal injury resulting from an accident in the course of work for the past one year prior to this study. Only incidence of the event for a given time was recorded as an injury.

**Job satisfaction:** a state of pleasurable emotional feeling reported by the worker as the result of one's job. It is a subjectively perceived response of study participants to their job.

**Excessive heat:** heat was recorded as excessive if a worker was found sweating when naked or with light clothing; if the investigator felt a sudden heat wave and or was sweating when entering to the workplace.

**Excessive noise:** noise that makes it difficult to communicate among neighbor workers without shouting at a distance of about one meter.

### **5.10 Data Analysis Procedures**

After editing and cleaning to check completeness and consistency, the data were entered using Epi Data version 3.1. Finally, data were exported to Statistical Package for Social Sciences (SPSS) version 16.0 (SPSS, 2008) for data management and analysis. Socio-demographic, work environment and behavioral characteristics of the respondents, and the magnitude and characteristics of work related injuries were analyzed using descriptive statistics such as frequency distribution, mode, and percentage.

Binary logistic regression using enter method was performed to investigate associations between independent and dependent variables using odds ratio. Variables that had significant association up to p-value ( $p < 0.30$ ) were entered to multivariate analysis. Finally independent variables that had p-value ( $p < 0.05$ ) in the multivariate logistic regressions were considered to have significant association with the dependent variable. Findings of observations on work environment was qualitatively judged and textually summarized as a presence of hazard or not.

### **Ethical Considerations**

Ethical clearance was obtained from College of Health Science of Jimma University ethical review Committee. Permission from the managers of the companies was obtained through formal letter request by Jimma University. Informed verbal consent was obtained from each study participant after the researchers provided a clear explanation of the study purpose. Discussions were made with safety personnel concerning workers with higher risk of getting injuries. Confidentiality of the data was maintained throughout the study period and study participants names were omitted from questionnaires.

### **Communication of Results**

Report of the study is submitted to Department of Epidemiology College Health sciences, Jimma University. It will also be communicated to Dukem and Bishoftu Town administrations, to their respective labor and social affairs offices, and to each studied industry. Presentations at symposia, conferences and publication in reputable journals will also be done to reach the wider scientific community.

## Results

### 6.1 Socio-demographic Characteristics

Out of total 378 workers included in this study, 359 of them were willing to participate which gave a response rate of 95%. The majority of the workers, 345 (96.1%) were males while 14 (3.9%) were females. The median age of the respondents was 25 with the minimum and maximum age of 18 years and 60 years respectively. Nearly two-third(63.2%) of the respondents were Orthodox Christians, while about a quarter (24.5%) of them were Protestant Christians, close to one-in-ten (9.7 %) of them were Muslims and the rest (2.5%)were other religions followers. About half (50.1%) of the study participants had educational level of grade 9 and above, while 27 (8.1%) of the participants were illiterate. Slightly more than half(51.8%) of the respondents were single while 44.6% of them were married.

Regarding employment condition, 81.6% of the respondents were permanent employees, while the rest were temporary employees. Slightly more than half(51.0%) of the participants were working in basic production, while those working in foundry and maintenance constituted 29.2% and 19.8% respectively. The majority of the study participants (39.8%) had stayed from 2 to 3.9 years in their companies followed by those who had stayed for less than 2 years (30.4%) and 4 to 5.9 years (25.1%).The median monthly salary of workers was 1286 Birr with the minimum and maximum salary of 530 and 5000 Birr respectively. About 94.7% of the respondents had  $\leq 5$  economical dependents living with them while 92.2% of the respondents lived in urban area (Table 1).

**Table 1: Selected socio-demographic characteristics of respondents in five iron and steel industries in Dukem and Bishoftu towns, November 2015.**

Variables	Frequency	Percent
<b>Sex</b>		
Male	345	96.10
Female	14	3.90
<b>Age Group</b>		
18– 29	276	76.88
≥30	83	23.12
<b>Religion</b>		
Orthodox	227	63.23
Protestant	88	24.51
Muslim	35	9.75
Others	9	2.51
<b>Educational Level</b>		
Illiterate	29	8.08
Can Read And Write	27	7.52
Primary school (1-8)	123	34.26
Secondary School (9-12)	106	29.53
TVET and Above	74	20.61
<b>Marital Status</b>		
Single	186	51.81
Married	160	44.57
Not Living Together*	11	3.06
Widowed	2	0.56
<b>Working Experience in Years</b>		
<2 Years	109	30.4
2 – 3.9 Years	143	39.8
4 – 5.9 Years	90	25.1
≥6 Years	17	4.7
<b>Monthly Salary in Birr</b>		
≤ 1000	62	17.27
1001 – 2000	255	71.03
2001 - 3500	34	9.47
>3500	8	2.23

\*Divorced or separated

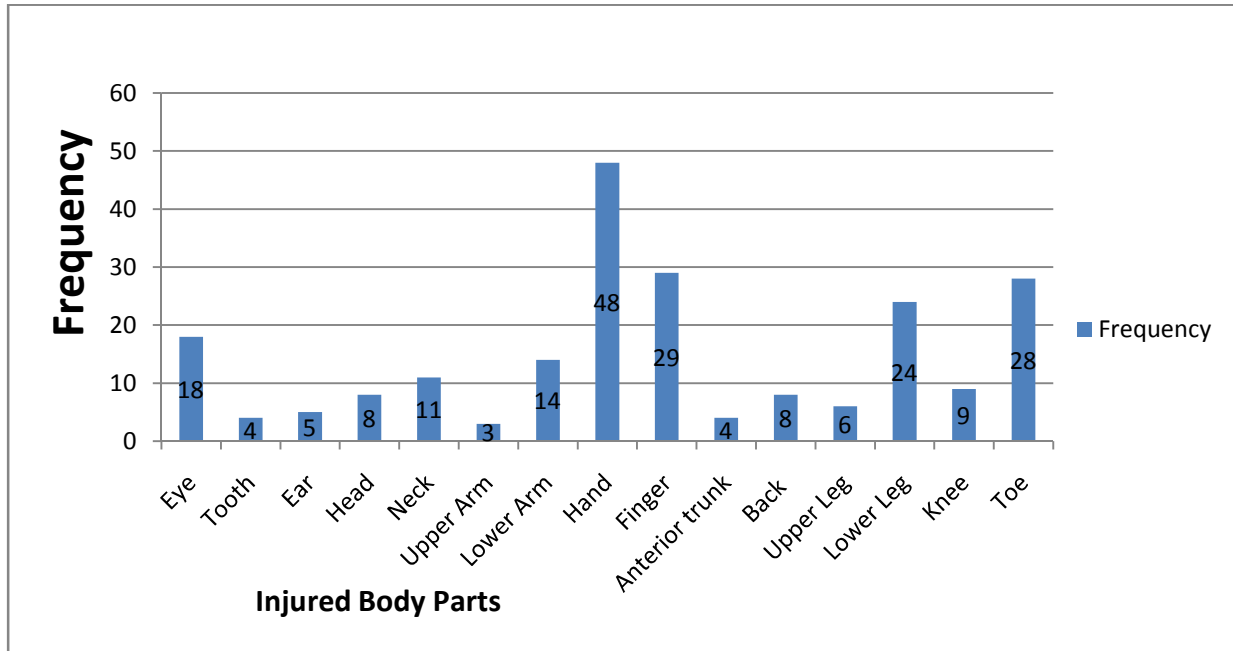
## 6.2 Characteristics of Work Related Injuries

From the total study participants 131 (36.5%) reported to have had incident at job that resulted in occupational injury in the last 12 months. Out of the total injured workers, 47.3% were injured once, 19.1% were injured twice, and 33.6% were injured three or more times in the last one year. More than four in ten(42.0%) of the injured workers were hospitalized, of



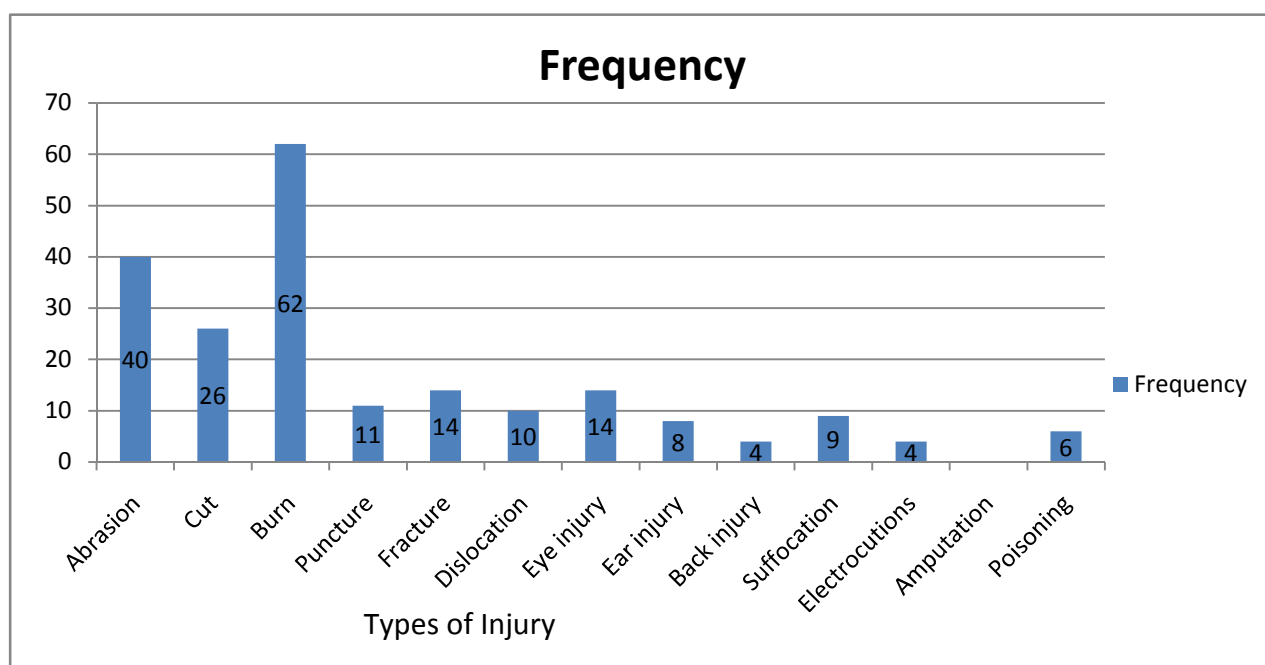
whom 27 (49.1%) were hospitalized for more than 24 hours. A total of 804 persons working days were lost in the last one year due to injury.

Among the body parts that were affected, the majority of injuries occurred on hand (21.9%), finger (13.2%), toe (12.8%), and lower leg (11.0%) (Fig. 2).



**Figure 2: Distribution of work related injuries by body parts in the last 12 months (n=219) among workers in five iron and steel industries in Bishoftu and Dukem towns, November 2015.**

Regarding the types of injury, burn (29.8%), abrasion (19.2%), and cut (12.5%) were commonly observed (Fig 3).



**Figure 3: Types of work related injuries in the last 12 months (n=208) among workers in five iron and steel industries in Bishoftu and Dukem towns, November 2015.**

The leading causes of injury among the study participants were hot metal contact (18.6%), and fire and explosion (16%) followed by splintering objects (15.5%), machinery (14.4%), and hit by falling objects (12.4%) (Table 2).

**Table 2: Causes of work-related injuries (n=194) in the last 12 months among workers in five iron and steel industries in Bishoftu and Dukem towns, November 2015.**

Causes of Injury	Number	Percent
Hot metal contact	36	18.6
Splintering objects	30	15.5
Fire and explosion	31	16.0
Machinery	28	14.4
Hit by falling objects	24	12.4
Collision with objects	11	5.7
Lifting objects	10	5.2
Falls	9	4.6
Hand tools	6	3.1
Acids and hot substances	6	3.1
Electricity	3	1.5
<b>Total</b>	<b>194</b>	<b>100</b>

### 6.3 Work Environment and Behavioral Characteristics

Regarding work environment factors, almost all (99.2%) of the participants worked for more than 40 hours/week. The majority of the study participants (83%) had night shift work either 3 days/week (42.6%) or 3.5 days/week (40.4%) depending on number of working days in a week in their companies. More than four in five (83.8%) of the participants had been regularly supervised at work where as more than half (58.8%) of the respondents had not taken safety and health training (Table 3).

Concerning behavioral characteristics, 29.2% of the respondents reported to have drunk alcohol, 6.4% chew chat and 5.3% smoke cigarette. The study showed that 17.5% of the participants reported to have sleeping disorder while 36.2% reported to be not satisfied with their job. About 18.4% of the workers did not have any personal protective equipment and about 97% of them reported that unavailability of the equipment was the reason they don't use personal protective equipment (Table 3).

**Table 3: Selected Work Environment and Behavioral Characteristics of Respondents(n=359) in five iron and steel industries in Bishoftu and Dukem towns, November 2015.**

Variables	Categories	Frequency	Percent
Night Shift	> 3 Nights/Week	146	40.7
	≤3 Nights/Week	213	46.5
	No Night Shift	46	12.8
Alcohol consumption	Never	254	70.8
	1-3 days/week	16	4.5
	Occasionally	89	24.8
Chew chat	Never	336	93.6
	Daily or 1-3days/week	8	2.2
	Occasionally	15	4.2
Smoke cigarette	Never	340	94.7
	Daily	7	2.0
	Occasionally	12	3.3
Sleep disorder	Yes	63	17.5
	No	296	82.5
Job satisfaction	Yes	229	63.8
	No	130	36.2
PPE use	Yes	293	81.6
	No	66	18.4

### 6.4 Observation of Work environment

Of the studied 33 work sections in the five industries, 20 (60.6%) of them had excessive heat, 27 (81.8%) had excessive dust and 21 (63.6%) had excessive noise in the workplace. There were no warning signs or safety rules in almost all (97%) of the work sections. In twenty four (72.7%) work sections, there were no protective arrangements for all production equipment and the

workers did not use the necessary personal protective equipment. Only one third (33.3%) of the sections reported to have taken preventive measures in the occurrence of the most dangerous incidents in the last 12 months. More than half (54.5%) of the work sections had copy of the most important health and safety regulations. Twenty seven (81.8%) of the studied work sections did not have health and safety personnel assigned while twenty six (78.8%) of the studied work sections did not have a written health and safety plan for action in the work place. Training regarding occupational safety was not given on schedule in connection with new employment, equipment and other changes. No meetings were held to discuss safety and health factors with workers in the last six months. No first-aid kits were present in the studied sections. However, one but all of the industries had small clinics headed by nurses which provide curative treatment for the injured workers.

### **6.5 Factors Associated With Work Related Injuries**

Among selected variables, those that showed a significant association with occupational injury when adjusted for all variables are presented here. Among socio demographic variables, job category showed significant association with work related injuries in both bivariate and multivariate logistic regression [AOR=2.55, 95% CI: (1.42, 4.58)]. Safety training [AOR=2.92, 95% CI: (1.68, 5.06)] and working in night shifts [AOR=3.6, 95% CI: (1.5, 8.5)] were the environmental variables that showed significant association with work related injuries. Among behavioral variables, job satisfaction showed significant association with work related injuries [AOR=2.7, 95% CI: (1.6, 4.5)](Table 3).

**Table 4: A logistic regression model for predictors of work related injuries (n=359) in five iron and steel industries in Bishoftu and Dukem towns, November 2015.**

Variables	Categories	Work related injury		Crude OR	p-Value	Adjusted	P-Value	
		Yes n (%)	No n (%)	(95% CI)		OR (95% CI)		
Sex	Female	3 (21.4)	11 (78.6)	0.9 (0.2, 4.4)	0.94			
	Male	128 (37.2)	217 (62.9)	1				
Age	18 – 29 Years	101 (36.6)	175 (63.4)	1.2 (0.6, 2.4)	0.53			
	>30 Years	30 (36.1)	53 (63.9)	1				
Religion	Orthodox	84 (37.0)	143 (63.0)	1	0.35	1	0.69	
	Protestant	31 (35.2)	57 (64.8)	0.7(0.4, 1.4)		0.9 (0.5, 1.6)		
	Muslim	15 (42.9)	20 (57.2)	1.1 (0.5, 2.7)		1.2 (0.6, 2.7)		0.62
	Others	1	8	0.3 (0.03, 2.2)		0.2 (0.02, 1.8)		0.16
Level of Education	Primary and below	60 (33.5)	119 (66.5)	1.2(0.7, 2)	0.59			
	≥ 9 grade	71 (39.4)	109 (60.6)	1				
Marital Status	Married	60 (37.5)	100 (62.5)	1.2(0.7, 2)	0.55			
	Not with spouse *	71 (35.7)	128 (64.3)	1				
Employment Status	Permanent	109 (37.2)	184 (62.8)	0.9 (0.5, 1.9)	0.82			
	Temporary	22 (33.3)	44 (66.7)	1				
Job Category	Maintenance	36 (50.7)	35 (49.3)	2.5 (1.3, 4.7)	0.01	2.6(1.4, 4.6)	0.002	
	Production and Foundry	95 (33.0)	193 (67.0)	1		1		
Service Duration	Less than 2 Years	42 (38.5)	67 (61.5)	1	0.77			
	2 to 3.9 Years	55 (38.5)	88 (61.5)	1.1 (0.6, 2)				
	4 to 5.9 Years	25 (27.8)	65 (72.2)	0.7 (0.3, 1.5)				
	≥ 6 Years	9	8	1.9 (0.6, 6.2)				
Salary/Month	< 1000 Birr	23 (37.1)	39 (62.9)	1	0.95	1	0.74	
	1001 – 2000 Birr	88 (34.5)	167 (65.5)	1.0 (0.5, 2)		1.1 (0.6, 2.1)		
	2001 – 3500 Birr	17 (50.0)	17 (50.0)	1.9 (0.7, 5.2)		1.9 (0.7, 4.9)		0.20
	>3500 Birr	3	5	1.0 (0.2, 5.9)		1.1 (0.2, 5.5)		0.93
Number of Dependents	≤ 5	123 (36.2)	217 (63.8)	1.2 (0.4, 3.6)	0.74			
	> 5	8	11	1				
Residence	Urban	120 (36.3)	211 (63.7)	1.1 (0.4, 2.7)	0.86			
	Rural	11 (39.3)	17 (60.7)	1				
Work hours/week	≤ 48 hours	36 (32.4)	75 (67.6)	0.8 (0.5, 1.5)	0.35			
	> 48 hours	95 (38.3)	153 (61.7)	1				
Night Shift	Yes	123 (39.3)	190 (60.7)	3.1 (1.2, 8.0)	0.02	3.6(1.5, 8.5)	0.004	
	No	8 (17.4%)	38 (82.6)	1		1		
Supervision	Yes	106 (35.2)	195 (64.8)	1	0.27	1	0.26	
	No	25 (43.1)	33 (56.9)	0.7 (0.3, 1.3)		0.7 (0.4, 1.3)		
Safety Training	Yes	32 (21.6)	116 (78.4)	1	0.00	1	0.000	
	No	99 (46.9)	112 (53.1)	3.0 (1.7, 5.4)		2.92 (1.7, 5.1)		
Alcohol	Yes	32 (30.5)	73 (69.5)	1	0.32	1		
	No	99 (39.0)	155 (61.0)	1.4 (0.7, 2.6)				
Chat	Yes	8 (34.8)	15 (65.2)	1	0.36			
	No	123 (36.6)	213 (63.4)	1.7 (0.6, 5.2)				
Cigarette	Yes	9 (47.4)	10 (52.6)	1	0.59			
	No	122 (35.9)	218 (64.1)	0.7 (0.2, 2.3)				
Sleeping Disorder	Yes	29 (46.0)	34 (54.0)	1	0.69			
	No	102 (34.5)	194 (65.5)	0.9 (0.5, 1.6)				
Job Satisfaction	Yes	61 (26.6)	168 (73.4)	1	0.001	1	0.00	
	No	70 (53.8)	60 (46.2)	2.5 (1.4, 4.5)		2.7 (1.6, 4.5)		
PPE Use	Yes	100 (34.1)	193 (65.9)	1	0.23	1	0.18	
	No	31 (47.0)	35 (53.0)	0.7 (0.3, 1.3)		0.6 (0.3, 1.2)		

\*Single, divorced, widowed or separated.

## Discussions

The prevalence of occupational injury of the present study was 365 per 1000 exposed workers per year. A Study conducted in iron and steel industries in Addis Ababa showed an injury prevalence of 333/1000 workers in a year (25). Studies conducted among small and medium scale industries in Bahir Dar and North Gondar also showed generally closer injury rates of 342, and 335 per 1000 workers in a year, respectively (41, 2, ). However, studies conducted among large scale metal manufacturing industries in Addis Ababa and in iron and steel manufacturing industry in India showed higher rates of injury with annual prevalence of 489/1000 and 615/1000 workers, respectively (40, 43).

This study shows that 42% of the injured workers were hospitalized, of which 49.1% were hospitalized for more than 24 hours. This is higher than the reports in the study conducted in in Addis Ababa (29.4%) and Tendaho agricultural company (11.0%)(40, 26). However, the condition was less severe compared to another study in iron and steel industries in Addis Ababa (62.2%) (25). Lower percent of workers were hospitalized for more than 24 hours in this study when compared to the above mentioned three studies in Addis Ababa and Tendaho where the majority (above 80%) of the hospitalization was for more than 24 hours (40, 26, 25). The present study also revealed that a total of 804 working days were lost in the last one year due to injury, which is much higher than the result in iron and steel industries in Addis Ababa (122 days) (25). But it is lower than the numbers seen in the studies conducted in metal manufacturing industries in Addis Ababa (3734 days per 405 injured workers) and Tendaho agricultural company (6153 days among 634 injured respondents) (40, 26).

The most common affected body parts in this study were the distal parts of upper and lower limbs while the most common types of injury were burn, abrasion and cut. Studies carried out in Ethiopia (2, 25, 26, 40, 41), India (43) and Iran (8) reported similar findings. This may be due to more involvement of these particular body parts while at work, exposure to unguarded machines, splitting and sharps materials, tools and instruments, hot metals and chemicals. Human failures such as improper working style, negligent risk-taking, and lack of complying with safety rules may also result in such injuries. Further about 18.4% workers were found to be not using PPE which may be another reason for such body parts injuries.

In agreement with studies conducted in Addis Ababa (25, 40), Afar (26) and Iran (8), the present study revealed that hot metal contact, fire and explosion, splintering objects, machinery, and hit by falling objects were the most common causes of injuries. The possible reasons for this could be work place environmental conditions, workers' behavior and non PPE use which might expose these workers to such injuries. As observed and reported by the participants unguarded machines, improper placing of materials in work section, hand tools and instruments misuse and lack of complying with safety rules were the other possible explanations behind frequent injury causes. Sometimes scrap collected from different parts of the country contained explosive materials which increased the injury rate and extent.

In this study, workers in maintenance section were 2.55 times more likely to get injured in their work when compared to workers in other sections [AOR=2.55, 95% CI: (1.42, 4.58)]. A study conducted among small and medium industry workers in North Gondar showed that job categories of mechanic and welding experienced more work related injuries than other workers (2). This could demonstrate the difference in injury risk due to different nature of occupational hazards and the difference in the perception of risk and behavior among workers in different job categories.

This study showed that workers who had not received any safety training were 2.92 times more likely to be injured when compared to workers who took safety training [AOR=2.92, 95% CI: (1.68, 5.06)]. This is consistent with the findings of the studies conducted in agricultural development company in Tendaho, Afar and textile industries in Amhara region where workers without health and safety training were found more likely to be injured (26, 37).

Consistent with the studies conducted in New Zealand (44), USA (45) and iron and steel industries in Addis Ababa (25), the present study showed workers with night shifts were 3.60 times more likely to be injured than workers who worked only at daytime. Night shift might attribute to increased sleepiness and fatigue among workers, resulted in a low alertness level, less vigilance and cognitive reasoning, and even making poor decisions or mistakes.

This study also revealed that workers who reported to be not satisfied with their job were 2.65 times more likely to be injured when compared to workers who reported to be satisfied with their job. This is consistent with the findings of the studies conducted in North Gondar (2), Tendaho (26) and Gondar (46) in Ethiopia and a study conducted in Ghana (47). This could be linked to the fact that when the workers are not satisfied with their job, they could not fully experience meaningfulness, greater responsibility, and better use of their knowledge and skills in their job and such situation could lead to poor safety behavior and increased occupational injuries. Essentially, when job satisfaction is increased, on- task activities are enhanced, leading to greater attention to safety, motivation, knowledge, and compliance. Thus, increasing employee job satisfaction could be as important as eliminating physical hazards in the workplace.

## **Limitations of the Study**

- Since this study was a one-year cross sectional study, the possibility of recall biases resulting in under reporting and misreporting of events was likely.
- There could be social desirability bias which might be due to expectation of compensation or other benefits. This may result in over reporting of injuries.



## **Conclusion**

In conclusion, the magnitude of work related injury among workers of iron and steel industries was very high. The economic impact while compensating and medically handling the injuries, and lost healthy workdays cannot be undermined. A significant relationship between work related injuries and job category, health and safety training, night shift and job satisfaction were found.

## **Recommendations**

The industries should provide appropriate health and safety training for workers, beginning with the first day of their employment. Intervention should be carried out in order to help workers especially who are in maintenance section and workers who have night shift work. Intervention programs designed to increase employee job satisfaction should be implemented with focus on dispositional and situational factors and with emphasis on rectifying the hazards and inconveniences in the work environment. The industries should establish functional occupational health and safety programs.

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# Annexes

## Annex 1: English Version Questionnaire

**Jima University**  
**Faculty of Public Health and Medical Sciences**  
**Department of General Public Health**

Questionnaire for assessment of work-related injuries among steel and iron industries workers in Dukem and Bishoftu towns

**Questionnaire Identification Number** \_\_\_\_\_

### Identification

Name of Industry \_\_\_\_\_

Address: Kebele \_\_\_\_\_

### Verbal Consent Form before Conducting Interview

Greetings,

Hello, I am \_\_\_\_\_. I am working in the research team of Jima University, Faculty of Public Health and Medical Sciences, Department of General Public Health. I would like to ask you a few questions about an incident at job that resulted in injuries to you in the previous 12 months. This will help us to improve occupational safety, health and working environment services provided to you based on your answer to our questions. Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential. Your participation is voluntary and you are not obliged to answer any question you do not wish to answer. If you feel discomfort with the interview please feel free to drop it any time you want. This interview will take about 30 minutes. Do I have your permission to continue?

1. If yes, continue to the next page
2. If no, skip to the next participant by writing reasons for his/ her refusal

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### ***Informed Consent Certified by***

Interviewer: Code \_\_\_\_\_ Name \_\_\_\_\_ Signature \_\_\_\_\_

Date of interview: \_\_\_\_\_ Time started: \_\_\_\_\_ Time completed: \_\_\_\_\_

Result of interview: 1.Completed 2.Respondent not available 3.Refused  
4. Partially completed

Checked by Supervisor: Name \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Questionnaire Identification Number** \_\_\_\_\_

### Section One: Socio Demographic Information

S.No.	Question	Possible Response	Code
101	Sex	1. Female      2. Male	
102	Age (If he or she does not know ask before and after event significant)	_____ years	
103	Religion	1. Orthodox      3. Catholic 2. Protestant    4. Muslim 5. Others (Specify) _____	
104	Educational Level	1. Illiterate 2. Can read and write 3. Primary school (1-8) 4. Secondary school (9-12) 5. Graduated from technical and vocational school	
105	Marital status	1. Married      4. Single 2. Divorced     5. Widowed 3. Separated	
106	Employment Status	1. Permanent    2. Temporary	
107	Job Category	1. Maintenance 2. Basic production 3. Foundry	
108	Service duration	_____ (in days, months or years)	
109	Daily or monthly salary in birr	_____	
110	Number of dependents living together	_____	
111	Area of residence	1. Urban      2. Rural	

### Section Two: Work Related Injury Characteristics

S.No	Question	Possible Response	Code
201	Have you had an incident at job that resulted in an injury to you in the last 12 months?	1. Yes    2. No (If No, skip to Q 301)	
202	If Yes to Q201 and/or Q202, how many times?	1. Once    2. Twice    3. $\geq$ Three days	
203	Part of body affected	1. Eye      1. Yes 2. No 2. Tooth    1. Yes 2. No 3. Hand     1. Yes 2. No 4. Ear      1. Yes 2. No 5. Knee     1. Yes 2. No 6. Toe      1. Yes 2. No 7. Finger    1. Yes 2. No 8. Head     1. Yes 2. No 9. Neck     1. Yes 2. No 10. Upper Arm 1. Yes 2. No 11. Lower Arm 1. Yes 2. No 12. Upper Leg 1. Yes 2. No 13. Lower Leg 1. Yes 2. No 14. Back    1. Yes 2. No 15. Anterior trunk 1. Yes 2. No 16. Multi location 1. Yes 2. No 17. Other (specify) _____	

204	Type of injury	1. Abrasion            1. Yes 2. No 2. Cut                    1. Yes 2. No 3. Burn                  1. Yes 2. No 4. Puncture            1. Yes 2. No 5. Fracture             1. Yes 2. No 6. Dislocation        1. Yes 2. No 7. Eye injury           1. Yes 2. No 8. Ear injury            1. Yes 2. No 9. Back pain            1. Yes 2. No 10. Suffocation        1. Yes 2. No 11. Electrocutions    1. Yes 2. No 12. Amputation        1. Yes 2. No 13. Poisoning          1. Yes 2. No 14. Other (specify) _____	
205	What were you doing at the time of injury?	_____	
206	Causes of injury?	1. Machinery            1. Yes 2. No 2. Hit by falling objects 1. Yes 2. No 3. Electricity            1. Yes 2. No 4. Splintering objects 1. Yes 2. No 5. Hand tools            1. Yes 2. No 6. Fire and explosion            1. Yes 2. No 7. Acids and hot substances 1. Yes 2. No 8. Hot metal contact    1. Yes 2. No 9. Falls                    1. Yes 2. No 10. Collision with objects 1. Yes 2. No 11. Lifting heavy objects 1. Yes 2. No 12. Other (specify) _____	
207	Day of Injury?	1. Monday                1. Yes 2. No 2. Tuesday               1. Yes 2. No 3. Wednesday            1. Yes 2. No 4. Thursday              1. Yes 2. No 5. Friday                  1. Yes 2. No 6. Saturday               1. Yes 2. No 7. Sunday                 1. Yes 2. No	
208	Time of injury?	1. In the morning        1. Yes 2. No 2. In the afternoon      1. Yes 2. No 3. In the evening        1. Yes 2. No 4. In the midnight       1. Yes 2. No	
209	Were you hospitalized as a result of injury in the last 12 months?	1. Yes                    2. No	
210	If Yes for Q210, for how long?	1. Less than 24 hours 2. More than 24 hours	
211	Number of days lost due to injury at work in the last one year	_____ days	

Questionnaire Identification Number \_\_\_\_\_

**Section Three: Work Environment Information**

S.No.	Question	Possible Response	Code
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301	Hours worked per week	_____	
302	Nights at work per week	_____	
303	Work place regularly supervised	1. Yes                      2. No	
304	Have you had any safety training in connection with new employment, new equipment or other changes?	1. Yes                      2. No	

#### Section Four: Information on Workers Behavior

S.No.	Question	Possible Response	Code
401	Do you drink alcohol?	1. Yes                      2. No	
402	If Yes to Q401, how often?	1. Every day 2. 1-3 days/week 3. Occasionally	
403	Do you chew chat?	1. Yes                      2. No	
404	If Yes to Q403, how often?	1. Every day 2. 1-3 days/week 3. Occasionally	
403	Do you smoke cigarette?	2. Yes                      2. No	
404	If Yes to Q403, how often?	1. Less than one pack per day 2. At least one pack per day 3. Occasionally	
405	Do you have any sleeping disorders?	1. Yes                      2. No	
406	Are you satisfied with the job or task you are required to do?	1. Yes                      2. No	
407	Do you use any personal protective equipment?	1. Yes                      2. No (If No, skip to Q409)	
408	If Yes to Q407, what type?	1. Gloves                      1. Yes 2. No 2. Ear plug                      1. Yes 2. No 3. Respirators                      1. Yes 2. No 4. Helmet                      1. Yes 2. No 5. Overalls                      1. Yes 2. No 6. Goggles                      1. Yes 2. No 7. Face shield                      1. Yes 2. No 8. Boots                      1. Yes 2. No 9. Other (specify) _____	
409	What are your reasons for not using personal protective equipment?	1. Lack of protective equipment 2. Lack of safety and health education 3. Not comfortable to use 4. Decrease work performance 5. Create safety and health hazards 6. Other (specify) _____	

That is the end of our questionnaire. Thank you very much for taking time to answer these questions. We appreciate your help.

**Annex 2: Amharic Version Questionnaire**

**ጅማዩኒቨርሲቲ**

**የህክምና ሳይንሶች እና ማህበረሰብ ጤና ፋኩልቲ**

**የጠቅላላ ማህበረሰብ ጤና የትምህርት ክፍል**

ይህ መጠይቅ በዱክም እና በሺፍቱክተሞች በሚገኙ የብረታ ብረት አምራች ፋብሪካዎች ስራተኞች መካከል ከስራ ጋር በተያያዘ የደረሱት ዳቶችን ለማጥናት የተዘጋጀ ነው።

የመጠይቅ መለያ ቁጥር \_\_\_\_\_ የፋብሪካው ስም \_\_\_\_\_  
አድራሻ፣ ቀበሌ \_\_\_\_\_

**ቃለ መጠይቁን ከማድረግ በፊት የተሳታፊዎች ፈቃደኝነት መጠየቅ**

እንደምን አሉ? እኔ-----

እባላለሁ። እዚህ የመጣሁት ይህንን ጥናት የሚያካሂድ የጅማዩኒቨርሲቲ የህክምና ሳይንሶች እና ማህበረሰብ ጤና ፋኩልቲ የጠቅላላ ማህበረሰብ ጤና የትምህርት ክፍል በድን አባል ሆኜ ነው።

ከዚህ በመቀጠል ባለፉት 12 ወራት ውስጥ ከስራ ጋር በተያያዘ የደረሱት ጉዳዮች በተመለከተ ጥያቄዎችን ልጠይቅዎት እወዳለሁ።

ከእርስዎ የሚገኘው መልስ በሀገራችን የሚደረግ ጉዳይ ነው። ጤንነትን እና የስራ አካባቢ አገልግሎትን ለማሻሻል ከፍተኛ እዝይ ኖረዎልኩ።

ስምዎ በዚህ ፎርም ላይ አይጠቀስም። ማንኛውም የሚሰጡን መረጃዎች በሚስጥር የተጠበቁ ናቸው።

ተሳትፎዎ በፍቃደኝነት ላይ የተመሰረተ ነው። መመለስ የማይፈልጉትን ጥያቄዎች እንዲመልሱ አይገደዱም።

ቃለ መጠይቁ ከልተመችዎ በማንኛውም ሰዓት ማቋረጥ ይችላሉ። ይህ ቃለ መጠየቅ 30 ደቂቃ ይፈጃል። ፍቃደኛ ናችሁልታል?

- 1. አዎ ካሉ ወደሚቀጥለው ገፅ እለፍ
- 2. ካልተስማሙ ያልተስማማባችንን ምክንያት በመጻፍ ወደሚቀጥለው ተሳታፊ እለፍ

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**Informed Consent Certified by**

የጠያቂ መለያ ቁጥር \_\_\_\_\_ ስም \_\_\_\_\_ ፊርማ \_\_\_\_\_

መጠይቁ የተሞላበት ቀን፡ \_\_\_\_\_ የተጀመረበት ሰዓት፡ \_\_\_\_\_ የተጠናቀቀበት ሰዓት፡ \_\_\_\_\_

- የቃለ መጠይቁው ጤነት፡
- 1. ተጠናቋል
  - 2. ተጠያቂው አልተገኘም
  - 3. ፍቃደኛ አልሆኑም
  - 4. በከፊል ተጠናቋል

በተቆጣጣሪው የተረጋገጠ፡ ስም \_\_\_\_\_ ፊርማ \_\_\_\_\_ ቀን \_\_\_\_\_

የመጠይቁ መለያ ቁጥር \_\_\_\_\_

**ክፍል አንድ: Socio Demographic Information**

ተ.ቁ	ጥያቄ	ምላሽ	ኮድ
101	ፆታ	2. ሴት                      2. ወንድ	
102	ዕድሜ	_____	
103	ሀይማኖት	_____	
104	የትምህርት ደረጃ	_____	
105	የጋብቻ ሁኔታ	_____	
106	የቅጥር ሁኔታ	_____	
107	የስራ ምድብ	_____	
108	በሞያ በታዎ ምን ያህል ጊዜ አገለገሉ?	_____ (በቀን፣ በወር ወይም በዓመት)	
109	የቀን ወይም የወር ደሞዝብ ብር	_____	
110	የሚያስተዳድሩት ሰዎች ብዛት	_____	
111	የሚኖሩበት አካባቢ	2. ከተማ    2. ገጠር	

**ክፍል ሁለት: ከስራ ጋር የተያያዙ ጉዳዮችን በተመለከተ**

ተ.ቁ	ጥያቄ	ምላሽ	ኮድ
201	ባለፉት 12 ወራት ውስጥ ከስራ ጋር በተያያዘ የደረሱት ጉዳዮች አለ?	2. አዎ                      2. የለም (መልሱ የለም ከሆነ ወደ ጥያቄ 301 እለፍ)	
202	ለጥያቄ ተ.ቁ 201 መልሱ አዎ ከሆነ ምን ያህል ግዜ?	2. አንዴ    2. ሁለት    3. ሶስት እና ከዚያ በላይ	
203	የተጎዳው የአካል ክፍል	18. ዓይን                      1. አዎ                      2. የለም 19. ጥርስ                      1. አዎ                      2. የለም 20. እጅ                              1. አዎ                      2. የለም 21. ጆሮ                              1. አዎ                      2. የለም 22. ጉልበት                      1. አዎ                      2. የለም 23. የእግር ጣት                      1. አዎ                      2. የለም 24. የእጅ ጣት                      1. አዎ                      2. የለም 25. ጭንቅላት                      1. አዎ                      2. የለም 26. አንገት                              1. አዎ                      2. የለም 27. የላይኛው ከንድ                      1. አዎ                      2. የለም 28. የታችኛው ከንድ                      1. አዎ                      2. የለም 29. ታፋ/ጭን                      1. አዎ                      2. የለም 30. ከጉልበት በታች ያለው እግር                      1. አዎ                      2. የለም 31. ጀርባ                              1. አዎ                      2. የለም	

		32. ደረት	1. አዎ	2. የለም	
		33. ብዙቦታ	1. አዎ	2. የለም	
		34. ሌላካለይገለፅ			

**የመጠይቁ መለያ ቁጥር \_\_\_\_\_**

204	የጉዳቱ አይነት	15. ጭረት/ቁስል	1. አዎ	2. የለም	
		16. መቆረጥ	1. አዎ	2. የለም	
		17. ቃጠሎ	1. አዎ	2. የለም	
		18. መውጋት	1. አዎ	2. የለም	
		19. ስብራት	1. አዎ	2. የለም	
		20. ወለምታ/ውልቃት	1. አዎ	2. የለም	
		21. የዓይን ጉዳት	1. አዎ	2. የለም	
		22. የጆሮ ጉዳት	1. አዎ	2. የለም	
		23. የጆርባህ መም	1. አዎ	2. የለም	
		24. መታፈን	1. አዎ	2. የለም	
		25. በኤሌክትሪክ መያዝ	1. አዎ	2. የለም	
		26. የአካል መጉደል	1. አዎ	2. የለም	
		27. መመረዝ	1. አዎ	2. የለም	
		28. ሌላካለይገለፅ)			
205	ጉዳቱ በተከሰተበት ሰዓት ምን እያረከ/እያረግሸነበር?				
206	የጉዳቱ ምክንያት ምን ነበር?	13. ማሸን	1. አዎ	2. የለም	
		14. በሚወድቁ ዕቃዎች በመመታት	1. አዎ	2. የለም	
		15. በኤሌክትሪክ	1. አዎ	2. የለም	
		16. በተፈናጣሪ ነገሮች	1. አዎ	2. የለም	
		17. በእጅ መሳሪያ	1. አዎ	2. የለም	
		18. እሳት እና ፍንዳታ	1. አዎ	2. የለም	
		19. አሲድ እና ትኩስ ነገሮች	1. አዎ	2. የለም	
		20. በጋሎብረቶች	1. አዎ	2. የለም	
		21. በመውደቅ	1. አዎ	2. የለም	
		22. ከእቃ ጋር በመጋጨት	1. አዎ	2. የለም	
		23. ከባድ እቃ በማንሳት	1. አዎ	2. የለም	
		24. ሌላካለይገለፅ			
207	ጉዳቱ የደረሰበት ቀን	8. ሰኞ	1. አዎ	2. የለም	
		9. ማክሰኞ	1. አዎ	2. የለም	
		10. ረቡዕ	1. አዎ	2. የለም	
		11. ሀሙስ	1. አዎ	2. የለም	
		12. አርብ	1. አዎ	2. የለም	
		13. ቅዳሜ	1. አዎ	2. የለም	
		14. እሁድ	1. አዎ	2. የለም	
208	ጉዳቱ የደረሰበት ሰዓት	5. ጠዋት	1. አዎ	2. የለም	
		6. ከሰዓት	1. አዎ	2. የለም	
		7. ማታ	1. አዎ	2. የለም	
		8. ለሊት	1. አዎ	2. የለም	
209	ባለፉት 12 ወራት በደረሰብዎት ጉዳት ምክንያት በጤና ተቋም ተኝተውታ ክመዋል?	2. አዎ	2. የለም		

210	ለጥያቄቁጥር 209 አዎከሆነለስንትሰዓታት?	3. 24 ሰዓትናከዚያበታች2. ከ24 ሰዓትበላይ	
211	ባለፈውአንድዓመትውስጥከስራጋርበተያያዘበደረሰቦትጉዳትምከንያትከስራየቀሩበትቀናትብዛት	_____ ቀን	

**ክፍልሶስት: የስራአካባቢንየሚመለከትመረጃ**

ተ.ቁ	ጥያቄ	ምላሽ
301	በሳምንትምንያህልሰዓትይሰራሉ?	_____
302	የማታፈረቃበሳምንትምንያህልሰዓትይሰራሉ?	_____
303	በየጊዜውየስራቦታቁጥጥርተደርጎያውቃል?	1. አዎ 2. የለም
304	አዲስሆነውሲቀጠሩወይምበአዳዲስየስራለውጦችወይምአዲስማሽንጋርሲመደቡየስራቦታደህንነትንስልጠናወስደዋል?	1. አዎ 2. የለም

**ክፍልአራት: የስራተኛውንባህሪየሚመለከትመረጃ**

ተ.ቁ	ጥያቄ	ምላሽ	ከድ
401	የአልኮልመጠጥይጠጣሉ?	2. አዎ 2. የለም	
402	ለጥያቄቁጥር 401 አዎከሆነበምንያህልግዜ?	4. በየቀኑ 5. ከ1-3 ቀንበሳምንት 6. አልፎአልፎ	
403	ጫትይቀማሉ?	3. አዎ 2. የለም	
404	ለጥያቄ 403 መልሱአዎከሆነበምንያህልግዜ?	1. በየቀኑ 2. ከ1-3 ቀንበሳምንት 4. አልፎአልፎ	
405	ሲጋራያጨሳሉ?	1. አዎ 2. የለም	
406	ለጥያቄቁጥር 405 አዎከሆነበምንያህልግዜ?	4. በቀንከአንድፓኬትበታች 5. ቢያንስበቀንአንድፓኬት 6. አልፎአልፎ	
405	የእንቅልፍችግርአለብዎት?	2. አዎ 2. የለም	
406	በሚሰሩትስራደስተኛኖት?	1. አዎ 2. የለም	
407	በስራቦታዎየጉዳቶችመከላከያመሳሪያይጠቀማሉ?	1. አዎ 2. የለም የለምከሆነወደጥያቄ 409 አለፍ	
408	ጥያቄተ.ቁ 407 አዎከሆነምንአይነት?	10. ግላቭ/ጓንት 1. አዎ 2. የለም 11. የጆሮ/ድምጽመከላከያ 1. አዎ 2. የለም 12. የአፍንጫእናአፍመከላከያ (ማስክ) 1. አዎ 2. የለም 13. የጭንቅላትመከላከያ 1. አዎ 2. የለም 14. የስራልብስ 1. አዎ 2. የለም 15. የብዩዳመንጽር 1. አዎ 2. የለም 16. የፊትመከላከያ 1. አዎ 2. የለም 17. ቦቲጫማ 1. አዎ 2. የለም 18. ሌላካለይገለፅ _____	
409	የማይጠቀሙከሆነምከንያትምንድነው?	7. የመከላከያመሳሪያዎችባለመኖራቸው 8. የደህንነትናየጤናትምህርትስለማይሰጥ 9. ለአጠቃቀምምቹስላልሆነ	

		10. የስራቅልጥፍናንስሎሚቀንስ 11. የደህንነትናየጤናጠንቅስሎሚያስከትል 12. ሌላካለይገለፅ	
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ቃለመጠይቅእዚህላይያበቃል። ለዚህቃለመጠይቅጊዜምንሰጥተውስለተባበሩንበጣምእናመስግናለን።

የመጠይቅመለያቁጥር \_\_\_\_\_

## **Annex 3: Checklist for Observation of Working Environment**

**Jima University**

**Faculty of Public Health and Medical Sciences**

**Department of General Public Health**

Checklist for Observation of Working Environment in Steel and Iron Industries in Dukem and Bishoftu Towns

**Checklist Identification Number:** \_\_\_\_\_

### Identification

Name of industry: \_\_\_\_\_

Work Section: \_\_\_\_\_

Final product \_\_\_\_\_

Address: Kebele: \_\_\_\_\_

Total number of employees directly involved in production processes \_\_\_\_\_

### ***Hazards in Working Environment***

1. Is there excessive heat in the workplace? 1. Yes 2. No

(A yes requires that a worker is found sweating when naked or with light clothing; if investigator feels as sudden heat wave when entering into the industry)

2. Is there excessive dust in the workplace? 1. Yes 2. No

(A yes requires if the investigator experiences sudden sneezing upon entering the industry or if the worker's eye brows, hair, nostrils and cloth is observed by investigators to be covered with dust particle)

3. Is there excessive noise in the workplace? 1. Yes 2. No

(A yes requires that if difficult to communicate with nearby worker without shouting)

4. Is there warning signs or safety rules? 1. Yes 2. No.

(A yes requires no lack of such arrangement at inspection around)

5. Do the employees use the necessary personal protective equipment? 1. Yes 2. No.

(A yes requires no lack in use of safety devices seen at inspection around)

6. Does all production equipment have the appropriate protective arrangements? 1. Yes 2.No

(A yes requires no lack of such arrangement (poorly installed electric wire or unguarded machine or equipment) at inspection around)

7. What is the most dangerous incident in the industry during the last 12 months, and any preventive measures been implemented? \_\_\_\_\_ 1. Yes 2. No

(Attainment of yes requires specification of the incident and preventive measures)

8. Does the industry have copy of the most important safety and health regulations? 1. Yes 2.No

(A yes requires a copy of the regulation)

9. Does the industry have of health and safety personnel? 1. Yes 2.No

(A yes requires either implementation as result of initiative from health and safety personnel or written program for action worked out with them)

10. Does the industry follow written health and safety plan for action in the workplace? 1. Yes 2.No

(A yes requires completion of at least one of the measures in the plan)

11. Does the industry have meetings to discuss safety and health factors with the employees in the last six months? 1. Yes 2.No

(A yes requires minutes with written conclusions)

12. Are training needs considered in connection with new employment, equipment or other changes? 1. Yes 2.No

(A yes requires an example of training given as a consequence of a change)

13. Does the industry have first aid equipment? 1. Yes 2.No

(A yes requires that first –aid equipment be available in the production area and that content be as prescribed)

**That is the end of our observation. Thank you very much for taking time to answer these questions. We appreciate your help.**

**Name of inspector** \_\_\_\_\_

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_