Addis Ababa University College of Health Science School of Public Health

Prevalence and Factors Associated with Work Related Injuries among Iron and Steel Industries workers Addis Ababa, Ethiopia

A Research Thesis Submitted To 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 in Public Heath

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Acronyms and abbreviations

AOR : Adjusted Odds Ratio

COR: Crude Odds Ratio

ILO: International Labour Organization

PPD : Personal protective Device

PPE : Personal Protective Equipment

SPSS : Statistical package for social sciences

USA : United States of America

MPH: Master of Public Health

Abstract

Background

Occupational accidents and work-related diseases cause over 2.3 million fatalities annually. This means that each year 54,000 workers die and 42 million work related accidents take place that cause at least three days' absence from work· Although few studies in Ethiopia showed that the prevalence of work related injury reaches up to 78.3%. But studies in iron and steel industries in Addis Ababa showed inconsistent finding. This study is believed to avoid uncertainty on previous findings and provide further information that may help policy makers, and trade unions in their efforts to improve occupational health and safety in iron and steel industries in Ethiopia.

Objective - To assess the prevalence of work related injuries and associated risk factors among iron and steel industries workers in Addis Ababa, Ethiopia

Methods- Institution based cross sectional study was conducted from March to April 2015 among 1110 randomly selected workers in Iron and steel industries. Data was collected using structured questionnaire by trained data collectors and analyzed using SPSS window version 20 where descriptive and logistics regression computed to see association between different factors and work related injuries.

Result- The overall prevalence of occupational and work related injury was 35%. Among factors, Sex(male) [AOR 1.96, 95%CI: (1.05, 3.67)], Employment condition being temporary employee [AOR 2.65, 95%CI: (1.49, 4.71)], untrained on safety and health [AOR 1.92, 95%CI: (1.19, 3.11)], no shifting [AOR 1.50, 95%CI: (1.02, 2.21)], presence work place violence [AOR 1.88, 95%CI: (1.18, 2.98)], safe solid waste disposal system [AOR 2.01, 95%CI: (1.35, 3.02)] machine work [AOR 1.71, 95%CI: (1.13, 2.59)], unguarded machine [AOR 2.35, 95%CI: (1.46, 3.78)], cigarette smoking [AOR 4.78, 95%CI: (2.32, 2.59)], sleeping disorder [AOR 2.01, 95%CI: (1.16, 3.75)] and not using personal protective equipments [AOR 4.26, 95%CI: (2.78, 6.53)] were significantly associated with presence of injury.

Conclusion and recommendation - the magnitude of work related injury in iron and steel industries was high and lack of safety and health training, work place violence, sleeping on work place, unavailability of safe waste disposal system, smoking cigarette, working on unguarded machine and not using PPE identified as risk factors. Therefore safety and health training and proper using of PPE should be given due attention in all iron and steel industries.

Key words - work related injury, Iron and steel factors,

1. Background

The International Labour Organization (ILO) estimates that occupational accidents and work-related diseases cause over 2.3 million fatalities annually, of which over 350,000 are caused by occupational accidents and close to 2 million by work-related diseases (1). In USA 3.0 million nonfatal workplace injuries and illnesses were reported by private industry employers in 2012, resulting in an incidence rate of 3.4 cases per 100 equivalent full-time workers (3). In sub-Saharan Africa, the fatality rate per 100,000 workers is 21 and each year 54,000 workers die and 42 million work related accidents take place that cause at least three days' absence from work (4).

Several factors contribute towards the occurrence of accidents/injuries in work systems. Over the years, a large number of individual related, job-related, and organizational-related factors are examined in different studies (2,6-9). Individual related factors include age, work experience, educational status, marital status, income, sex and behavior of the worker. Job related factors include occupation, location of work, hazards in work system, shift of working and workplace factors like poor housekeeping. Organization related factors include working group, coworker support and supervisory support, management's commitment to safety and work place safety status (5).

In Ethiopia there is no well organized injury recording system. But 2 studies in 2010 in iron and steel industries and large metal manufacturing industries showed inconsistency on their finding even though they were done at the same time with prevalence of work related injury 333 and 489 per 1000 exposed workers and there were also disagreement on findings on factors associated with injury (6, 19).

Therefore this study intended to provide up to date information on magnitude and factors associated with work related injuries that can avoid uncertainty resulted from disagreement of results from previous studies and attract the attention of policy makers, governments, and the trade unions in their efforts to improve occupational health and safety in iron and steel industries in Ethiopia.

Statement of the problem

Occupational accidents kill nearly a 1,000 people every day and work related diseases provoke the death of almost 5,400 more individuals. There were also over 313 million non-fatal occupational accidents in 2010, meaning that around the world work provokes injury for approximately 860,000 people every day(1). In Ethiopia studies in Iron and steel industries showed that the prevalence of work related injury 333 and 489 per 1000 exposed workers and individual, job and organization related factors are associated (6,19). Currently the number of iron and steel manufacturing industries in Addis Ababa increasing rapidly and majorities are privately owned (34). With this growing number of industries, safety and health of workers is major concern. Even though 2 researches that have been done on iron and steel industry shown the prevalence and factors associated with injury, there is inconsistency in the finding and little is known about associated factors . Therefore results of this study will help to avoid uncertainty on the findings of previous studies and will introduce additional factors associated with injury and draw the attention of policy makers, governments, and the trade unions in their efforts to improve occupational health and safety in iron and steel industries in Ethiopia.

2. Literature Review

1.1. Work Environment of Iron and Steel industries

The iron and steel industries are particularly hazardous places of work (11). Common working sections or departments in iron and steel production are melting and rolling, cork and can section, nailing and fencing, mechanic and maintenance, crane operation, assembling, fabrication, engraving and electroplating, welding section, forging, grinding, foundering, packaging, painting and stamping (12, 19). Operations in the iron and steel industry may expose workers to a wide range of hazards or workplace activities or conditions that could cause incidents, injury, death, ill health or diseases (12). Most common occupational hazards include physical hazards (noise, vibration and extreme temperatures, chemical hazards (vapours, gases, dusts and fumes, exposure to carbon monoxide (CO) gas, skin contact with chemicals, Ergonomic mechanical hazard such as falls from height and same level, falling objects, electric shock, burns related to electrical and accidental contact with hot molten metal, Hazards (working in confined spaces, inadequate ventilation, unguarded machinery, fire and explosion, workplace violence, odor pollution, inadequately trained health and safety professionals, lack of effective supervision on usage of personal protective equipments (PPE), manual handling and repetitive work, inadequate workplace inspections and accident/ incident prevention programs, inadequate emergency rescue facilities, inadequate occupational safety and health training and lack of effective communication and coordination among the various professional groups (12, 13).

Metal production tasks are both physically demanding and stressful. The metal workers have been significantly exposed to prolonged hammering and cutting activities in excessive noise and with awkward body postures. Moreover, stressors from heat and humidity, welding fumes and metal dusts often cause excess strain and are reflected in a deterioration of their physical work performance (28).

1.2. Burden of work related injuries

Occupational injury is an important cause of mortality and morbidity throughout the world, in both developing and developed countries (14). Each year nearly 6,000 workers die and millions of others are injured in the United States alone. The total consequences of occupational injury extend well beyond direct physical injury and include a wide array of social and economic burdens (15). The International Labor Organization (ILO) estimated that the total cost of occupational accidents and work-related diseases are 4% of the gross national product of a given country (16). The global burden

of occupational injuries and illnesses is substantial, particularly in developing countries. Rates of occupational injury fatalities, for example, are estimated to be at least two to five times higher in the developing regions of the world, compared to North America and Western Europe. In developing countries like Ethiopia estimated costs have been less well characterized because there are usually no large, centralized record systems that include health conditions having an occupational cause (17).

1.3. Prevalence of work related injuries

The study on Work-related injuries and musculoskeletal disorders among metal manufacturing factory workers in a major city of China showed the prevalence of work related injuries is 10.3% (10). The study on occupational injuries and their long term consequences among mechanics and construction metal workers showed the injury incidence was 18 per 100 gainfully employed workers, and was highest in the Age group under 20 years (18). The study on Work related injuries and associated risk factors among iron and steel industries workers in Addis Ababa, Ethiopia showed the prevalence of work related injury is 33.3% (6). Another study in large scale metal manufacturing industries in Addis Ababa and study on Kombolcha Textile Factory, North-East Ethiopia showed the prevalence of work related injuries are 48.9% and 63% respectively (9,19). The study on Small and Medium-Scale Industries in Gondar wereda, north Gondar zone, Amhara Regional State, Ethiopia and on Tendaho Agricultural Development S.C, Afar Regional State showed the prevalence of work related injuries 33.5% and 78.3% respectably (7, 8).

1.4. Injured body parts

Study on iron and steel industries in Addis Ababa indicated the most common affected body parts were fingers (26.1%), lower arms (16%) legs (16%) and eyes (10.9%) (6). The study on Large Scale Metal Manufacturing Industries in Addis Ababa showed hands, finger, toes, eye, back and knees are commonly affected by slightly increasing percent respectively (19).

2.4 Factors Associated with Injuries

Researchers have increasingly recognized that industrial accidents are caused by a dynamic interaction between factors in the social and physical environments, that is, characteristics of the individual and the organization as well as technical forces (20). The study in USA indicated working in jobs with overtime schedules was associated with a 61% higher injury hazard rate compared to jobs without overtime. Working at least 12 hours per day was associated with a 37% increased hazard rate and

working at least 60 hours per week was associated with a 23% increased hazard rate (21). The study done on Occupational Injury Occurrence and Related Risk Factors among Chinese Migrant Workers showed that sex has significant influence on the occurrence of occupational injury. Compared to females, the likelihood of occupational injury is 10% higher for male migrant workers. Age also has a significant effect. This study also showed the likelihood of occupational injury is increased by 12% among respondents with no occupational training (22).

The study on small and medium scale industries in Gondar, Ethiopia showed Age, job categories and work experience were major socio-demographic determinants of work-related injury but monthly income and educational level showed no association. From workplace variables hours worked per week, presence of workplace supervision, health and safety training showed significant association with the prevalence of work-related injuries. From behavioral factors sleeping disorder and job satisfaction are positively associated with the occurrence of injuries (7). The study on Tendaho Agricultural Development S.C, Afar Regional State showed age, work experience; weekly working hours, health and safety training, used to drink alcohol, sleeping disorder, job satisfaction, not using PPE were strongly associated with injury occurrences (8). Another study on Kombolcha Textile Factory, North-East Ethiopia showed educational and marital status of worker, amount of weekly working hours, manual handling of heavy objects, maintenance of machine, sleeping disorder, chewing chat and not using PPD are significantly associated with injury (9). A Case Control Study among Textile Factory Workers in Amhara Regional State, Ethiopia indicated only age and sex from socio-demographic factors showed statistical significance and information access to health and safety, regular workplace supervision and training on health and safety from work environment determinants and PPE use, alcohol drinking consumption, sleeping disturbance, job dissatisfaction and job stress are associated with occurrence of injury (2). The study on large scale metal manufacturing industries in Addis Ababa, Ethiopia showed sex, age, educational status, employment pattern, health and safety supervision, weekly working hours, presence of danger signs and cigarette smoking are statistically associated with the occurrence of injury (19). Another study on iron and steel manufacturing industries in Addis Ababa shows education and marital status of worker, number of night shifts, weekly working hours, work stress, excessive heat alcohol intake during working days, daytime sleepiness, job satisfaction and PPE use are associated with occurrence of injury (6).

In general the studies indicated from socio demographic factors workers with young age are more susceptible to injury than their counter parts (2, 7, 8, 9, 19, 22) and other study shows the reverse (25). Similarly the magnitude of injury is high in male workers than female workers (19, 9, 22, 25). Similarly workers with less work experience are in risk of work related injury (7, 8). However Injury risk is high in initial years of employment diminishes when an individual acquires sufficient work experience, and rises again with aging (5). Similarly low education level is related to more injury in some studies (3, 17). In contrary one study shows high educational level is related with high injury occurrence (6). Two of the review literature indicates workers in marriage are at less risk than divorced, separated and single workers (6, 9).

From behavioral factors literatures show that the magnitude of work related injury is high in workers not using personal protective equipment/device compared to workers using PPE/PPD (2, 6, 7, 8). Similarly workers with sleeping disturbance at working time are more injured than workers without sleeping disturbance (2, 6, 7, 8, 9, 24). Similarly workers satisfied by their job are less injured than those dissatisfied by their job. (2, 6, 7, 8) Also studies show that workers take alcohol more days than their counter parts have high injury rate. (2, 6, 8) one study shows worker smoking cigarette are more susceptible to injury (19) and the other study shows workers chewing chat are more get injured than workers not chewing chat (9).

From workplace variables some of the literatures show that workers working more hours in the week are more injured than workers working only standard weekly working hour (6, 7, 8, 9, 19, 19). Also extended work hours increased the risk of occupational injury. Especially working over 12 hours per day doubled the risk of injury (23). Similarly workers who have trained on health and safety are less injured than those who didn't train on occupational health and safety (2, 7, 8, 22), Also the studies show that workers in environment not regularly supervised on safety and health issue are more likely injured than workers whose job is regularly supervised on safety and health matters (2, 7, 19). Crosses sectional study in Japan shows Temporary workers are more prone to injury than permanent workers (26).

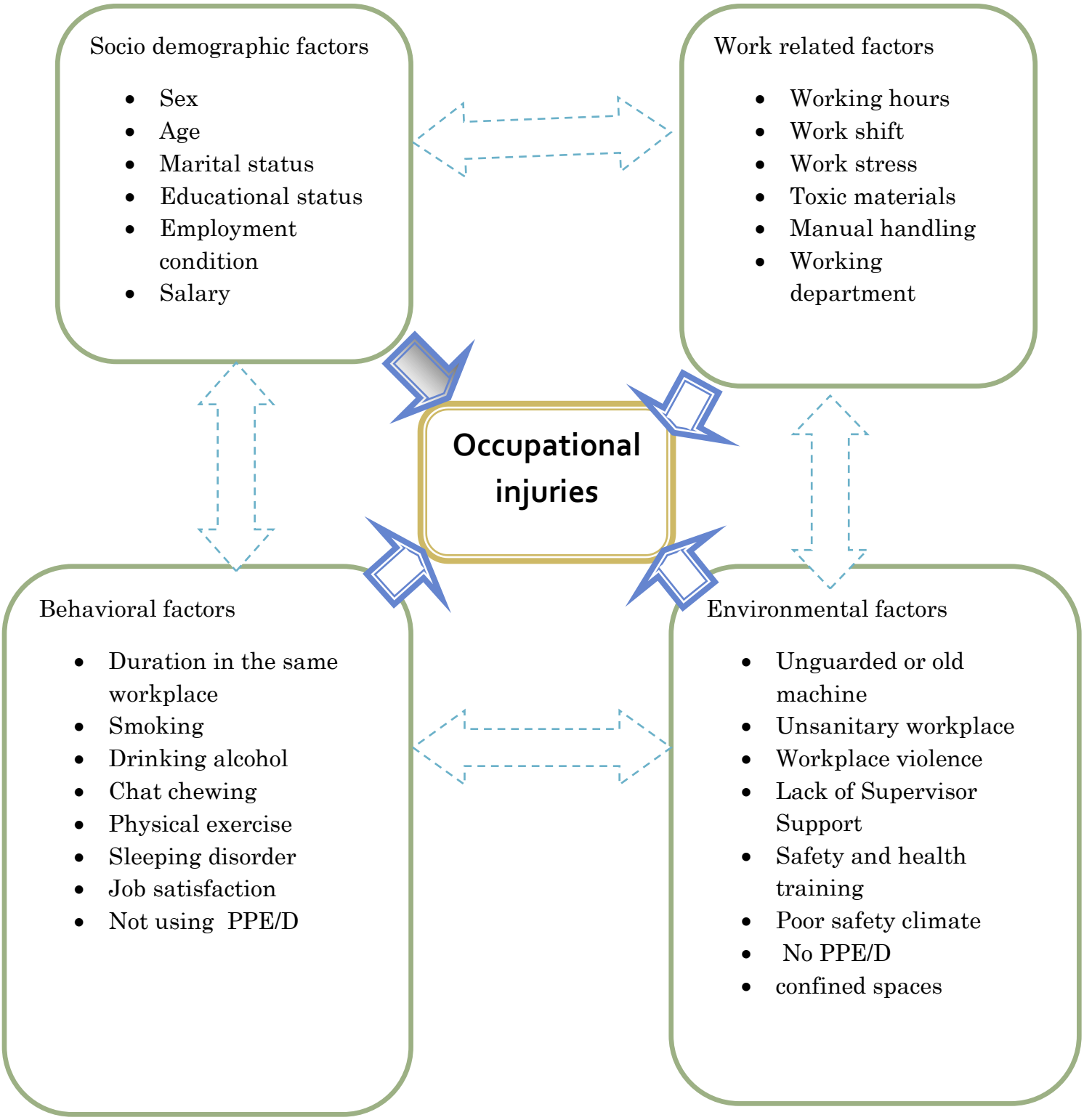

Figure 1 conceptual framework of work related injuries and associated factories. Source, reviews from different literatures

3. Objective of the study

3.1. General objective

- To assess the prevalence of work related injuries and associated risk factors among iron and steel industry workers in selected industries in Addis Ababa, Ethiopia

3.2. Specific objective

- To assess the prevalence of work related injuries in iron and steel industries in Addis Ababa
- To identify factors associated with work related injuries in iron and steel industries in Addis Ababa

4. Methods

4.1. Study Area

The study was conducted in Addis Ababa which the capital city of Ethiopia. According to 2007 census the city administration has a total of 2,739,551 and projected to be 3,194,999 in 2014 (33). From 10 sub cities Akaki sub city contain large number of industries and among surveyed industries 7 were selected from this sub city, 2 industries from bole sub city and the remaining 1 industry from Yeka sub city. The report from Trade industry showed 70 registered iron and steel manufacturing industries and more than 4000 people engaged (34).

4.2. Study design

Institutions based cross sectional study was conducted from March to April 2015 .

4.3. Source Population

All workers in the selected Iron and steel industries in Addis Ababa.

4.4. Study population

Sampled employees in iron and steel industries in Addis Ababa.

4.3.1. Inclusion Criteria

Permanent and temporary workers who had worked 12 month in those sampled Iron and steel industries.

4.3.2. Exclusion Criteria

All administrative workers in those sampled Iron and steel industries.

4.4. Sample size determination

For the first objective sample size (n) was calculated using single population proportion formula considering the magnitude of proportion at 0.33 from previous study done in four iron and steel industries in Addis Ababa in 2010 (6), margin of error (d) of 0.04 and confidence interval (z1//2) of 95%.

$n=\left[\frac{z\alpha/2}{d}\right]^2 p[1-p]$

$n=\left[\frac{1.96}{0.04}\right]^2 0.33[1-0.33] = 531$

When we adjust for variability a design effect of 2 and non response rate of 10%, the sample size calculated was 1,168.

For second objective on factors associated with work related injuries, the following assumptions were made: work related injuries among workers not using personal protective equipment or device being 53.6%, work related injuries among workers using PPE being 26.5% (6). A type I error of 5%, power to detect the assumed difference 80% and a 10% non response rate with design effect of 2, the sample size required for the study was 117 in each group, a total of 234.

$$n_1 = \frac{\left[z\alpha_{/2}\sqrt{2pq} + z_{1-\beta}\sqrt{p_1q_1 + p_2q_2}\right]^2}{[p_1 - p_2]^2}$$

$n_2 = n_1$, $n = n_1 + n_2$

Where n_1 = number of workers using PPE

n_2 = number of workers not using PPE

p_1 = proportion of work related injuries among workers not using PPE

p_2 = proportion of work related injuries among workers using PPE

$p = \frac{p_1 + p_2}{2} = 0.4005$ q=1-p =0.5995

$\frac{z\ \alpha}{2}$ =critical value at 95% level of significance

$z1 - \beta$ = standard normal distribution value corresponding to 80% power to detect the assumed difference =0.84.

$$n_1 = \frac{[1.96\sqrt{2 \text{ x } 0.4005 \text{ x } 0.5995} + 0.84\sqrt{0.536\text{x}0.464 + 0.265 \text{ x } 0.735}]^2}{(0.536 - 0.265)^2}$$

= 53 (workers using PPE)

Since $n_1 = n_2$ total sample size with 10% non response rate and design effect of 2 is 234. Therefore compared with the sample size of first objective, 1,168 is larger and it was taken as sample size for this study.

4.5. Sampling procedure

For the purpose of this study, numbers of iron and steel manufacturing industries with workers more than 150 were listed to prepare a sampling frame. Then those industries were stratified based on expected level of risk of work related injuries that is by industries containing metal melting sections. Industries with metal melting were only 3 and all are included in the sample. The remaining 7 industries were selected by simple random sampling technique from 10 industries without melting metal sections. The calculated sample size (n=1,168) was allocated probability proportional to the size of the selected iron and steel manufacturing. Study subjects were selected by simple random sampling method from the various working section of the industries. The sampling procedure is indicated in figure 2.

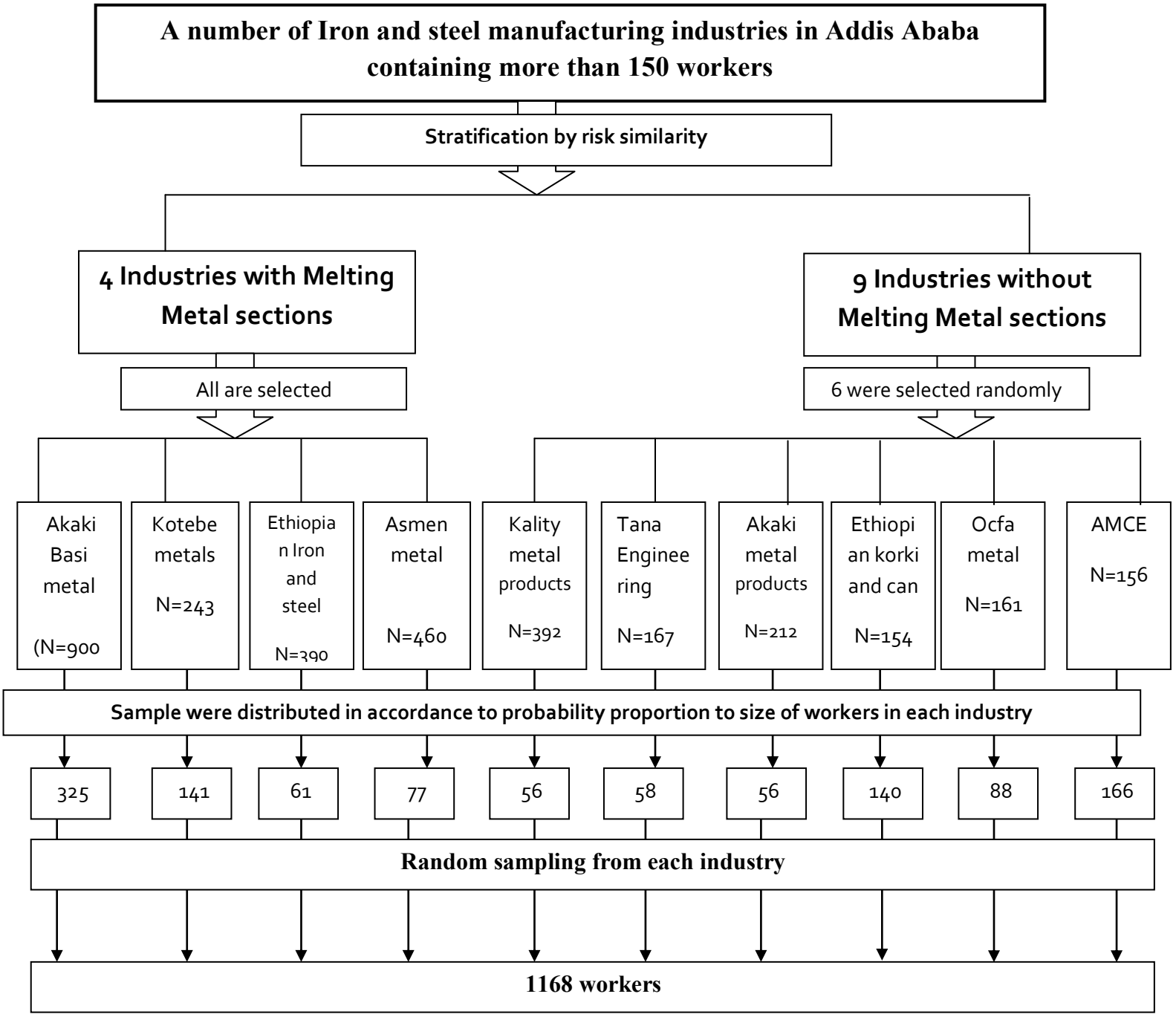

Figure 2 schematic presentation of sampling procedure

4.6. Data collection instrument

Structured questionnaire was developed by reviewing various literatures. Questionnaire was translated in to Amharic and was back translated in to English after data collected. Moreover occupational health and safety check list was developed to document observable hazards and to interview key informants.

4.7. Data collection procedures

Data was collected using structured questionnaire which was developed by reviewing various literatures. Occupational health and safety check list used to inspect observable work related hazards. Moreover in-depth interview with key informants were done to solicit more information on the subject matter.

4.8. Study Variables

4.8.1. Independent variables

- **Socio demographic characteristics -** Age, Sex, Marital status, religious status, educational status, employment condition and salary
- **Environmental and work related variables -** Weekly working hours, Workplace supervision, Health and safety training, Work shift, Workplace violence, safe and adequate water, safe solid and liquid waste disposal system, job requires that you keep learning new things, job performance /manual or machine/, raw materials or products stored and color marked, functional dangers or warning signs, machines always guarded, machines always maintained
- **Behavioral characteristics of worker –** duration in the same workplace, smoking status, alcohol taking status, chat chewing status, sleeping disorder, Personal protective equipment using status,

4.8.2. Dependent Variables

- Work related injuries

4.9. Operational definitions

- **Work related injuries-** Any physical injury condition sustained on worker in connection with the performance of his or her work in textile factories.
- **Permanent workers -** a person who employed for indefinite period in Iron and steel industries.

- **Temporary workers** - a person who employed for more than 12 months but for definite period in Iron and steel industries.
- **Iron** – Is a metal element. Because of we couldn't find free iron by nature, in iron and steel industries iron containing ores are melted with temperature of 1600^{o}c and poured to give Iron.
- **Steel -** is iron that contains less than 2% of carbon. The purpose of steel-making operations is to refine the pig iron which contains large amounts of carbon and other impurities. The carbon content must be reduced, the impurities oxidized and removed, and the iron converted into a highly elastic metal that can be forged and fabricated.
- **Excessive heat**: heat is recorded as excessive if a worker is found sweating when naked or with light clothing or if data collector or investigator feels sudden heat wave when entering to the industry.
- **Excessive noise**: When persons with 1 meter each other are unable to hear in normal communication unless loudly.
- **Work place violence:** The intentional use of power, threatened or actual, against another person or against a group, in work-related circumstances, that either resulting or has a high degree of likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation (35)

4.10. Data quality

Individuals knowledge in occupational health and safety issues who were working in occupational health and safety, environmental health, engineering and MPH students were used as data collectors after receiving training on the questionnaire

4.11. Data Analysis procedures

Data was entered to SPSS window version 20 and sets of analysis were performed. Bivariate logistic regression analysis was employed to see association between associated factors and work related injuries. Crude odds ratio with 95% confidence intervals and significance level at $P<0.05$ were used to see the association between associated factors and work related injuries. Variables with P at <0.3 during the bivariate analysis were included in the multivariate logistic regression analysis to see the effect of confounding variables. Adjusted odds ratio with confidence interval and at $P<0.05$ as significant level were calculated.

4.12. Ethical consideration

The ethical approval and clearance was obtained from Addis Ababa university school of public health. Permission letter for all managers of selected industry was distributed. Data collectors were requested for respondents' consent by the consent form which incorporated confidentiality that any information provided will be kept private by not mentioning his or her name on questionnaire paper. The autonomy of workers for the information they provide and range of participation. Participating and not participating on this study was full right for all workers and participants can stop at any time from participation. Participants can skip any question that they don't want to answer and can ask any question that are not clear.

The study has no risk on participant and there is also no direct benefit for being participated on the study. If injury occurs at the time of data collection, it will be reported for clinic or first aid will be given if possible.

4.13. Dissemination of results

The finding of the study will be disseminated to Addis Ababa University, School of Public Health, Ministry of Health, the Addis Ababa City Health Bureau, the Ministry of Labor and Social Affairs. Finally, the paper will be submitted to journal publishers for publication.

5. Results

5.1. Socio demographic characteristics of respondents

From 1168 samples 1110 respondents participated in the study brings the participation rate to 95% and 991(89.3%) were male. 313(32.9%) of respondents were above the age of forty five and 950(86.5%) followers of Ethiopian orthodox. 446(41%) completed technical and vocational training, and 32(2.9%) were illiterate. 613(55.6%) were married and 449(40.7%) were single. 910(83.1%) were permanent employee and 418(47.1%) earn a monthly salary between 1000 and 2000 birr (Table 1)

Table 1 Socio-demographic characteristics of respondents in Iron and steel industries in Addis Ababa, March-April, 2015

Variables		Number(%)
Sex	male	991(89.3)
	female	119(10.7)
Age group	≤24 years	186(19.6)
	25-35 years	254(26.7)
	36-45 years	198(20.8)
	≥46 years	313(32.9)
Religion	Orthodox	950(86.5)
	Protestant	87(7.9)
	Muslim	48(4.4)
	Others	25(2.2)
Educational status	Illiterate	32(2.9)
	read and write	86(7.9)
	primary school (1-8)	237(21.8)
	Secondary school (9-12)	247(22.7)
	Technical and vocational	446(41)
	Degree or higher	39(3.6)
Marital status	married	613(55.6)
	single	449(40.7)
	Divorced	12(1.1)
	Widowed	28(2.5)
Employment condition	Permanent	910(83.1)
	Temporary	185(16.9)
Salary	≤1000 birr	77(8.7)
	≥1001 and ≤2000 birr	418(47.1)
	≥2001 and ≤3000 birr	221(24.9)
	≥3001 birr	172(19.1

5.2. Prevalence of work related injury

The overall prevalence of work related injury was 35% and it was highest in Asmen metal industry 44.7% and lowest in Akaki basic metal industry and Ethiopian cork and crown industry 29.4% each. Out of total injured respondents 21.6% and 3.5% were injured one time and more than four times respectively in the last 12 months before the survey. Of those injured 225(57.8%) were hospitalized where the total hospitalization days were 5697, and total absent days from work were 6783 days. (table 2)

Regarding parts of the body injured, 127(11.4%) sustained finger injury, 96(8.6%) hand injury, 84(7.6%) eye injury, and 84(7.6%) leg injury. When looking at type of injury, 70(6.3%) had burn, 63(5.7%) cut and eye injury, 59(5.3%) abrasion and 57(5.1%) dislocation (table 3).

It is also documented that 106(22.8%) got the injury from the machine they were working with while 70(15.1%) when lifting heavy objects, 60(12.9%) fire and 56(12%) splintering objects. Regarding days of injury occurred 54(14%) and 44(11.4%) injuries occurred on Wednesday and Tuesday respectively. But 199(51.4%) didn't now days of injury occurred. Injured respondents were also asked about time of injury occurred and 117(31.2%) and 90(24.0%) were responded afternoon and morning were more times of injury occurred respectively (Table 4).

Table 2 Distribution of work related injuries in the last 12 months.

work related injury	Injury distribution among industries, Number (%)										
	01	02	03	04	05	06	07	08	09	10	Total
	(n_1=135)	(n_2=51)	(n_3=313)	(n_4=130)	(n_5=73)	(n_6=56)	(n_7=86)	(n_8=159)	(n_9=53)	(n_{10}=54)	(N=1,110)
Injuries in the last 12 months	51(4.59)	15(1.35)	92(8.90)	55(4.95)	25(2.25)	18(1.62)	30(2.70)	71(6.39)	16(1.44)	16(1.44)	389(35.0)
Frequency of injuries in the last 12 months (n=389)											
once	35(3.15)	13(1.17)	52(4.68)	28(2.25)	18(1.62)	10(0.90)	24(2.16)	37(3.33)	10(0.90)	13(1.17)	240(21.6)
twice	6(0.54)	0(0)	27(2.43)	4(0.36)	3(0.27)	3(0.27)	6(0.63)	5(0.45)	5(0.45)	3(0.27)	62(5.58)
three times	3(0.27)	1(0.09)	4(0.36)	16(1.44)	1(0.09)	2(0.18)	0(0)	21(1.89)	0(0)	0(0)	48(4.3)
4 times & more	7(0.60)	1(0.09)	9(0.81)	7(0.60)	3(0.27)	3(0.27)	0(0)	8(0.72)	1(0.09)	0(0)	39(3.5)
Total	51(4.59)	15(1.35)	92(8.90)	55(4.95)	25(2.25)	18(1.62)	30(2.70)	71(6.39)	16(1.44)	16(1.44)	389(35.0)
Hospitalization (n=225)	33(24.4)	4(7.8)	47(17.2)	33(25.4)	15(20.5)	12(21.4)	19(22.1)	44(27.7)	7(13.2)	11(20.4)	225(20.3)
The number of days being Hospitalized (n=225)	395(6.9)	248(4.4)	760(13.3)	1257(22)	185(3.2)	109(1.9)	698(12.2)	1598(28)	135(2.4)	312(5.5)	5697(100)
The number of days being absent from work (n=225)	535(7.9)	447(6.6)	933(13.8)	1277(18.8)	230(3.4)	265(3.9)	992(14.6)	1623(23.9)	202(3)	379(5.6)	6783(100)

01= kality metal products industry, 02= Ethiopian cork and crown manufacturing industry, 03= Akaki basic metals industry, 04= Ethiopian Iron and steel industry 05= Akaki metal products industry, 06=Automotive manufacturing company of Ethiopia (AMCE), 07=Kotebe metals industry, 08= Asmen metal Industry, 09= Tana engineering PLC. And 10= Ocfa metal manufacturing

Table 3 Body parts affected and injury type in the last 12 months, 2015

Injury characteristics	Number (%)
Affected body part	
Finger injury	127(11.4)
Hand Injury	96(8.6)
Eye injury	84(7.6)
Leg injury	84(7.6)
Back injury	55(5.0)
Ear injury	45(4.0)
Knee injury	27(2.4)
Head injury	21(1.9)
Tooth injury	15(1.4)
Lower leg injury	7(0.6)
Internal body	5(0.5)
Upper leg injury	2(0.2)
Chest injury	2(0.2)
Total	570(51.4)
Types of Injury	
Burn	70(6.3)
Eye injury	63(5.7)
Cut	63(5.7)
Abrasion	59(5.3)
Dislocation	57(5.1)
Puncture	54(4.9)
Fracture	37(3.3)
Ear injury	20(1.8)
beat	15(1.3)
Electrocution	13(1.2)
poison	7(0.6)
Total	**476(42.9)****

* Sum of injured body parts exceeds 389 because of one person injured more than one with different body parts affected

** Sum of types of injury exceeds 389 because of multiple type of injury report by single respondent

Table 4 Source of injury, days and time of injury in the last 12 months, 2015 (n=389)

Characteristics	Number (%)
Source of injury	
Machinery	106(9.50)
Lifting heavy objects	70(6.30)
Fire	60(5.40)
Splintering objects	56(5.04)
Hand tools	40(3.60)
Chemicals	37(3.33)
Hit by falling objects	29(2.61)
Collision with objects	26(2.34)
Falls	24(2.16)
Hot Substances	10(0.90)
Electricity	7(0.63)
total	465(41.89)
Days of injury occurrences	
Monday	21(1.89)
Tuesday	44(3.96)
Wednesday	54(4.86)
Thursday	29(2.61)
Friday	25(2.25)
Saturday	7(0.63)
Sunday	8(0.72)
Don't remember	199(17.93)
Total	387(34.86)*
Time of Injury occurrence	
Morning	90(8.10)
Afternoon	117(10.54)
Evening	11(0.99)
Midnight	17(1.53)
Don’t remember	122(10.99)
total	375(33.78)

* Days of injury for 2 respondent missing, ** Time of injury for 14 respondents missing

5.3. Factors related to work related injuries

5.3.1. Socio demographic factors .

From demographic factors sex, Age, educational status and employment condition were significantly associated with work related injury in bivariate logistic regression. However only sex and employment conditions showed significant association with work related injury in multivariate logistic regression. Males were 1.96 times more likely to get injury when compared with females [AOR: 1.96, 95%CI: (1.05, 3.67)] and temporary workers were 2.65 times more likely get injured compared with permanent workers [AOR: 2.65, 95%CI: (1.49, 4.71)] (Table 7).

5.3.2. Environmental and work related Factors

755(68%) of study participants reported working more than 48 hours in a regular week. Regarding work place safety and health supervision 717(65.7%) reported that environment was not supervised by concerned bodies. Only 329(30.1%) of respondents received on the job safety and health training. Among participants 732(66.7%) responded had work shift. Regarding the availability of safe and adequate water for drinking and keeping personal hygiene, 874(79.5%) responded positively while 761(69.2%) having safe waste disposal system.

In bivariate analysis working more than 48 hours per week, lack of regular supervision on safety and health, facing workplace violence, lack of safe and adequate water for personal hygiene, lack of safe solid and liquid waste disposal system, routine work or lack of learning new thing from work process, not ordering raw materials and products coded in color and properly, working on machine, working on unguarded machine and not maintaining machine timely were statistically associated with work related injury.

In multivariate analysis workers not trained in safety and health related with job were 1.92 times more likely get injured than workers trained in safety and health [AOR: 1.92, 95%CI : (1.19,3.11)]. Similarly worker working without shift are 1.5 times more likely get injured than workers working with shift. [AOR: 1.50, 95%CI: (1.02, 2.21)]. Workers facing work related instability like workplace violence, nervousness, managerial (colleagues) disagreement were 1.88 times more likely injured than workers without violence. [AOR: 1.88, 95%CI: (1.18, 2.98)] Compared with workers have safe solid and liquid waste disposal system that prevents them from accidents at work workers not have safe disposal method were 2.01 times more likely get

injured. [AOR: 2.01, 95%CI: (1.35, 3.02)] Similarly machine workers were 2.79 times more likely injured when compared with manual workers. [AOR 2.79, 95%CI: (1.16, 6.73)] Workers working in environment with raw materials and products not stored by coded in color, were 1.71 times more likely to get injured than workers working in environment with raw materials and products properly ordered and color coded. [AOR 1.71, 95%CI: (1.13, 2.59)] Finally workers working on unguarded machines or uninstalled with safety devices during their activities were 2.35 times more likely got injured than workers working on guarded and installed with safety devices. [AOR 2.35, 95%CI: (1.46, 3.78)] (Table 7)

5.3.3. Behavioral factors

From behavioral factors workers who smoke cigarette were 4.78 times likely got injured compared with not smoking workers. [AOR: 4.78, 95%CI: (2.32, 9.86)] Workers with sleeping disorder or those sleeping at work place were 2 times more likely injured compared with not have sleeping disorder at work place. [AOR: 2.01, 95%CI: (1.16, 3.75)] Similarly workers not using personal protective equipments at work were 4.26 times more likely got injured than workers properly using PPE. [AOR: 4.26, 95%CI: (2.78, 6.53)] (Table 7)

Table 5 Environmental and work related factors in Iron and Steel industries in Addis Ababa, 2015

Conditions	Number	percent
weekly working hour		
>48 hours	755	68
<48 hours	355	32
supervision on safety and health	375	34.3
work shift	732	66.7
safety and health training	329	30.1
work place violence	173	16
safe and adequate water	874	79.5
safe waste disposal	761	69.2
job allows keep learning new things	558	52.2
job performance		
manually	117	10.8
machine	99	9.2
mixed	864	80
raw materials or products stored and color marked	599	56.2
machines always guarded	351	32.9
machines always maintained	601	56.1

5.3.4. Behavioral Variables

The study showed that 1016(93.7%) of the respondents reported none smoker, 695(65%) not drinking alcohol and 979(91.5%) not chewing chat. Moreover 748(70%), 199(18%), and 819(75.5%) reported that they were satisfied by their job, have sleeping disorder and use personal protective equipment respectively. Of those not using personal protective equipment 233(87.6%) cited unavailability (not being provided) as reason for not using PPE.

Table 6 behavioral factors of respondents Iron and Steel industries in Addis Ababa, 2015,

variables	Number (%)
smoking cigarette	
not smoking	1016(93.7)
everyday	31(2.9)
1-2 days	14(1.3)
3 days	2(0.2)
4-5 days	21(1.9)
drinking alcohol	
Not taking alcohol	695(65.0)
everyday	14(1.3)
1-2 days	232(21.7)
3 days	63(5.9)
4-5 days	66(6.2)
chewing chat	
not chewing chat	980(91.5)
everyday	19(1.8)
1-2 days	57(5.3)
3 days	4(0.5)
4-5 days	10(0.9)
sleeping disorder	199(18.5)
job satisfaction	748(70.0)
PPE use	819(75.5)

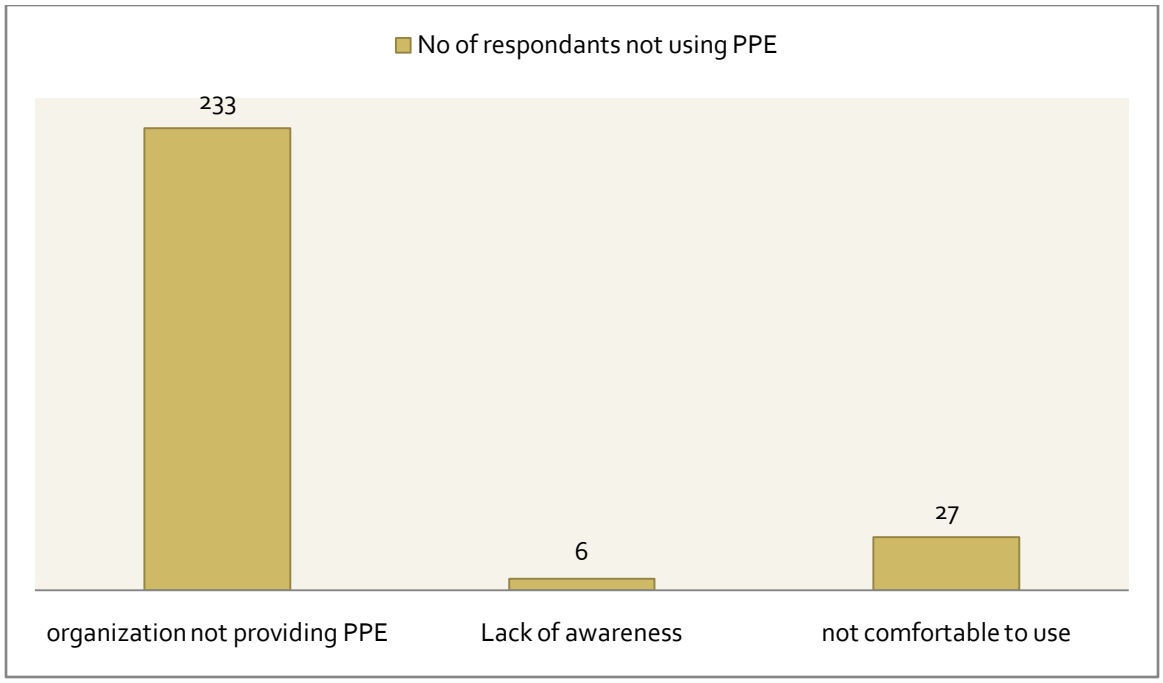

Figure 3 Reported causes for not using PPE in the last 12 months among respondents in Iron and Steel industries in Addis Ababa, March and April, 2015 (n=1110)

5.4. Work place observation

Working environment of studied industries were observed and 3 Industries engaged in melting metals were found to have excessive heat more in and around the furnace and oven areas without appropriate PPE. Machines were not guarded to prevent workers from burning of splintering molten and hot metals. Workers randomly asked about why they not using PPE, and most of them responded the organization not providing on time and those temporary workers have no right to ask PPE because they signed agreement at the time of recruitment.

All working sections except heat treatment and painting sections were observed with excessive noise. Workers in these sections were also not using hearing protection PPE. Excessive dust was common in all industries and most of them were with confined working place that hinder the activities of workers who enter, work in and exit from them and with poor air quality. Only three industries have posted safety sign and symbols on working environment and only 2 industries had safety and health personnel. None of working sections observed with first aid equipment and 9 of selected industries had clinic.

Table 7 Factors tested for association of work related injury in Iron and Steel industries in Addis Ababa, March - April, 2015, (n=1110)

variables	work related injury		p value crude	COR(95%CI)	AOR(95%CI)	p value adjusted
	yes	no				
sex						
Male	354	637	0.17	1.33(0.88,2.02)	1.96(1.05,3.67)	0.03*
Female	35	84		1.00	1.00	
Employment condition						
Permanent	72	133		1.00	1.00	
Temporary	308	602	0.19	0.80(0.58,1.11)	2.65(1.49,4.71)	0.000***
Safety and health training						
Yes	103	226		1.00	1.00	
No	281	483	0.08	1.28(0.97,1.68)	1.92(1.19,3.11)	0.007**
work shift						
yes	270	462		1.00	1.00	
no	114	251	0.065	1.30(0.99,1.68)	1.50(1.02,2.21)	0.04*
work place violence						
Yes	102	71	0.000	3.28(2.35,4.58)	1.88(1.18,2.98)	0.007**
No	276	630		1.00	1.00	
Safe waste disposal						
Yes	224	537		1.00	1.00	
No	155	183	0.000	2.03(1.56,2.65)	2.01(1.35,3.02)	0.000***
job performance						
manually	46	71		1.00	1.00	
machine	24	75	0.02	2.03(1.12,3.66)	2.79(1.16,6.73)	0.02*
mixed	301	563	0.34	1.21(0.82,1.81)	1.75(0.96,3.18)	0.07
Raw materials or products stored and color marked						
Yes	167	432		1.00	1.00	
No	199	267	0.000	1.93(1.49,2.49)	1.71(1.13,2.59)	0.01**
machines always guarded						
Yes	84	267		1.00	1.00	
No	283	433	0.000	2.01(1.56,2.77)	2.35(1.46,3.78)	0.000***
Smoking cigarette						
yes	42	26	0.000	3.26(1.96,5.40)	4.78(2.32,9.86)	0.000***
no	337	679		1.00	1.00	
Sleeping disorder						
yes	96	103	0.003	2.27(1.32,3.89)	2.01(1.16,3.75)	0.014*
no	252	624		1.00	1.00	
PPE use						
yes	223	596		1.00	1.00	
no	155	111	0.000	3.73(2.80,4.98)	4.26(2.78,6.53)	0.000***

Note *- only variables reached p-value <0.3 were included in multivariate logistic regression analysis and those variables significant at p value 0.05 in the subsequent analysis were displayed on the table*

- ** Significant at p-value <0.05, ** significant at p-value <0.01 and *** significant at p-value <0.001.*

6. Discussion

6.1. Prevalence and characteristics of injuries

This study showed the prevalence of work related injury on substantial level. A number of factors that determine the occurrence of injury were recorded. From 11 factors determined, not using proper personal protective equipment, working on unguarded machine, being temporary worker and cigarette smoking were highly associated with injury.

This study showed the overall prevalence of work related injury was 35%. Studies in manufacturing industries in China, India and Sweden showed lower prevalence of work related injury with 11.96%, 10.2% and 18% respectively (10, 11, 18). This might be due to management of occupational health and safety in those industries was better than Iron and steel industries in Addis Ababa. The finding of this study consistent with the studies done in Kombolcha textile factory, small and medium- scale industries in Gondar and Iron and steel industry in Addis Ababa with prevalence of work related injuries 36.9% and 33.5% and 33.3% respectively (6, 7 ,8). Studies in Tendaho Agricultural Development S.C and large scale metal manufacturing industry showed relatively higher prevalence of work related injury with 783 and 489 injuries per 1000 exposed workers (8, 19). This might be the difference less data quality in study in large metal manufacturing industry. Therefore the finding of this study showed the prevalence of work related injury is not decreasing although previous studies recommended several health and safety measures to be taken. Poor safety and health working environment and unavailability of PPE resulting from weak occupational health and safety management system in industries might be the case of injury.

Regarding hospitalization and absent from work due to injury, this study revealed more than half of (57%) injured workers hospitalized and averagely 14.6 days spent in hospital bed and 6783 days or 17.4 days per injured workers absent from work. Activities in iron and steel industries demand high muscle energy and accidental contact with hot and sharp machines and hand tools might cause severe injury. Similarly 62.2% of injured workers hospitalized due to work related injury as revealed in previous study in Iron and steel industry (6).

Most frequently occurred injuries were burn, eye injury, cut, abrasion, dislocation and puncture with 14.7%, 13.2%, 13.2%, 12.4%, 12% and 11.3% respectively. These were also most frequently occurred injuries except burn in previous studies (6, 19). During workplace observation workers in furnace and oven areas told that burning were most frequently occurring injury in their work.

Regarding body part affected, finger, hand, eye and legs most affected. The studies in iron and steel industries also showed similar finding (6, 19). This is because they were most frequently involved body parts on work without PPE use. Most of injuries were caused by machinery (22.8%), fire and hot substance (15.1%), lifting heavy objects (15.1%) and splinting objects (12%). This finding was also consistent with other studies (6, 19). Most machines were unguarded and combined with none use of appropriate personal protective equipments or devices, the risk of being injured was high.

6.2. Factors associated with injuries

Studies from different scholars at different place showed a number of factors associated with injuries. This study revealed that male workers were more likely to get work related injury than females. Several studies have reported similarly (2, 9, 10, 19, 22, 25, 31, 32). The reason for this might be the participation of male workers in heavy and highly risky working sections. This study also showed temporary workers were more likely to get injured than permanent workers. This might be most of temporary workers in different industries revealed that industries did not provide PPE for them and they were at risk of injury. Studies in Japan and USA reported similar finding (26, 25).

From environmental factors safety and health training was significantly associated with injury when adjusted to other variables. Untrained worker on safety procedures to be taken before, during and after performing the job probably not properly use PPE and the risk of getting injury is high. Different studies on the past also revealed safety and health training associated with work related injury (2, 7, 8, 22, 32). The report of this study showed workers working without shift in a week were more likely to get injured. That might be working without rest enables works stressed and might not take enough care for themselves to prevent occupational hazards. Other researches also reported similarly (6, 7, 8, 9, 19,).

Absence of safe solid and liquid waste disposal system was also significantly associated with injury. Sprinted and milled metals not removed immediately, it prevents movement of workers and exposes them to injury from machine or elsewhere. The sprinted metals might cause leg injury for workers without safety shoos. Not removing oils and other liquids used for lubrication and cooling hot metals, when they become waste, exposes accidental falling of workers on sharp metals or machine that results injury. Most of similar literatures reviewed, not studied the association of safe solid and liquid waste disposal system with injury. But one study revealed safe solid and liquid waste disposal system have no association with work related injury (19). This might be the result of variation in sampling.

Working on unguarded machines was also significantly associated with occupational injury. Most of machines were observed very old and unguarded. Sprinting hot and molten metals might cause injury to nearby worker. The finding was inconsistent with other study (19). This could be also variation in sampling. The study also showed Workers facing work related instability like workplace violence, nervousness, managerial (colleagues) disagreement were more likely injured than workers without violence. Work place violence is psychosocial hazard and avoids conducive working environment. When workers get in to violent condition they may lose attention to prevent injury.

Machine workers are also more likely to get injured than manual workers. This might be most of machines were unguarded and results injury for operators. Working in environment with raw materials and products not stored by coded in color was factors that account for occurrence of injury in this study. This might be some workers accidentally fall from obstacles due to poor arrangement of raw materials and products.

Cigarette smoking from behavioral factors that was significantly associated with injury in this study and consistent with the study on magnitude and factors of occupational injury among workers in large scale metal manufacturing industries in Addis Ababa and other study (30) . Different studies (2, 6, 7, 8, 9, 24, 31) showed sleeping disorder as factor for occurrence of injury and it was also confirmed by this study. This study also showed that the higher magnitude of work related injury in workers not using personal protective equipment/device compared to workers using PPE/PPD and it was consistent with other studies (2, 6, 7, 8, 31)

7. conclusion and Recommendation

7.1. Conclusion

- This study showed the prevalence of work related injury is high among Iron and Steel manufacturing industry workers in Addis Ababa compared with the study in china and India.
- Among variables male workers, temporary workers, working for extended hours, lack of safety and health training, lack shift work, presence of work place violence, unavailability of safe solid and liquid waste disposal system, unguarded machine, lack of proper ordering and coding of raw materials and products, cigarette smoking, having sleeping disorder and none use of personal protective equipments or devices were significantly associated with work related injury.

7.2. Recommendations

The following points are strongly recommended for Iron and steel industries based on findings of this study.

- Since most of activities in metal manufacturing industries need intensive muscle power, the employers should consider shifting workers.
- Always properly using PPE at work prevents major occurrences of injury. Therefore industries should be closely monitored for availability and proper using of PPE by all workers and providing PPE should not be a condition for recruitments of worker.
- Properly arranging and coding raw materials and products should be practiced in all industries.
- Safe solid and liquid waste disposal system should be practiced.
- All machines that can cause injury to workers should be guarded.
- Smoking should be discouraged
- Workers with sleeping disorder should be assessed for routine case of sleeping and proper measure should be taken.

8. Strength and Limitations of the study

8.1. Strengths

- The sample for this study is relatively higher than studies done previously and better representative for source population.

8.2. Limitations of the study

The findings and interpretation of this study need to be evaluated with the concept that some limitations potentially exist in the study.

- Some respondents might not recalled the occurrence of injury in the past 12 months and the prevalence of injury stated in this study could be higher.
- Workers in night shift, annual leave and with other reasons out of work place during data collection period in some industries were not participated in and some important data might be missed.

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Annex-I English questionnaire

Questionnaire ID _____

Name of industry by code _____Address by code_____

1. Information sheet

Hello, my name is _____.I came from Addis Ababa University College of Health Science School of Public Health research team. I would like to ask few questions which take 20 minutes about incident at work that resulted in injuries to you at work in the previous 12 months. Your information that you are going to provide will help policy makers to design strategy/give priority for prevention and control of occupational injuries to have healthy workforce.

Title of the study: Assessment of prevalence of work related injuries and associated risk factors among iron and steel industries workers in Addis Ababa, Ethiopia

Back ground of the study: Each year, work-related injuries and diseases kill an estimated 2 million people worldwide. In Sub-Saharan Africa, the fatality rate per 100,000 workers is 21 and the accident rate16,000. This means that each year 54,000 workers die and 42 million work related accidents take place that cause at least three days' absence from work· Few studies in different industries in Ethiopia show that the prevalence of work related injury reaches up to 69%. Therefore this study will provide additional information and attract the attention of policy makers, governments, and the trade unions in their efforts to improve occupational health and safety in iron and steel industries in Ethiopia.

Benefit of the study: There is no direct benefit for participants for being participated in responding to this questionnaire. The result will be disseminated to all stockholders for designing prevention and control measures.

Risk of the study: the study has no any risk for the participant and interview also will be private to make safe participants from management related problems.

Rights of the participant: Participating and not participating is the full right and participants can stop from participation in the study at any time. And also the participant can skip question which the worker does not want to respond. Participants can ask any questions which is not clear for understanding.

Confidentiality: Any information forwarded will be kept private and his name will not be specified.

2. Informed consent

I have read this form or it has been read to me in the language I comprehend and understood all conditions stated above. Therefore, I am willing to participate in this study.

Name of participant _____ Signature

_____

Name of supervisor _____ Signature

_____. Date of interview _____

Result of interview

1. Completed
2. Respondent not available
3. Refused
4. Partially Completed.

Remark: For any inconvenience and problem related to questionnaire please contact principal investigator.

Name of PI - **Zeleke Tora Wadilo**

Address: Tell- **0910317442** e-mail zetoraaz@gmail.com

Part I socio demographic characteristics

No	Questions	possible response	skipping
101	sex	1. Male 2. Female	

102	Age	……..	
103	Religion	1. Orthodox 2. Protestant 3. Catholic 4. Muslim 5. others	
104	Educational level	1) Illiterate 2) Read and write 3) Primary school (1-8) 4) Secondary school (9-12) 5) Technical and vocational 6) Degree or higher	
105	Marital status	1) Married 2) Single 3) Divorced 4) Widowed 5) Separated	
106	Employment condition	1) Permanent 2) Temporary	
107	Job category	…….	
108	salary	……	

Questionnaire ID _____

Part -II-work related injuries

No	Questions	possible response	skipping

No	Questions	possible response	skipping
201	Have you had an incident that resulted injury to you in the last 12 months?	1. Yes 2. No	
202	Have you had an incident at work that resulted injury to you in the last 2 weeks?	1. Yes 2. No	
203	If yes for Q201 or 203, how many times?	1) In 12 months _____ 2) In 2 weeks _____	
204	Parts of the 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) Fingers 1) Yes 2) No 8) Head 1) Yes 2) No 9) Upper arm 1) Yes 2) No 10) Lower arm 1) Yes 2) No 11) Upper leg 1) Yes 2) No 12) Lower leg 1) Yes 2) No 13) Back 1) Yes 2) No 14) Chest 1) Yes 2) No Others (specify)…….	
205	Types 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	

No	Questions	possible response	skipping
		7) Amputation 1) Yes 2) No 8) Electrocution1) Yes 2) No 9) Suffocation 1) Yes 2) No 10) Ear injury 1) Yes 2) No 11) Eye injury 1) Yes 2) No 12) Poisoning 1) Yes 2) No 13) Others specify ……..	
206	What was your personal condition at the time of injury?	1) I was new for the work process 1) Yes 2) No 2) Thinking about private affairs 1) Yes 2) No 3) Due to other medical problem 1) Yes 2) No 4) Accident is beyond control 1) Yes 2) No 5) It is the work behavior 1) Yes 2) No 6) It is due to not using PPD/E 1) Yes 2) No 7) I don't remember 1) Yes 2) No 8) Others (specify) ……	
207	What was the source 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. Collision with objects 1) Yes 2) No 6. Fire 1) Yes 2) No 7. Hand tools 1) Yes 2) No 8. Falls 1) Yes 2) No	

No	Questions	possible response	skipping
		9. Hot substances 1) Yes 2) No 10. Acid and acidic substance 1) Yes 2) No 11. Lifting heavy objects 1)Yes 2) No 12. Others specify…….	
208	What was the days of the week injury occurred?	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 8) I don't remember 1) Yes 2) No	
209	How much is the time when injury occurred?	1) Morning 1) Yes 2) No 2) Afternoon 1) Yes 2) No 3) Evening 1) Yes 2) No 4) Midnight 1) Yes 2) No 5) I don't remember 1) Yes 2) No	
210	Have you hospitalized or being laid on the bed at home due to injury?	1) Yes 2) No	
211	If you answer for Q210 is 'yes' how long?	……..	
212	The number of days you are absent from work due to injury	…….	

Questionnaire ID _____

Part –III- workplace related factors

No	Questions	possible response	skipping
301	How much is your weekly working hour?	……..	
302	Is your workplace is regularly supervised on safety and health?	1) Yes 2) No	
303	Have you had safety and health training in connection with your job?	1) Yes 2) No	
304	Have you had any work shift?	1) Yes 2) No	
305	If yes for Q304, How often?	……..	
306	Have you ever faced any work related instability like workplace violence, nervousness, managerial (colleagues) disagreement?	1) Yes 2) No	
307	Do you always get safe and adequate water for your hygiene?	1) Yes 2) No	
308	Do you have always safe solid and liquid waste disposal system that prevents you from accidents at work?	1) Yes 2) No	
309	In your job, how often do you take part with others in making decisions that affect you?	1. Always 2. Sometimes 3. Not at all	
310	How often do you participate with others in helping set the way things are done on your job?	1. Always 2. Sometimes 3. Not at all	
311	How often do the demands of your family interfere with your work on the job?	1. Always 2. Sometimes 3. Not at all	

No	Questions	possible response	skipping
312	How often do the demands of your job interfere with your family life?	1. Always 2. Sometimes 3. Not at all	
313	Do you trust management at the place where you work?	1) Yes 2) No	
314	Do you think you are treated with respect in your organization?	1) Yes 2) No	
315	The conditions on your job allow you to be about as productive as you could be?	1) Yes 2) No	
316	The place where you work is running in a smooth and effective manner?	1) Yes 2) No	
317	Safety and health conditions where you work are good?	1) Yes 2) No	
318	Is safety of workers is a high priority with management where you work?	1) Yes 2) No	
319	Your job requires that you keep learning new things?	1) Yes 2) No	
320	Is the chances for promotion is good in your position?	1) Yes 2) No	
321	Promotions are handled fairly?	1) Yes 2) No	
322	Your supervisor is concerned about the welfare of those under him or her?	1) Yes 2) No	
323	The way you performing your job is	1) Yes 2) No	
324	Do you use mobile devices near	1) Yes	

No	Questions	possible response	skipping
	worksites to lift or move materials safely at last 12 months?	2) No	
325	Are raw materials or products stored and color marked to prevent you from accidents?	1) Yes 2) No	
326	Are there always functional dangers or warning signs during your activities?	1) Yes 2) No	
327	Are machines always guarded or installed with safety devices during your activities?	1) Yes 2) No	
328	Are machines always maintained immediately when old or unsafe?	1) Yes 2) No	

Questionnaire ID _____

Part –IV- behavioral factories

No	Questions	possible response	skipping
401	Duration in same workplace in hour/day/month/year	……..	
402	Have you had any medical problem before or after you work in this area?	1) Yes 2) No	
403	If yes for Q402,types of problem	…….	
404	Do you smoke?	1) Yes 2) No	
405	If yes for Q404, how often?	1) Everyday 2) 1-2 days 3) 3 days 4) 4-5 days	
406	Do you take excess alcohol?	1) Yes 2) No	
407	If yes to Q406, how often?	1) Everyday 2) 1-2 days 3) 3 days 4) 4-5 days	
408	Do you chew chat?	1) Yes 2) No	
409	If yes to Q408, how often?	1) Everyday 2) 1-2 days 3) 3 days 4) 4-5 days	
410	Do have any sleeping disorders?	1) Yes 2) No	
411	If yes to Q410, what is the	1) Working more than 8 hour without shifting	

No	Questions	possible response	skipping
	reason?	2) Working in evening 3) Trying to work more than one task at a time 4) Others explain	
412	Are you satisfied with job or task required to do?	1) Yes 2) No	
413	Do you use any personal protective device during working?	1) Yes 2) No	
414	If No to Q413, what is the reason? What are your reasons for not using personal protective equipment?	1. Organization providing no PPE 2. Lack of awareness 3. Not comfortable to use 4. Other specify	

Annex-II Amharic version Questionnaire

አባሪ-2 የአማርኛ ትርጉም መጠይቅ

ይህ መጠይቅ በአዲስ አበባ ከተማ ውስጥ የሚገኙ የብረታ ብረት ፋብርካዎች በሚሰሩ ሠራተኞች መካከል ከሚሰሩት ሥራ ጋር በተያያዘ የደረሰባቸውን ጉዳት ለማጥናት የተዘጋጀ መጠይቅ ነው፡፡

የመጠይቁ መለያ ቁጥር _____

የድርጅቱ ስም _____ **አድራሻ** _____

ጤና ይስጥልኝ ስሜ _____ **ይባላል፡፡ እኔ የመጣሁት ከአዲስ አበባ ዩኒቨርስቲ ጤና ሳይንስ ኮሌጅ ከህብረተሰብ ጤና ትምህርት ቤት ከጥናት ክፍል ነው፡፡ አሁን ሊጠይቆት የሚፈልገው ለ20 ደቂቃ የሚያቆይ ከሥራዎት ጋር በተገናኘ ባለፉት 12 ወራት ውስጥ የደረሰበዎትን አደጋ ካለ እና ተዛማጅ ጉዳዮችን ነው፡፡ የሚሰጡት መረጃ ፖሊሲ አውጭዎችን በሥራ ምክንያት የሚደርሱ አደጋዎችን ለመከላከል ቅድሚያ እንዲሰጡ ያደርጋል፡፡**

የጥናቱ ሪዕስ

በአዲስ አበባ ውስጥ በሚገኙ ብረታብረት ፋብርካዎች በሚሰሩ ሠራተኞች ላይ የደረሱ የሥራ ላይ አደጋዎች መጠን እና አጋላጭ ጉዳዮችን ማጥናት፤

የጥናቱ መግቢያ

በዓለማችን ከ2 ሚሊዮን በላይ የሚሆኑ ሰዎች ከሥራ ጋር በተያያዘ በሚከሰት አደጋ እና በሽታ ይሞታሉ፡፡ ከሣራ በረሃ በታች በሚገኙ አገራት ከሥራ ጋር በተያያዘ በሚደርስ አደጋ የመሞት ዕድል ከ100,000 ሰዎች 21 ሲሆን 16,000 ያልታሰቡ አደጋዎች ይደርሳሉ፡፡ ይህ ማለት በእያንዳንዱ ዓመታት በትንሹ 3 ቀናት ከሥራ የሚያስቀሩ 42 ሚሊዮን የሚሆኑ በሥራ ላይ አደጋዎች የሚደርሱ ሲሆን 54 ሺህ የሚሆኑ ሰዎች ይሞታሉ፡፡ በኢትዮጵያ የተወሰኑ ጥናቶች እንደሚያሳዩት በሥራ ላይ የሚደርሱ አደጋዎች እስከ 69% እንደሚደርሱ ያሳያል፡፡ ስለዚህ ይህ ጥናት ወቅታዊ መረጃ በመስጠት የፖሊሲ

አውሮፓዎች፣ የመንግስት እና የንግድ ድርጅቶች ትኩረት በመሳብ በብረታብረት ፋብርካዎች በሥራ ላይ የሚደርሱ አደጋዎችን ለመከላከል ያስችላቸዋል።

ከጥናቱ የሚገኝ ጥቅም

አንድ ሠራተኛ ይህን መጠይቅ በመመለስ ስለተሳተፈ ቀጥተኛ የሆነ ጥቅም አያገኝም። የዚህ ጥናት ውጤት ለሚመለከታቸው አካላት ሁሉ የሚሰራጭ በመሆኑ በቀጣይ በሥራ ላይ የሚደርስ አደጋ ለመከላከል ከፍተኛ ሚና የሚጫወት በመሆኑ በተዘዋዋሪ ተጠቃሚ ይሆናል።

በጥናቱ የመሳተፍ ስጋት

አንድ ሠራተኛ ይህንን መጠይቅ የሚደርስ ምንም አይነት ጉዳት የሌለ ሲሆን ሠራተኛን ማንነት ለተቋሙ አስተዳደር አይገለጽም።

በጥናቱ የሚሳተፍ ሠራተኛ መብት

በዚህ ጥናት መሳተፍ እና አለመሳተፍ የአንድ ሠራተኛ ሙሉ መብት ነው። ከዚህ ባሻገር በጥያቄ ለመመለስ የማይፈልገውን ጥያቄ መዝለልም ሆነ ከጥናቱ ሙሉ በሙሉ መተው ይችላል። በተጨማሪ ያልገባው እና የተጠራጠረበት ጥያቄ ካለ የጥናቱ አስተባባሪውን መጠየቅ ይችላል።

ምስጢራዊነት

በዚህ መጠየቅ የተሰጠው መረጃ መስጥራዊነት የተጠበቀ ሲሆን የሠራተኛ ስም በፍፁም አይገለፅም።

2. ስምምነት

ከላይ የተፃፈውን መረጃ እኔ በሚችለው ቋንቋ ስለተገለፀ ሁሉንም በማንበብ ተረድቻለሁ። ስለሆነም በጥናቱ ለመሳተፍ ፈቃደኛ ነኝ።

የተሳታፊ ስም _____ ፊርማ _____

የሱፐርቫይዘሩ ስም _____ ፊርማ _____

መጠይቁ የተሞላበት ቀን _____

የመጠይቁ ውጤት

1. በሙሉ ተሞልቷል
2. ተሳታፊው አልተገኘም
3. ለመሙላት ፈቃደኛ አለሆነም
4. በግማሽ ተሞልተዋል

መሳሰቢያ፡- ያልገበዎት ወይም ጥያቄ የሆነበዎት ሁኔታ ካለ የጥናቱ ዋና ተሳታፊ መጠየቅ ይችላሉ፡፡

የጥናቱ ዋና ተሳታፊ ዘለቀ ቶራ ዋድሎ

አድራሻ ስልክ 0910317442 ኢ-ሜይል zetoraaz@gmail.com

የጥያቄ መለያ ቁጥር _____

ክፍል አንድ

ማህበራዊ እና ስነ-ሕዝባዊ ሁኔታዎችን በተመለከተ

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
101	ፆታ	1. ወንድ 2. ሴት	
102	ዕድሜ	……..	
103	ሐይማኖት	1) ኦርቶዶክስ ክርስቲያን	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
		2) ፕሮተስታንት ክርስቲያን 3) ካቶሊክ ክርስቲያን 4) ሙስሊም 5) ሌላ	
104	የትምህርት ደረጃ	1) ማንበብ እና መፃፍ የማይችሉ 2) ማንበብ እና መፃፍ የሚችሉ 3) የመጀመሪያ ደረጃ ትምህርት ያጠናቀቁ /1-8/ 4) ሁለተኛ ደረጃ ትምህርት ያጠናቀቁ 5) 10 + 1 አስከ ኮሌጅ ድፕሎማ 6) የመጀመሪያ ድግሪና ከዚያ በላይ	
105	የጋቢቻ ሁኔታ	1) ያገቡ 2) ያላገቡ 3) የፈቱ 4) በሞት የተለዩ	
106	የቅጥር ሁኔታ	1) በጊዜያዊነት 2) በቋሚነት 3) በምክትልነት	
107	የሥራ ድርሻ	……..	
108	የወር ደመወዝ	……	

ክፍል ሁለት

ከሥራ ጋር በተያያዘ የደረሰ ጉዳትን በተመለከተ

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
201	ባለፉት አስራ ሁለት ወራት ውስጥ ከሥራዎት ጋር በተያያዘ	1) አለ 2) የለም ⟶	301

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
	የደረሰበዎት ጉዳት አለ?		
202	ባለፉት ሁለት ሳምንት ውስጥ ከሥራዎት ጋር በተያያዘ የደረሰበዎት ጉዳት አለ?	1) አለ 2) የለም	
203	ለጥያቄ 201 ወይም 202 መልስዎት አለ ከሆነ ስንት ጊዜ ነው ጉዳት የደረሰበዎት?	1) በአስራ ሁለት ወራት ውስጥ ___ ጊዜ 2) በሁለት ሳምንት ውስጥ _____ ጊዜ	
204	የተጎዳበዎት የሰውነት ክፍል	1) ዓይን 1) አዎ 2) አይደለም 2) ጥርስ 1) አዎ 2) አይደለም 3) እጅ 1) አዎ 2) አይደለም 4) ጆሮ 1) አዎ 2) አይደለም 5) ጉልበት 1) አዎ 2) አይደለም 6) እግር 1) አዎ 2) አይደለም 7) የእጅ ጣቶች 1) አዎ 2) አይደለም 8) ራስ 1) አዎ 2) አይደለም 9) የላይኛው ክንድ 1) አዎ 2) አይደለም	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
		10)የታችኛው ክንድ 1) አዎ 2) አይደለም 11)ታፋ 1) አዎ 2) አይደለም 12)ከጉልበት በታች 1) አዎ 2) አይደለም 13)ጀርባ 1) አዎ 2) አይደለም 14)ደረት 1) አዎ 2) አይደለም 15)ሌላ ካለ ይጠቀስ	
205	የጉዳቱ ዓይነት	1) ቁርጠት /መላጥ/ 1) አዎ 2) አይደለም 2) መቆረጥ 1) አዎ 2) አይደለም 3) ቃጠሎ 1) አዎ 2) አይደለም 4) መወጋት 1) አዎ 2) አይደለም 5) ስብራት 1) አዎ 2) አይደለም 6) ወለምታ 1) አዎ 2) አይደለም 7) ተቆርጦ መውደቅ 1) አዎ 2) አይደለም 8) በኤሌክትሪክ መያዝ 1) አዎ 2) አይደለም	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
		9) መታፈን 1) አዎ 2) አይደለም 10)የጆሮ ጉዳት 1) አዎ 2) አይደለም 11)የዓይን ጉዳት 1) አዎ 2) አይደለም 12)መመረዝ 1) አዎ 2) አይደለም 13)ሌላ ካለ ይጥቀሱ ……	
206	አደጋ የደረሰበዎት በምን ምክንያት ነው ብለው ያስባለ?	1) ለሥራው አዲስ በመሆኑ 2) ስለ ግል ሕይወት እያሰቡ ስለነበር 3) በሌላ የጤና ችግር ምክንያት 4) አደጋን መከላከል ስለማይቻል 5) የሥራው ባሕሪ ስለሆነ 6) የጉዳት መከላከያ መሣሪያ ስላልተጠቀሙ 7) የጉዳቱን ምክንያት አላስታውስም 8) ሌላ ምክንያት ካለ ይጠቀስ ……	
207	የጉዳቱ መንስኤ ምን ነበረ?	1) ማሽን 1) አዎ 2) አይደለም 2) የወደቀ ዕቃ 1) አዎ 2) አይደለም 3) ኤሌክትሪክ 1) አዎ 2) አይደለም 4) የሚፈናጠሩ ነገሮች 1) አዎ 2) አይደለም	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
		5)ከዕቃ ጋር በመጋጨት 1) አዎ 2) አይደለም 6) እሳት 1) አዎ 2) አይደለም 7) በእጅ መሣሪያዎች 1) አዎ 2) አይደለም 8) በመውደቅ 1) አዎ 2) አይደለም 9) በሞቃት ነገሮች 1) አዎ 2) አይደለም 10)በኬሚካል ነገሮች 1) አዎ 2) አይደለም 11)ክብድ ዕቃዎችን በማንሳት 1) አዎ 2) አይደለም 12)ሌላ ምክንያት ካለ ይጠቀስ ……	
208	አደጋው የተከሰተው በምን ቀን ነበረ?	1) ሰኞ 1) አዎ 2) አይደለም 2) ማክሰኞ 1) አዎ 2) አይደለም 3) ረቡዕ 1) አዎ 2) አይደለም 4) ሐሙስ 1) አዎ 2) አይደለም 5) አርብ 1) አዎ 2) አይደለም 6) ቅዳሜ 1)	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
		አዎ 2) አይደለም 7) እሁድ 1) አዎ 2) አይደለም 8) ቀኑን አላስታወስም 1) አዎ 2) አይደለም	
209	አደጋው የተከሰተበት ሰዓት	1) ጠዋት 1) አዎ 2) አይደለም 2) ከሰዓት 1) አዎ 2) አይደለም 3) በምሽት 1) አዎ 2) አይደለም 4) በሌሊት 1) አዎ 2) አይደለም 5) አላስታውስም 1) አዎ 2) አይደለም	
210	በአደጋ ምክንያት በጤና ተቋማት ወይም በቤት ተኝተው ያውቃሉ?	1) አለ 2) የለም	
211	ለጥያቄ 210 መልስዎት አዎ ከሆነ ለምን ያህል ጊዜ?	.....	
212	በአደጋ ምክንያት ከሥራ የቀሩበት ቀናት ብዛት	.....	

ክፍል ሦስት

የሥራ ቦታን በተመለከተ

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
301	በሳምንት ምን ያህል ሰዓት ይሰራሉ?	1. ከ48 ሰዓት በላይ 2. ከ48 ሰዓት በታች	
302	በሥራ ቦታዎ ላይ የጤና እና የደህንነት ቁጥጥርና ክትትል ሳይቋረጥ እየተደረገ ነው?	1) አለ 2) የለም	
303	ከሥራዎት ጋር በተገናኘ በጤንነት እና ደህንነት ዙሪያ ስልጠና ወስደው ያውቃሉ?	1) አለ 2) የለም	
304	በሥራ ላይ መቀያየር/ፈረቃ አድርገው ያውቃሉ?	1) አለ 2) የለም	
305	በተራ ቁጥር 304 መልስዎ አዎ ከሆነ በየስንት ሰዓት?	1) በየአራት ሰዓት 2) በየስምንት ሰዓት 3) በየሃያ አራት ሰዓት 4) ሌላ ካለ ይጠቀስ	
306	ከሥራ ጋር በተገናኘ ሁከት ወይም በኃይል መደፈር፣ የዕምሮ መሳት ወይም ከኃላፊ ወይም ከሌሎች ሠራተኞች ጋር ያለመስማማት ወይም ተጣልተው ያውቃሉ?	1) አለ 2) የለም	
307	በሥራ ቦታ የግል ንጽህናዎትን ለመጠበቅ በቂ እና ንፁ ውሃ	1) አለ 2) የለም	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
	ያገኛሉ?		
308	በሥራ ላይ አደጋ እንዳይደርስበዎት ለማስቻል የተመቻቸ የደረቅና ፈሳሽ ቆሻሻ ማስወገጃ ዘዴ አለ?	1) አለ 2) የለም	
309	ከሥራ ጋር በተገናኘ እርሰዎን በሚመለከት በሚደረግ ውሳኔ ለምን ያህል ጊዜ ተሳትፈው ያውቃሉ?	1) ሁል ጊዜ 2) አልፎ አልፎ 3) ተሳትፈው አያውቁም	
310	በሥራዎት ሂደት ላይ በሚደረግ ውሳኔ ለምን ያህል ጊዜ ተሳትፈው ያውቃሉ?	1) ሁል ጊዜ 2) አልፎ አልፎ 3) ተሳትፈው አያውቁም	
311	የሚሰሩት ሥራ ከቤተሰብዎ ጋር ያለውን ግኑኝነት ለምን ያህል ጊዜ አለመስማማት ወይም አለታዊ ተፅዕኖ አሳድሮ አውቃል?	1) ሁል ጊዜ 2) አልፎ አልፎ 3) አሳድሮ አያውቁም	
312	ከቤተሰብዎ ጋር ያለው ግኑኝነት በሥራዎት ላይ ለምን ያህል ጊዜ ውጥረት ወይም ጭንቀት አሳድረው ያውቃል?	1) ሁል ጊዜ 2) አልፎ አልፎ 3) አሳድሮ አያውቁም	
313	በመ/ቤትዎ ባለው	1) አለ	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
	አስተዳደር ሙሉ እምነት አለዎት?	2) የለም	
314	መ/ቤትዎ እርሰዎን በአክብሮት ያስተናግዳል?	1) አለ 2) የለም	
315	የሚሰሩት ሥራ ያለዎትን አቅምና እውቀት ሙሉ በሙሉ ተጠቅመው እንዲሰሩ ያደርጋል	1) አለ 2) የለም	
316	የሚሰሩት ሥራ ያለምንም ችግር በተሳለጠ ሁኔታ እየሄደ ነው?	1) አለ 2) የለም	
317	በሥራ ቦታዎ ያለው የደህንነት እና ጤንነት ሁኔታ ጥሩ የሚባል ነው?	1) አለ 2) የለም	
318	የሚሰሩበት ተቋም ለሠራተኛ ደህንነት እና ጤንነት ቅድሚያ ይሰጣል?	1) አለ 2) የለም	
319	የሚሰሩት ሥራ በቀጣይ አዳዲስ ዕውቀት እያገኙበት እንዲሄዱ ያደርጋል?	1) አለ 2) የለም	
320	በሥራ ቦታዎ የደረጃ ዕድገት የማግኘት ዕድል ጥሩ ነው?	1) አለ 2) የለም	
321	የደረጃ ዕድገት አሰጣጥ	1. አለ	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
	ፍትሐዊ ነው?	2. የለም	
322	ሥራዎትን የሚያከናውኑበት ሁኔታ	1) በእጅ 2) በማሽን 3) በሁለቱም	
323	ከባድ የሆኑ ቁሳቁሶችን በእጅ ማንሳት፣ ማውረድ እና ከቦታ ቦታ ማንቀሳቀስ ሥራ አለ?	1) አለ 2) የለም	
324	ለሥራ ግብዓት የሆኑ እና ምርቶች በአግባቡ አደጋ በማያስከትሉ ሁኔታ ምልክት ተደርጎባቸው ይቀመጣሉ?	1) አለ 2) የለም	
325	ሁል ጊዜ የሚሰሩ የአደጋ ሁኔታን የሚገልፁ ምልክቶች አሉ?	1) አለ 2) የለም	
326	ማሽኖች ሁል ጊዜ አደጋ እንዳያደርሱ የታጠሩ ናቸው?	1) አለ 2) የለም	
327	ማሽኖች ጥገና ሲያስፈልጋቸው በወቅቱ ይጠገናሉ?	1) አለ 2) የለም	

ክፍል አራት

የሠራተኛ የሕይወት ዘይቤን በተመለከተ

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
401	በያዙት ሥራ የቆዩበት ጊዜ ምን ያህል ነው በቀን/በወር/በዓመት	.....	
402	ስጋራ ያጨሳሉ?	1) አዎ 2) የለም →	404
403	ለጥያቄ ቁጥር 402 መልስዎ አዎ ከሆነ በሳምንት ለምን ያህል ጊዜ?	1) ሁል ጊዜ 2) 1-2 ቀናት 3) 3 ቀናት 4) 4-6 ቀናት	
404	አልኮል ይጠጣሉ?	1) አዎ 2) የለም →	406
405	ለጥያቄ ቁጥር 404 መልሰዎ አዎ ከሆነ በሳምንት ለምን ያህል ቀናት?	1) ሁል ጊዜ 2) 1-2 ቀናት 3) 3 ቀናት 4) 4-6 ቀናት	
406	ጫት ይቅማሉ?	1) አዎ	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
		2) የለም ⟶	408
407	ለጥያቄ ቁጥር 406 መልስዎ አዎ ከሆነ በሳምንት ለምን ያህል ቀን?	1) ሁል ጊዜ 2) 1-2 ቀናት 3) 3 ቀናት 4) 4-6 ቀናት	
408	በሥራ ቦታዎ ሆነው እንቅልፍ የሚያስቸግርበት ሁኔታ አለ?	1) አዎ 2) የለም ⟶	410
409	ለጥያቄ ቁጥር 408 መልስዎ አዎ ከሆነ ምክንያቱ ምንድነው ብለው ያስባሉ?	1) በቀን ከስምንት ሰዓት በላይ ያለፈረቃ መስራት 2) በማታ መስራት 3) በአንድ ጊዜ ከአንድ በላይ የሆነ ሥራ ማከናወን 4) ሌላ ካለ ቢጠቀስ	
410	በሚሰሩት ሥራ አርክተዋል?	1) አዎ 2) የለም	
411	በሥራ ላይ የሚደርሱ አደጋዎችን ለመከላከል እንዲያስችልዎት የአደጋ መከላከያ መሣሪያዎች እና ቁሳቁሶችን ይጠቀማሉ?	1) አዎ 2) የለም ⟶	412
412	ለጥያቄ ቁጥር 411 መልስዎ የለም ከሆነ ምክንያቱ ምንድር ነው?	1) ተቋሙ የአደጋ መከላከያ መሣሪያዎች እና ቁሳቁሶችን ስለማይሰጥ 2) ግንዛቤ ስለሌለኝ 3) ለሥራ ስለማይመቸኝ	

ተ/ቁ	ጥያቄዎች	አማራጭ መልሶች	እለፍ
		4) ሌላ ካለ ቢጠቀስ ……..	

Annex-III Observational checklist for the work environment

Name of industries (Code)_____

Name of the working section_____

Hazards in the working industries

1. Is there **excessive heat** in the workplace?
    a. Yes
    b. No,

Yes requires that a worker is found sweating when naked or with light clothing or if data collector or investigator feels sudden eat wave when entering to the industry.

2. Is there **excessive noise** in the workplace?
    a. Yes
    b. No,

Yes requires when that is difficult to communicate with nearby workers without shouting.

3. Is there **excessive dust** in the workplace?
    a. Yes
    b. No ,

Yes requires if the investigator experiences sudden sneezing upon entering or if worker's eye brows, hair, nostrils and close is observed to be covered with dust particles

4. Is there **warning signs** or safety rules in the workplace?
    a. Yes
    b. No ,

Yes requires no lack of such signs or posts while inspection around.

5. Do the employees use the **necessary personal protective devices**?
    a. Yes
    b. No

No requires lack of such equipment and used by each workers while inspection around.

6. Do all production **equipments have appropriate protective arrangement**?
    a. Yes
    b. No ,

Yes requires no lack of such arrangement while inspection around.

7. Does the industry have **safety and health personnel**?
    a. Yes
    b. No ,

Yes requires either implementation as result of initiatives from health and safety personnel or written action worked out with them?

8. Does the industry follow **written health and safety plan of action** in the workplaces?
    a. Yes
    b. No ,

Yes requires the completion of at least one of the measures in the plan.

9. Does the working section have **first aid equipment**?
    a. Yes
    b. No ,

Yes requires the presence of first aid equipment during data collection

Letter of Declaration

I, the undersigned, declare that this is my original work and to my knowledge, has never been in this or other university or other part of the country, and that all the recourses and materials used for thesis, have been fully acknowledged.

Name:- Zeleke Tora Wadilo (BSc)

Signature:- .....

Place Addis Ababa Ethiopia

Date Submission .....

This thesis has been submitted for examination for our approval as university advisor.

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Bilal Shekur MD, MPH ? Signature:- .....