



PREVALENCE AND RISK FACTORS OF WORK-RELATED INJURY AMONG
WORKERS IN THE CONSTRUCTION INDUSTRIES IN JIMMA TOWN, SOUTH
WESTERN ETHIOPIA

BY

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COLLEGE OF HEALTH SCIENCE, DEPARTMENT OF ENVIRONMENTAL
HEALTH, SCIENCE AND TECHNOLOGY

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ABSTRACT

Background: Safety and Health issues have always been a main problem and concern in the construction industry. Wherever reliable records are available, construction is found to be one of the most dangerous on health and safety criteria, particularly in developing countries. Despite efforts have been made to address this problem, the results have been far from satisfactory; the number of construction injuries still remains alarmingly high. In developing countries, safety rules usually do not exist; if they do, the regulatory authority is usually very weak in implementing such rules effectively. Ethiopia is one of the developing countries that are currently enjoying a strong growth in construction activities.

Objectives: this study has the aim to assess the prevalence and risk factors of work-related injuries among construction industry employees in Jimma town, and thus introduce the foundations on which appropriate health and safety systems may be raised.

Methodology: To achieve this objective an overview of published materials have been assumed. Standardized questionnaire, and Physical examination of study subjects by experienced Health Officers was done to complement self-reported information. The work environment observation was also conducted with observational checklist.

Results: The overall prevalence rate of work-related injuries in the preceding one year was 42.0%. The leading causes of injuries were injured by object (36.9%), followed by Lower back pain (35.6%), falling (23.5%), eye problem (21.5%), and skin disorder (20.1%). Totally 63(42.3%) injured respondents got medical treatment, the most, 33(22.2%) victims were severely injured, they were hospitalized for more than 24 hours, and 1197 work days were lost among 89 injured respondents in the past one year. Being male, job dissatisfaction, chewing behaviour, working without using PPE, absence of vocational training, lack of supervision, and working overtime were found to raise the odds of having work- related injuries among construction workers.

Conclusion: The study revealed that work-related injuries were common among construction employees. Therefore, counter measures such as turn out awareness of risk factors, avoiding overtime work, providing training, supervision and personal protective equipment could be effective to decrease prevalence of work-related injuries.

Key words: Construction industry, work-related injury, Risk-factors, Health and Safety, and PPE.

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ABBREVIATIONS

AOR	Adjusted Odds Ratio
AS	Australian Standard
CI	Confidence Interval
COR	Crud Odds Ratio
CPWR	Center for Construction Research and Training
DEHP	Department of Environmental Heritage protection
ILO	International Labor Organization
ISO	International Organization for Standardization
LBP	lower back pain
LSA	Labor and Social Affairs
MOH	Ministry Of Health
MSDs	muskloskeletal disorders
OEL	Occupational Exposure Level
OR	Odds Ratio
OSHA	Occupational Safety and Health Administration
PPE	Personal protective equipment
SPSS	Statistical Software Package for Social Science
SRS	systematic random sampling
USA	United State of America

CHAPTER ONE: INTRODUCTION

1.1. BACKGROUND

Building and civil engineering are the two broad categories of construction projects (Alazab, 2004). Building applies to projects involving houses, offices, shops, factories, schools, hospitals, power plants, railway stations, and so on. Civil engineering applies to all the other built structures in our environment, including roads, tunnels, bridges, railways, dams, canals, and docks (Mo and Lu, 2008; Proffitt and Beacham, 2012). In addition some projects will comprises both types of construction activities (Alazab, 2004; Zheng et al., 2010). Both the civil and building workers are bare to physical, chemical, biological, psychosocial and the ergonomically hazard which makes more dangerous to the various health problems, such as eyes, skin, respiratory, hearing loss, digestive problems and musculo-skeletal disorders, (Adane et al., 2013; Tadesse and Israel, 2016; Alazab 2004; Saarela, 2006).

Worldwide over 1.1 million people die of occupational injuries and work-related diseases every year (Demba, 2013; Yiha and Kumie, 2010; Diseases, 2013; Bharara, Sandhu, and Sidhu, 2012; Tekele, 2002). In developing countries, the risks that foster ill health are estimated to be 20 times higher than in developed countries (Saarela, 2006; Demba, 2013). Among this figure the construction industry contribute large number of injuries and deaths. Globally, 17 % of all work-related fatalities are in the construction sector (Bharara, Sandhu, and Sidhu, 2012; Proffitt and Beacham, 2012; Balaji and Kothai, 2014). So that, construction work environment is generally more hazardous than most other work environments due to the use of heavy equipment, dangerous tools, hazardous materials, its structural and organizational challenges for risk management and rapidly changing work conditions (Adane et al., 2013; Lopez and Gilkey, 2014).

It is also the emergent industry of the world, include 7.5% of the total work force and it contributes major economic activity next to agriculture, because the socio-economic and infrastructure development goals are achieved only by the involvement of construction industry. So 44% of urban unorganized workers are involved in the construction work after agriculture (Balaji and Kothai, 2014). It currently shows increasing trends, not only in terms of volumes of work done, but also in terms of the complexity of construction projects. Today many cities in the world have been transformed from what they used to be in the early 1990s due to ongoing improvements to road infrastructure, power lines, telecommunication systems and multi-store buildings etc. (Abdeljalil

El Kholti, 2014). Thus, construction is often classified as a high-risk industry as it has historically been plagued with much higher and unacceptable injury rates compared to other industries. So that, Accidents at construction sites are identified as a major public health and development problem throughout the world (Zheng et al., 2010; Moradinazar et al., 2013; Yiha and Kumie, 2010; Adane et al., 2013).

The results of 19 years of research in the United States of America showed about 11.5% of work related injuries among construction workers and 7.2% among other industrial workers (Hardeep et al., 2008). Therefore, in developing countries like Ethiopia, the construction activities are carried out by low income laborers, illiterate, unskilled, and unorganized workers by cheap payment in unsafe work environment and absence of implementation of occupational health and safety laws will face high injuries (Mo and Lu, 2008). In Egypt, about 13 per cent of work-related deaths and 18 per cent of occupational injuries were recorded among workers in the construction industry, (Alazab, 2004). In Ethiopia, little work has been done on occupational health and safety aspects especially on construction workers.

The prevalence rate of work-related injuries among construction workers in Gondar was identified 38.7% (Adane et al., 2013). However, the construction industry remains the high risk industry especially in developing countries. Still the health and safety problems of construction industry were not reduced even different work have done (Balaji and Kothai, 2014).

This study will be designed to show the prevalence and risk factors of work- related injuries among construction workers in Jimma town.

1.2. STATEMENT OF THE PROBLEM

1.2.1. Global Burden of Work- related Injury

Work-related injuries are the most significant cause of work absence, disability, retirement, mutilation, and even mortality, (Halvani et al., 2012; Proffitt and Beacham, 2012). Global estimates by ILO show that the work-related problems are bigger than earlier believed. So that, it is epidemic problem in the field of public health in developing countries, (Moradinazar et al., 2013). A study from US has shown that between 33% and 69% of all occupational injuries were missed of the reported injuries,(Saarela, 2006). Especially, figures of occupational fatal and non-fatal accidents in developing countries were greatly underestimated (Moradinazar et al., 2013). In china, Injuries are the fourth leading cause of death next to malignant tumors, cardiovascular diseases and diseases of respiratory system. It is estimated that total number of deaths from injuries in China will reach 1,400,000 by 2010 and 2,500,000 by 2050, (Zheng et al., 2010).

In Sub-Saharan Africa countries slightly more than 54 000 fatal work-related accidents happen annually(Demba, 2013; Saarela, 2006). Approximately 42 million work-related accidents took place that cause at least 3 days absence from work. The fatality rate of the region is 21 per 100000 workers and the accident rate per 100000 workers is 16000 (Saarela, 2006).

The construction workers are 3 times to be killed and 2 times more to be injured than other fields (Adane et al., 2013).

1.2.2. Characteristics of construction industry

A). Majority of construction workers are unskilled, illiteracy and low income

Occupational hazards among workers are high due to lack of skill, illiteracy, poverty, lack of proper training and information on dangers and risks at the work place and other related factors (Adane et al., 2013; Hardeep et al., 2008).

B). Most of the construction workers are unorganized workers

Unorganized workers do not receive sufficient attention from the trade unions. There is no formal employer – employee relationship. So that, work- related injuries and deaths are higher in unorganized workers than highly skilled and organized workers.

Globally 340 million of the workforce roughly 92% of workers is engaged in the unorganized sector, of which, around half of them are from the construction industry.

In India, according to the National Sample Survey Organization survey report 2004-2005, total employment in the country was 45.9 %. Out of this about 2.6 % were in the organized sector remaining of 43.3 % are in unorganized category.

According to the International Labor Organization the national average of serious injury rate in unorganized sector is higher than that of organized sector (Balaji and Kothai, 2014).

C).The construction industry is mobile industry

The construction workers move from site to site. The laborers working in harsh circumstances and living in unhygienic conditions suffer from serious occupational health problems and made them more vulnerable to injuries and diseases than other industrial workers,(Lopez and Gilkey, 2014).

D).The construction industry involves different jobs or hazards

The construction industry involves many other types of work apart from the building process, such as painting, landscaping, machine oprating, welding, plastering, and paving etc. All these types of work make up one industry, but each of them contains dissimilar exposures which responsible for different health hazards (Alazab, 2004). It comprises a serious of occupational risks, such as work at heights (use of scaffolding, gangways and ladders), excavation work (use of explosives, earth moving machines), lifting of materials (use of cranes, hoists), painting (use of different chemicals), welding (use of electric power) and so on, which are specific to the sector (Adane et al., 2013; Hardeep et al., 2008).

e. Lack of attention, poor implementation of law and incomplete reporting system

In developing countries especially in health, and safety aspects rules usually do not exist; if they do, the regulatory authority is usually very weak in implementing such rules effectively, have got little attention. Even there is no correct fatal and non-fatal accident report. The law is soft, the responsible body gives less attention to safety issues like supervision, training, provision of PPE, medication, compensation etc, (Saarela, 2006; Adane et al., 2013).

1.3. SIGNIFICANT OF THE STUDY

Currently in developing Countries, like Ethiopia the construction industries become highly expanded for the purpose of economic growth without considering safety and health of workers that cause work-related injuries and deaths such as falling, injured by object, lower back pain, eye problem, skin disorders and so on. Identifying those factors affecting work-related injury is very important for planning relevant health and safety services. Because the scientific evidence to what factors affecting construction workers health and safty in the study area was not found, it is the question of interest, to identify the factors that associated with occurrence of injuries among construction workers in the study area. Therefore the study on work-related injuries among construction workers will be useful in the development of injury prevention strategy; initiates workers as they use safety rules and protective devices at work, and also give evidence for policy makers as those protective devices are essential for workers, and improve the engineering of industrial environment and to develop appropriate admenstrative method by considering health and safty of employees, so that work- related injuries among workers will be reduced.

1.4. CONCEPTUAL FRAMEWORK OF THE STUDY

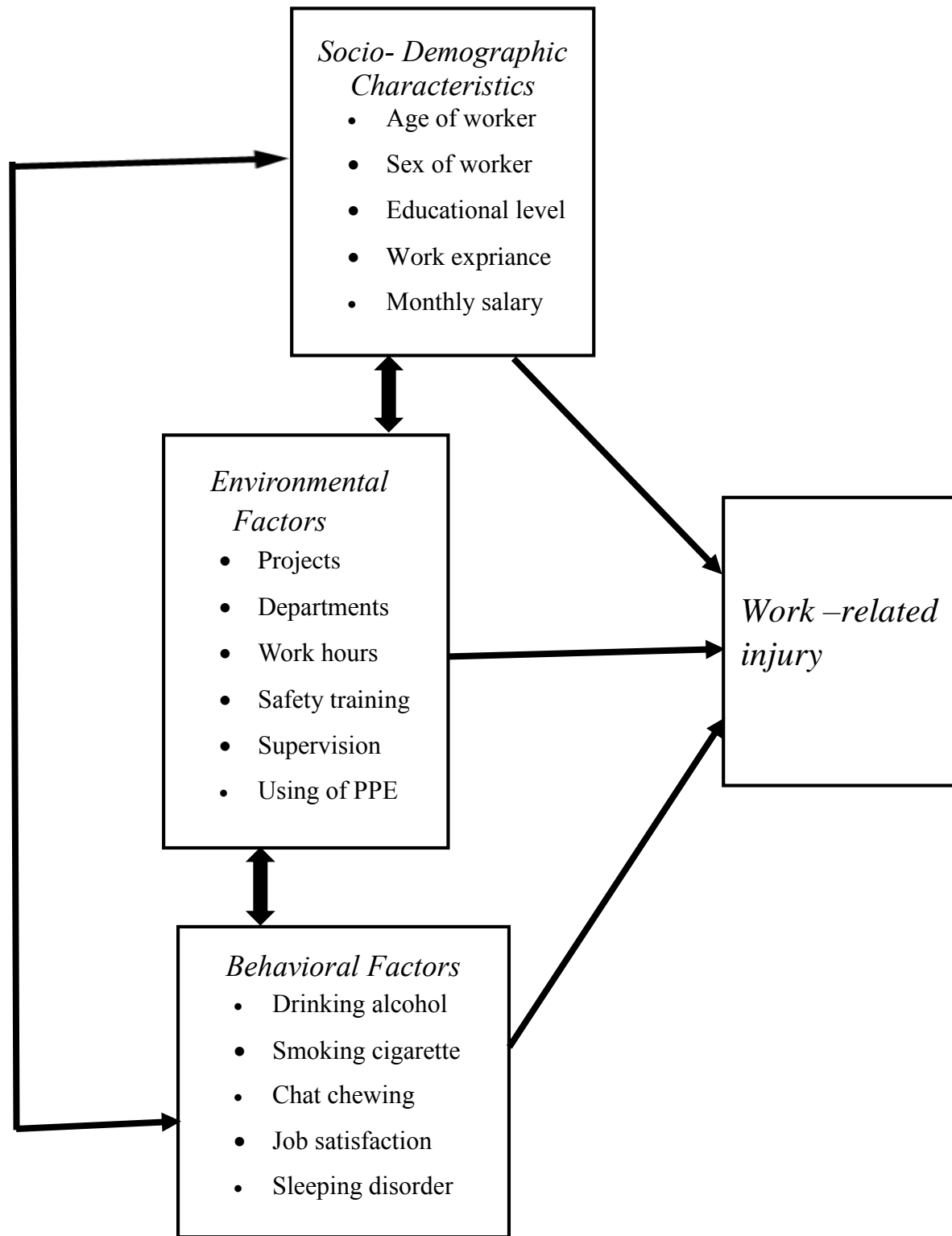


Figure 1. Shows schematic presentation of conceptual framework, Jimma town, 2016

CHAPTER TWO: LITERATURE REVIEW

2.1. Work- related injuries

2.1.1. *Falling and injured by objects:*

The exact figure of fatal accidents in the construction occupation and their percentage contribution to all occupational fatal accidents is not known (Saarela, 2006). However, in Argentina (16.1%), USA (19%), Spain (25%), France (26%), and Japan (40%), of the fatalities were reported in the construction sector. Injuries are one of the emerging public health problems in China 700,000 deaths with a death rate of 65.2 per 100,000 population each year (Kines, 2002; Adane et al., 2013). The overall injury prevalence in china was 15.0 per 100 workers (95% CI: 13.0–17.0). falls (15.5%), and falling objects (13.0%), (Zheng et al., 2010). In Ethiopia 50% of the male and 48.5% of the female workers reported accidental injuries. These accounts falling injuries (11%) and injured by sharp object (14%) (Adane et al., 2013; Hardeep et al., 2008). The major accidental injuries reported among workers were either falling from a height, falling from same level, injured by falling objects and sharp objects. The injuries from falling, objects or instruments are depended on nature of work, lack of personal protective equipment, inattention, lack of safety training. 51.2% of the disabling injuries were caused by human factors. These human factors derive from lack of safety measures at the workplace, lack of health education, lack of attention, and the absence of personal protective devices (Alazab, 2004; Zheng et al., 2010; Saarela, 2006; Moradinazar et al., 2013; Kines, 2002). According to the recent study done in Ethiopian fall injuries constitute about 37.4 % among the total injuries. Fall from the same level 21.3% and from high 16.1% (Adane et al. 2013).

2.1.2. *Eye problem:*

Many different paint chemicals, varnishing, dust particles, and welding fumes at construction sites may affect the eyes of painters and welders. Besides, unknowing contact of the eyes with dusty hands during work, and mechanical injury during the breaking of stones and with movable object or tool eye disorders may occurred. Painters, and welders have an elevated risk of eye injury (Way, 2001; Peate, 2007). Another study in Ethiopia 16% (Hardeep et al., 2008), and in Egypt, about 23.6% of the workers showed the prevalence of eye complaints like conjunctivitis and foreign bodies in the eyes (Alazab, 2004). In Gahanna eye irritation and itching accounts 11.3% (Ovenseri-ogbomo et al., 2012).

2.1.3. Skin disorders:

Skin disorders are also known as occupational dermatoses, because it is primarily caused by work (Rycroft and Frosch, 2006; Zorba et al., 2013). When we compare with other occupational problems, skin disorders are more often exist, quickly happened disease, cause or worse by work, and easily diagnosed work-related disease. The type of eczema caused by contact with substances is called contact dermatitis (Finlan, 2014). Being work-related contact dermatitis responsible for 80% of the cases (Zorba et al., 2013). It includes irritant contact dermatitis (70–80%), and allergic contact dermatitis (20–25%) (Walls and Duckett, 2012; Zorba et al., 2013). One study in Ethiopia shows the prevalence of skin disorder 15%. It includes over 84.5% percent of the female and 62.5% of the male workers had skin problems (Hardeep et al., 2008). This may be due to chromium hypersensitivity, out of the total chromium concentration in cement, 50-80% of chromium is in hexavalent form (Sun and Chu, 2006; Mirabelli et al., 2012; Hardeep et al., 2008). Which can lead to both contact allergic and contact irritant dermatitis. Irritant dermatitis occurs in the form of cement burn, while contact allergic dermatitis presents in the form of eczematous lesion. The cement burn usually develops on the legs and/or feet following prolonged contact with wet cement inside boots. Contact allergic dermatitis usually appears on the skin of workers' hands and fingers. Among painters, chemicals can be an aggravating factor of dermatitis and its primary symptoms of contact dermatitis including dryness, redness, itching, swelling, flaking, cracking and blistering, and it can be very painful. 3.7% of the Egyptian construction workers had dermatitis (Alazab, 2004). Out of the total studied, 1473 cases of occupational skin diseases in Germany in 1990, about 16% of were among construction workers (Hardeep et al., 2008).

2.1.4. Lower back pain:

In Ethiopia the prevalence of MSDs was 14%, 81.8% of the female workers, and 54.17% of the male workers were reported to have back pain problems (Hardeep et al., 2008). In Egypt (13.9%) of construction workers reported to have musculoskeletal disorders (Alazab, 2004). In Sweden 72% of construction workers reported to have lower back pain while 52% had knee problems and 37% neck-shoulder pains (Hardeep et al., 2008). In Hungary, musculoskeletal disorders were observed in workers involved in construction apprentice (Alazab, 2004). Occupational exposures such as lifting, Repetitive motions of different body parts, forceful movements, awkward postures, whole-body vibration and perhaps psychosocial stressors cause lower back pain. It was identified

by the Pan American Health Organization as one of the top three occupational health problems to be targeted by surveillance within the WHO Region of the Americas (Punnett et al., 2005).

2.1.5. Respiratory diseases:

The construction industry is dusty due to demolition work, stone cutting, drilling, welding, wood work, cement mixing, and other activities going on simultaneously. The prevalence of respiratory disease in Ethiopia was 5%, 22.9% of the male and 27.30% of the female workers complained about difficulty in breathing (Hardeep et al., 2008). However, similar study in Egypt reported 15% of the prevalence (Alazab, 2004). It could be attributed to prolonged exposure to dust without the use of personal protective equipment. Cumulative exposures to asbestos, welding/cutting, silica, cement dusts, demolitions, and some tasks resulting in exposures to different dusts, and chemicals were associated with the risk of airway obstruction (Welch, 2014; Bureau and Bls, 2013; Dement et al., 2015). Dust was also identified as potential exposure for excavations or demolitions workers (Alazab, 2004).

2.1.6. Hearing problem:

In Ethiopia 46% of the workers felt irritation and about 67% reported to have headaches which could be due to noise pollution (Hardeep et al., 2008). Research shows that 38% of the workers in the Dutch construction industry complains about noise and that 17% of the workers complains about their hearing ability(Mcdonald, Chen, and Cherry, 2000).

2.2. Factors associated with work related injuries among construction workers

2.2.1. Socio- demographic factors

Age: in Gondar a study revealed that Workers above ≥ 45 years in age were 3.16 times more likely to be injured than workers found in the age group between 14–29 [AOR: 3.16, 95% CI: (1.03, 9.64)] however, no statistically significant association was found between workers in the age range of 14-29 and 30-44 years [AOR: 1.47, 95% CI: (0.82, 2.63)] (Adane et al., 2013).

In 2010, workers aged 45 years and older accounted for about 74.3 percent of fatalities. Young workers (those under 25) accounted for 5.9 percent of fatalities and workers aged 25 to 44 accounted for 19.9 percent of the fatalities(Health, 2015).

Sex: Occupational injuries were significantly associated with workers gender i.e. males were 2.01 times [AOR: 2.01, 95% CI: (1.20, 3.37)] more likely to experience injury than females (Adane et al., 2013). Another study in Ethiopia revealed 50% of the male and 48.5% of the female workers

reported accidental injuries ranging from serious (20.83% male, 18.20% female), medium injuries (12.50% male; 6.10 female) to slight injuries (16.67% male; 24.20 female (Hardeep et al., 2008).

Educational level: most construction sites employ low education, unskilled, and inexperienced male farmers who migrate to cities to seek better employment opportunities. It provided income for uneducated person. In China from 1260 male construction workers the most (65%) had completed grade 9 school (Zheng et al., 2010).

Work experience: Work experience of the worker was also significantly associated with occupational injuries. Workers who had 5 years and less working experience were less likely injured compared to those who had 6 years & above working experience [OR: 0.70, 95% CI: (0.50-0.98)](Yiha and Kumie, 2010).

2.2.2. Environmental factors

Construction project: the magnitude of work related injury might be affected by many factors, such as type of constructions, good communication, resource availability, quality of management, and provision of health, and safety services, compliance, and so on. (Zheng et al., 2010).

Work department: in the construction industry different work categories generate different hazards. The health and safety services, type of PPE, training, exposure time, and so on depends on work category, due to dissimilar exposure among departments. Painters, excavation, and plasterers exposed for different chemicals, and dust. Daily laborers are high risk of LBP, paving, and painters are risky for eye injury, masonry are highly affected with skin disorders etc,(Hardeep et al., 2008; Alazab, 2004; Adane et al., 2013).

Working hours: had significant association with injuries. Working > 8 hours/day raised the odds of Occupational injury by 14.06 folds compared to those who worked for 8 hours/day [AOR: 14.06, 95% CI: (5.67, 34.86)] (Adane et al., 2013). The reason could be explained by the fact that,daily occupational exposure limit, fatigue associated with long hours of work that may increases the likelihood of work related injuries, and that exceptionally long hours may also result in injuries associated with breaching physical endurance limits (Mariammal, Jaisheeba, and Sornaraj, 2012; Yiha and Kumie, 2010; Tadesse and Israel, 2016).

Safety training: Injury prevention and safety education included basic construction safety, machine operation safety, high working place safety, and electrical safety. According to the safety training requirements released in 2006 by the state administration of work safety, construction workers are

required to receive at least 32 hr of safety training before they first begin to work in construction industry and at least 8 hr of safety training annually afterward (Zheng et al., 2010; Yiha and Kumie, 2010; Proffitt and Beacham, 2012; Halvani et al., 2012). The training is usually organized by the construction company and conducted by a certified safety specialist. In china prevalence of injury among no safety education (16.2 per 100 workers) (Zheng et al., 2010).

The lack of safety training increased risk of injury OR 3.56 (CI 1.34-9.49) (Lopez and Gilkey, 2014). Workers who did not undergo vocational training were 2.37 times more likely to have injury than those who underwent vocational training [AOR: 2.37, 95% CI: (1.08, 5.22)] (Adane et al., 2013).

The most important is the variability typical of construction processes, which could eventually lead to changes in risk exposure conditions. The scientific literature concerning injuries at the workplace points out how different risks characterize the various types of work. Construction sites are, by definition, temporary places of work, where several firms are present at the same time to undertake work for short periods. On average, trained workers were present at construction sites for 10 months, while a systematic training program could have a greater impact if measured in the long term (Bena et al., 2009; Health, 2015; Adane et al., 2013).

Regular workplace supervision: it is also significantly decreased the occurrence of injuries (Takele and Kumie, 2001; Proffitt and Beacham, 2012; Dong and Wang, 2010).

PPEs: the last measure in the hierarchy of hazard control that works because it depends on workers' behavior (Tadesse and Israel, 2016; Kines, 2002; Johnstone, 2006). PPEs are designed to protect against health hazards and accidents. The construction regulation broadly requires that such protective clothing, equipment, or devices be worn "as are necessary to protect the worker against the hazards to which the worker may be exposed". However, Lack of provision of PPEs from the employer and some of the workers didn't know the importance of different PPEs in prevention and control of exposure to different occupational hazards and injuries in construction site were identified in Ethiopia (Adane et al., 2013; Tadesse and Israel, 2016; Takele and Kumie, 2001; Tekele,2002).

2.2.3. Behavioral factors

Alcohol drinking: Several studies found large, positive effects of self-reported alcohol use on occupational injuries, examined the relationship between alcohol use and work-related injuries among Colorado farm residents between 1993 and 1995. Drinking had a significant effect on

reporting a work-related injury: Those who drank alcohol on average three or more times per week had about 3.2 injuries per 10,000 person-work-days, compared with 1.9 injuries per 10,000 person-work-days for non drinkers, representing a 70-percent increase in risk (Zheng et al., 2010; Hf et al., 2012; Bena et al., 2009).

Smokers: The highest morbidity of 23.11% at the construction site was due to acute febrile illness and tobacco consumption of workers. Alcohol drinking and cigarette smoking are also common among construction workers in China. Crude injury prevalence was significantly higher among workers who had the highest cigarette pack-year index (26.0 per 100 workers), (Zheng et al., 2010).

Chat chewing: The odds of injuries among employees who chewed chat were about three times more compared to those who did not 2.6, 95%CI: (1.6, 4.2). This might be due to the fact that abuse of mind altering substances, like chat is likely to cause a change in the behavior and impair workers concentration and performance. A high blood level of such substances while at work will endanger both safety and efficiency,(Tadesse and Israel, 2016).

Job satisfaction: were 45% less likely to face injury compared to their counter parts [AOR: 0.55, 95% CI: (0.34, 0.90)]. Job satisfaction showed statistically significant association with work-related injury; construction workers who reported current job satisfaction were 45% less likely to face injury compared to their counter parts [AOR: 0.55, 95% CI: (0.34, 0.90)] (Adane et al., 2013).

Sleep disorders: is also common risk factors of work-related injuries. These risk factors were also consistent with another studies, (Takele Tadesse and Kumie 2001; Yiha and Kumie 2010).

CHAPTER THREE: OBJECTIVES OF THE STUDY

3.1 General objective

- To assess the prevalence and risk factors of work-related injuries among workers in the construction industry in Jimma town, Southwestern Ethiopia, 2016

3.2. Specific objectives

- ❖ To determine prevalence of work-related injuries among construction industry workers in Jimma town, Southwestern Ethiopia, 2016
- ❖ To identify factors associated with work-related injuries within construction industry workers in Jimma town, Southwestern Ethiopia, 2016

CHAPTER FOUR: METHODS AND MATERIALS

4.1. Study area

The study area is Jimma town, located 355 km South West of the capital city of Addis Ababa with an area of 4,623 hectare. It is situated between 7.67 degree latitude and 36.83 degree longitude at an altitude of about 1725 m above the mean sea level with most humid temperate. The town, with a population of 184,125, has 17 kebeles (13 urban and 4 rural kebeles), 3 hospital (1 referral, 1 zonal and 1 military), 4 health centers, 4 NGO health facilities, 30 private clinics, 3 health posts, one university, and an airport.

Currently Jimma town has 10 licensed construction industries with a total of 3167 employees. The construction industry includes many types of work like building processes, civil engineering, painting, landscaping, electrical supplies, telecommunications, plastering and paving. Due to economic constraints, the study will be limited to the construction activities such as painting, plastering, mason, welding, excavation, daily laborer, driver (operator) and other similar activities under the construction industry based on the objective of the study.

4.2. Period

The study was carried out from March 7-15/2016 in Jimma town, South West Ethiopia.

4.3. Study design

Institutional based cross-sectional study design was conducted.

4.4. Population

4.4.1. Source population

The source population were all workers who have been working in licensed construction industries found in Jimma town in the year 2016.

4.4.2. Study population

The study population were those workers who have been working in randomly selected 5 industries.

4.4.3. Study unit

Those randomly selected individual worker from the study population.

4.5. Inclusion and exclusion criteria

4.5.1. Inclusion criteria

All workers who works one month and above in the construction industries in Jimma town.

4.5.2. Exclusion criteria

Administrative workers were not included in the study because they were not considered exposed. And workers less than one month expriance in the construction industry were excluded from the study.

4.6. Sample size determination

The required sample size was determined by using single population proportion formula(Adane et al. 2013).

$$n = \frac{(Z_{\alpha/2})^2 * p(1-p)}{d^2} = \frac{(1.96)^2 * 0.387(1-0.387)}{(0.05)^2}$$

$$n = 365$$

Where:

n - Sample size

$Z_{\alpha/2}$ - value at $\alpha = 0.05$ or critical value for normal distribution at 95% C.I (1.96),

P- Proportion (taken from study in Gondar town [Adane et al, 2008]) and

d - Tolerable margin of error

Correction formula was used since the total population is less than 10,000.

$$n_f = \frac{n_i}{1 + n_i/N} = \frac{365}{1 + 365/3167} = 327$$

$$n_f = 327 + 10 \% \text{ (non-response rate)}$$

$$n_f = 360$$

4.7. Sampling techniques and Procedures

Multi-stage sampling technique was used to select the study participants. From 10 licensed construction industries in Jimma town 5 industries (50%) were selected by lottery method (Sambo and Chatora, 2003). Then, the selected sample size was proportionally allocated to the number of workers. Based on the objective the building industries were first stratified in to seven departments, namely excavation work, daily laborer, mason, plasterer, welder, painter, and driving/Operators. Then the appropriate sample of workers from each stratum were determined by using proportional allocation formula. Finally, simple random sampling technique was employed to select determine sample sizes from the strata.

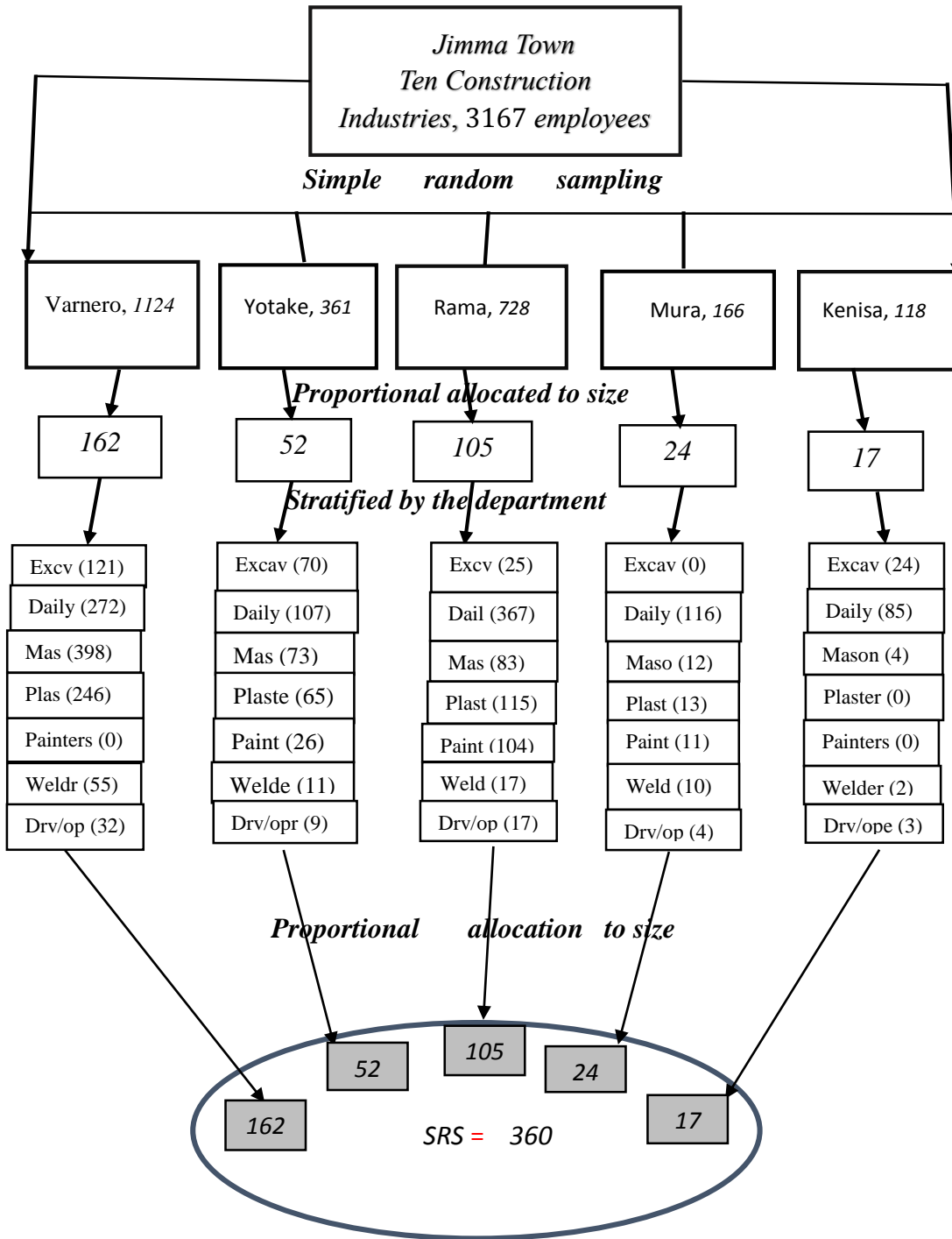


Figure 2. Shows Schematic presentation of sampling procedure, Jimma, 2016

4.8. Data collection instrument and procedures

A standardize questionnaire was adapted by reviewing different literatures based on the study objectives(Walls and Duckett, 2012; Kurpiewska and Padlewska, 2011; Finlan, 2014).The questioner was developed in English and translation to Amharic and Affan Oromo languages by language experts. Then face to face interview was conducted by trained data collectors who speak Amharic and Affan Oromo languages.

Detailed information about the socio-demographic, behavioral characteristics, work environment, work history, personal history, psychological questions, awareness and practice towards safety and health in the work place among construction workers and occurrences of injuries in the preceding one year was collected. Physical examination of study subjects by experienced five health officers was done to complement self-reported information. The work environment observation was also conducted with observational checklist.

4.9. Variables

4.9.1. *Dependent variable*

- Work related Injury

4.9.2. *Independent variables*

- Socio-demographic characteristics

- ❖ Age the worker
- ❖ Sex of the worker
- ❖ Educational level
- ❖ Work experience
- ❖ Monthly salary

- Behavioral factors

- ✚ Drinking alcohol
- ✚ Smoking cigarette
- ✚ Chewing Chat
- ✚ Job satisfaction
- ✚ Sleeping disorder

- Environmental factors
 - Projects
 - Work category
 - Work hours per day
 - Health and Safety training
 - Work- place supervision
 - Use of PPE

4.10. Operational definitions

Alcohol drinker: an employee who drinks at least five drinks per week for men and two drinks per week for women for at least 1 year (Tadesse and Israel, 2016).

Chat chewer: An employee chewing chat (a mild psychoactive substance) three times a week for at least 1 year, (Tadesse and Israel, 2016).

Cigarette smoker: an employee who was smoking one cigarette a day for at least 1 year, (Tadesse and Israel, 2016).

Excessive noise: noise that makes it difficult to communicate among neighbor workers without shouting at a distance of about one meter, (Yiha and Kumie, 2010).

Job satisfaction: The employee was considered as satisfied with job when his/her sum of generic job satisfaction scale score was 32 or above. The workers were asked six yes/no, and multiple questions from sixty,(Tadesse and Israel, 2016).

Low back pain (LBP): was defined as any “non-traumatic musculoskeletal disorder affecting the low back.” It included all back pain, regardless of diagnosis, that was not secondary to another disease or injury cause (e.g., cancer or motor vehicle accident). It included lumbar disk problems (displacement, rupture) and sciatica but excluded cervical spine problems, such as neck pain or neck twisting problems,(Punnett et al., 2005).

Personal Protective Equipment (PPE): Utilization of the worker- specialized clothing or equipment worn by employees for protection against health and safety hazards at the time of visit or interview. Personal protective equipment is designed to protect many parts of the body, i.e., eyes, head, face, hands, feet, and ears (Tadesse and Israel, 2016).

Severity of injury: characterized by hospitalization more than 24 hours and absence from work over three days in the last one year (Takele and Kumie, 2001).

Work related injury: for the purpose of this study was defined as any personal injury or disease in the course of work like falling, injured by object, lower back pain, skin disorders, eye problem, breathing difficulty and hearing problem, resulting from an accident or long term exposure to occupational hazard (Tadesse and Israel, 2016). And it was measured by dichotomous response (yes/no).

4.11. Data collection process and quality management

Data quality was assured with careful design of tools, translation and retranslation of tools, training of data collectors and supervisors, pre-test of the questioner. The questionnaire was prepared originally in English and translated to Amharic and Affan Oromo languages and back to English with another translator to keep the consistency of the questioners. Five nurses and two environmental health professionals who can speak Amharic and Affan Oromo languages were elected for data collector and supervisor respectively. Then data collectors and supervisors were trained one day about the questioner and how to administer it. The questionnaire was pre-tested on 18 workers before data collection to check consistency; correction was taken by identifying potential problem areas and logistic plan for data collection was done. After completing each interview data collectors check completeness of questionnaire. During data collection, the supervisors supervise for its completeness on daily basis and feedback was given to each data collectors.

The investigator observed the work environment by using observational checklist adapted from different literatures.

Before data collection the workers were told about the aim of the study and they were informed that the data used only for scientific purposes. Then verbal consent was asked.

4.12. Data analysis and interpretation

The data was entered to EPI data 3.1 then was exported to SPSS version 20 statistical package for analysis. Frequency distribution, mean and percentage calculation were made to describe socio-demographic characteristics and to determine the magnitude of occupational injuries. Logistic

regression analysis was also made to see the relative effects of independent variables on the dependent variable (work-related injuries). So that, bivariate and multivariate logistic regressions analysis with 95%CI were performed. First, crude odds ratios (CORs) and 95% confidence intervals (CIs) of each factor was done by using bivariate logistic regression. Then, Variables with P-value less than 0.25 in the bivariate analysis were selected for multivariate analysis. Then variables P-value of less than 0.05 in multivariate analysis were taken as significance and included in the final model. Finally, the outcomes were presented with adjusted odds ratio (AOR) and 95% confidence interval (CI).

4.13. Ethical clearance

Administrative approval was obtained before conducting the study and ethical considerations was respected. Ethical clearance letter was obtained from Jimma university ethical clearance committee then letter of support from department of environmental health, science and technology. Support letter was taken for construction industries responsible persons and other concerned bodies in Oromia region, Jimma town. Informed consent was obtained from each interviewee and they were also given the choice to refuse to participate in the study.

4.14. Plan for Dissemination of the result

The result will be disseminated to Jimma University department of Environmental Health Sciences and Technology, Jimma town labor and social affairs (LSA) office and other stakeholders through publication, workshop, seminar and other relevant mass media. It will be published on National or international journals to other researchers to share recommendations.

CHAPTER FIVE: RESULT

5.1. Socio-demographic characteristics

From the total sample size of 360 workers to be studied, 5 workers refused to participate that made response rate of 98.6%. From this figure the majority, 266(74.9%) were male, and 89(25.1%) were female. The age of the respondents' range from 14–70 years with a mean (\pm standard deviation) age of 26.36 ± 9.411 years. Majority 253(71.5%) of the workers were in the age group of 14–29 years followed by 30-44 years (19.4%) and 45-70 years (9.1%), respectively. Two hundred twenty eight respondents (64.2%) identified themselves as Christians, followed by 127(35.8%) of Muslim. Most respondents, 203(57.2%), were Oromo by ethnicity. One hundred fourty four (40.6%) respondents were married, 198(55.8%) single, 11(3.1%) divorced and 2(0.6%) were widowed. Regarding educational level, 34(9.6%) were illiterate, 15(4.2%) able to read and write only, 162(45.6%) primary education (1-8 grade), and 144(40.6%) were secondary education and above. Two hundred thirty eight (67.0%) respondents had five years and bellow service duration and 117(33.0%) were with above five years of working experience. Most, 212(59.7%), respondents had monthly payment of Birr < 2000.00 . Table1 summarizes the socio demographic characteristics of the study participants.

Table 1. Socio-demographic characteristics of participants, JimmaTown, 2016

Characteristics	Projects					
	Varnero (n=159)	Youtake (n=52)	Rama (n=103)	kenisa (n=17)	Mura (n=24)	Total (n=355)
	<i>Numr (%)</i>	<i>Numr (%)</i>	<i>Numr (%)</i>	<i>Numr (%)</i>	<i>Numr (%)</i>	<i>Numr (%)</i>
<i>Age</i>						
14 -29	115(72.3)	42(80.8)	71(68.9)	13(76.5)	12(50.0)	253(71.5)
30-44	34(21.4)	6(11.5)	19(18.5)	3(17.6)	8(33.3)	70(19.4)
>45	10(6.3)	4(7.7)	13(12.6)	1(5.9)	4(16.7)	32(9.1)
<i>Sex</i>						
Male	128(80.5)	36(69.2)	78(75.7)	11(64.7)	13(54.2)	266(74.9)
Female	31(19.5)	16(30.8)	25(24.3)	6(35.3)	11(45.8)	89(25.1)
<i>Marital status</i>						
married	67(42.1)	22(42.3)	31(30.1)	9(52.9)	15(62.5)	144(40.6)
single	86(54.1)	27(51.9)	69(66.9)	7(41.2)	9(37.5)	198(55.8)
Divorce	5(3.1)	3(5.8)	2(1.9)	1(5.9)	0(0.0)	11(3.1)
Widow	1(0.7)	0(0.0)	1(1.1)	0(0.0)	0(0.0)	2(0.6)
<i>Religion</i>						
Protestant	57(35.8)	7(13.5)	4(3.9)	1(5.9)	3(12.5)	72(20.3)
Orthodox	70(44.0)	35(67.3)	29(28.2)	11(64.7)	8(33.3)	153(43.1)
Muslim	31(19.5)	10(19.2)	69(66.9)	4(23.5)	13(54.2)	127(35.8)
Others	1(0.7)	0(0.0)	1(0.9)	1(5.9)	0(0.0)	3(0.8)
<i>Ethnicity</i>						
Oromo	99(62.3)	14(26.9)	73(70.9)	7(41.2)	10(41.7)	203(57.2)
Amhara	35(22.0)	17(32.7)	2(1.9)	2(11.8)	0(0.0)	56(15.8)
SNNP	23(14.5)	20(38.5)	26(25.2)	7(41.2)	13(54.2)	89(25.1)
Others	2(1.3)	1(1.9)	2(1.9)	1(5.9)	1(4.2)	7(2.0)
<i>Educational level</i>						
Illiterate	12(7.5)	5(9.6)	10(9.7)	2(11.8)	5(20.8)	34(9.6)
Read and write	5(3.1)	2(3.8)	4(3.9)	1(5.9)	3(12.5)	15(4.2)
Primery(1-8)	60(37.7)	35(67.3)	48(46.6)	10(58.8)	9(37.5)	162(45.6)
Secondary and above	82(51.6)	10(19.2)	41(39.8)	4(23.5)	7(29.2)	144(40.6)
<i>Working expriance</i>						
<1 yr	62(38.9)	20(38.5)	54(52.4)	6(35.3)	10(41.7)	152(42.8)
1-5yrs	36(22.6)	11(21.2)	22(21.4)	6(35.3)	10(41.7)	86(24.2)
>5yrs	61(38.4)	21(40.3)	27(26.2)	5(29.4)	4(16.7)	117(33.0)
<i>Salary</i>						
<2000	91(57.2)	32(61.5)	58(56.3)	11(64.7)	20(83.3)	212(59.7)
2001-6000	62(38.9)	20(38.5)	45(43.7)	5(29.4)	4(16.7)	136(38.3)
>6001	6(3.8)	0(0.0)	0(0.0)	1(5.9)	0(0.0)	7(2.0)

5.2. Working environment and Behavioral characteristics

The most, 135(38.0%) participants were daily laborer, and 80(22.5%), 63(17.7%), 34 (9.6%), 21(5.9%), 13(3.7%) and 9(2.5%) were masonry, plasterer, excavation, painter, welders and driver (operators) respectively. The majority, 227(63.9%) of the respondents worked above 8hrs per day. Two hundred eighty eight (81.1%) of the respondents had never been engaged on occupational health and safety training. Most, 253(71.3%) of them hadn't used personal protective equipment during the work. Two hundred six (58.0%) of the respondents were revealed that work place supervision had never been made in the past 12 months.

The data showed that 111(31.3%), 55(15.5%), and 22(6.2%) of participants were used to chew khat, drink alcohol and smoke cigarette respectively. The data also indicated that 59(16.6%) respondents had sleeping disorder. One hundred thirty five (38.0%) of the respondents were not satisfied with their current job (Table 2).

Table 2. Work environment and Behavioral characteristics of participants, JimmaTown, 2016

Characteristics	Projects					
	Varnero (n=159)	Youtake (n=52)	Rama (n=103)	Kenisa (n=17)	Mura (n=24)	Total (n=355)
	Numbr (%)	Numbr (%)	Numbr (%)	Numbr (%)	Numbr (%)	Numbr (%)
Job Catagory						
Daily laborer	70(44.2)	13(25)	30(29.1)	10(58.8)	12(50.0)	135(38.0)
Masonry	36(22.6)	10(19.2)	26(25.2)	1(5.9)	7(29.2)	80(22.5)
Plasterer	25(15.7)	9(17.3)	24(23.3)	2(11.8)	3(12.5)	63(17.7)
Excavation	15(9.4)	9(17.3)	7(9.8)	3(17.6)	0(0.0)	34(9.6)
Painter	0(0.0)	9(17.3)	9(8.7)	1(5.9)	2(8.3)	21(5.9)
Welder	7(4.4)	0(0.0)	6(5.8)	0(0.0)	0(0.0)	13(3.7)
Driver/Operator	5(3.1)	2(3.8)	1(1.1)	1(5.9)	0(0.0)	9(2.5)
work Hours						
=<8hrs	64(40.3)	10(19.2)	30(29.1)	12(70.6)	12(50.0)	128(36.1)
>8rs	95(59.7)	42(80.8)	73(70.9)	5(29.4)	12(50.0)	227(63.9)
safety training						
Yes	33(20.8)	8(15.4)	18(17.5)	4(25.5)	4(16.7)	67(18.9)
No	126(79.2)	44(84.6)	85(82.5)	13(76.5)	20(83.3)	288(81.1)
PPE Using						
Yes	51(32.1)	15(28.9)	28(27.2)	6(35.3)	2(8.3)	102(28.7)
No	108(67.9)	37(71.1)	75(72.8)	11(64.7)	22(91.7)	253(71.3)
Supervision						
Yes	66(41.5)	23(44.2)	42(40.8)	7(41.2)	11(45.8)	149(42.0)
No	93(58.5)	29(55.8)	61(59.2)	10(58.8)	13(54.2)	206(58.0)
Chew khat						
Yes	55(34.6)	21(40.4)	29(28.2)	2(11.8)	4(16.7)	111(31.3)
No	104(65.4)	31(59.6)	74(71.8)	15(88.2)	20(83.3)	244(68.7)
Drink alcohol						
Yes	28(17.7)	12(23.1)	13(12.6)	1(5.9)	1(4.2)	55(15.5)
No	131(82.3)	40(76.9)	90(87.4)	16(94.1)	23(95.8)	300(84.5)
Smoke cigarette						
Yes	12(7.5)	3(5.8)	5(4.9)	1(5.9)	1(4.2)	22(6.2)
No	147(92.5)	49(94.2)	98(95.1)	16(94.1)	23(95.8)	333(93.8)
Sleeping disorder						
Yes	29(18.2)	5(9.6)	22(21.4)	2(11.8)	1(4.2)	59(16.6)
No	130(81.8)	47(90.4)	81(78.6)	15(88.2)	23(95.8)	296(83.4)
Job satisfied						
Yes	103(64.8)	27(51.9)	64(62.1)	11(64.7)	15(62.5)	220(62.0)
No	56(35.2)	25(48.1)	39(37.9)	6(35.3)	9(37.5)	135(38.0)

5.2.1. The reason why not they used PPE at work

Among 355 participants the majority, 253(71.3%) have not used personal protective equipment during interview, and visites. The main resean was lack of provision 189(74.7).

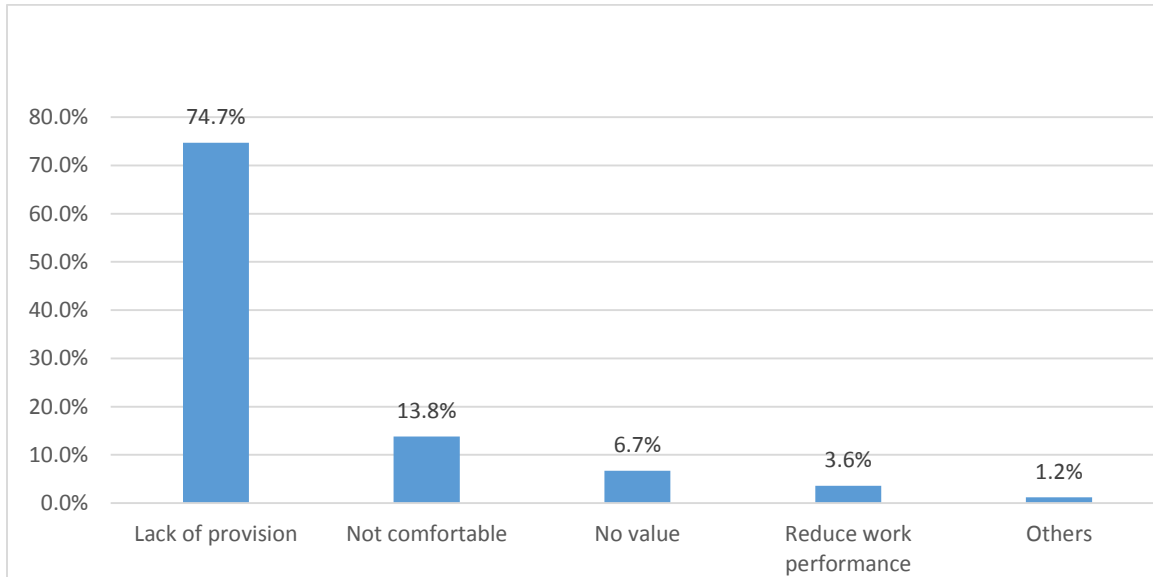


Figure 3. The reason of unable to use PPE reported by employees, Jimma town, 2016

5.3. Work- related injury characteristics

Out of the total 355 study subjects, 149 (42.0%) had experienced work-related injuries at least once in the past 12 months with overall work related injury prevalence rate of 42 per 100 workers per year. From this figure, injured by tools or object 55(36.9%), lower back pain 53(35.6%), falling injuries 35(23.3%), eye injury 32(21.5%), skin disorder 30(20.1%), breathing difficulty 16(10.7%) and hearing problem 14(9.4%). Totally 63(42.3) injured respondents got medical treatment. Among this figure more than half (22.2%) victims were severely injured, they were hospitalized at least for 24 hours. 1197 work days were lost among 89 injured respondents in the past one year.

Table 3. Work-related mechanical injuries in the construction workers, JimmaTown, 2016

Characteristics	Projects					
	<i>Varnero</i> (n=159)	<i>Youtake</i> (n=52)	<i>Rama</i> (n=103)	<i>Kenisa</i> (n=17)	<i>Mura</i> (n=24)	<i>Total</i> (n=355)
	<i>Numbr (%)</i>	<i>Numbr (%)</i>	<i>Numbr (%)</i>	<i>Numbr (%)</i>	<i>Numbr (%)</i>	<i>Numbr (%)</i>
Work-Related Injuries						
In the past 12 months						
Yes	65(40.9)	24(46.2)	44(42.7)	7(41.2)	9(37.5)	149(42.0)
No	94(59.1)	28(53.8)	59(57.3)	10(58.8)	15(62.5)	206(58.0)
Falling injury	13(20.0)	4(16.7)	11(25.0)	3(42.8)	4(44.4)	35(23.5)
From high	10(15.4)	3(12.5)	9(20.4)	1(14.3)	1(11.1)	24(16.1)
From Ground	3(4.6)	1(4.2)	2(4.5)	2(28.6)	3(33.3)	11(7.4)
Number of Occurrence						
Once	8(12.8)	2(8.3)	8(20.0)	2(28.6)	3(33.3)	23(15.4)
More than once	5(7.1)	2(8.3)	3(10.0)	1(14.3)	1(11.1)	12(8.1)
Falling in the last 1 week	3(4.6)	1(4.7)	2(4.0)	0(0.0)	0(0.0)	6(4.0)
Affected body parts						
Head	3(4.3)	1(4.7)	4(8.0)	0(0.0)	0(0.0)	8(5.4)
Eye	2(2.9)	1(4.7)	0(0.0)	0(0.0)	0(0.0)	3(2.0)
Hand	7(10.0)	3(12.5)	11(22.0)	1(14.3)	1(11.1)	23(15.4)
Leg	9(12.8)	3(12.5)	9(18.0)	1(14.3)	0(0.0)	22(14.8)
Multiple	5(7.1)	4(16.7)	9(18.0)	1(14.3)	0(0.0)	19(12.8)
Others	2(2.9)	1(4.7)	0(0.0)	0(0.0)	0(0.0)	3(2.0)
Injured by object	26(38.6)	11(45.8)	16(32.0)	1(14.3)	1(11.1)	55(36.9)
Sharp object	18(25.7)	8(33.3)	10(20.0)	1(14.3)	1(11.1)	37(24.8)
<i>Moving object</i>	9(12.8)	3(12.5)	6(12.0)	0(0.0)	0(0.0)	18(12.1)
Number of occurrence						

Once	15(21.4)	7(29.2)	12(24.0)	0(0.0)	1(11.1)	35(23.5)
More than once	12(17.1)	4(16.7)	4(8.0)	0(0.0)	0(0.0)	20(13.4)
Injury in the last 1 week	5(7.1)	2(8.3)	1(2.0)	0(0.0)	1(11.1)	9(6.1)
<i>Affected body parts</i>						
head	5(7.1)	3(12.5)	0(0.0)	0(0.0)	0(0.0)	8(5.4)
eye	2(2.9)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	2(1.3)
hand	13(18.6)	7(29.2)	11(22.0)	0(0.0)	1(11.1)	32(21.5)
leg	15(21.4)	6(25.0)	10(20.0)	0(0.0)	0(0.0)	31(20.8)
Multiple	8(11.4)	5(20.8)	5(10.0)	0(0.0)	0(0.0)	18(12.2)
Others	1(1.4)	0(0.0)	1(2.0)	0(0.0)	0(0.0)	2(1.3)

Table 4. Skin disorder, and Breathing difficulty among construction workers, JimmaTown, 2016

Characteristics	Projects					Total (n=355) Numr (%)
	<i>Varnero</i> (n=159) Numr (%)	Youtake (n=52) Numr (%)	Rama (n=103) Numr (%)	Kenisa (n=17) Numr (%)	Mura (n=24) Numr (%)	
Skin disorder in the Past 12mths	16(22.9)	4(16.7)	8(16.0)	1(14.3)	1(11.1)	30(20.1)
Hand eczema	14(20.0)	4(16.7)	7(14.0)	1(14.3)	1(11.1)	27(18.1)
Symptoms						
Itching	13(18.6)	4(16.7)	3(6.0)	1(14.3)	1(11.1)	22(14.8)
<i>Dryness</i>	11(15.7)	2(8.3)	4(8.0)	0(0.0)	0(0.0)	17(11.4)
Redness	14(20.0)	3(12.5)	5(10.0)	1(14.3)	0(0.0)	23(15.4)
Swelling	10(14.3)	4(16.7)	5(10.0)	1(14.3)	1(11.1)	21(14.1)
Cracking	9(12.9)	3(12.5)	4(8.0)	0(0.0)	0(0.0)	16(10.7)
Multiple	13(18.6)	4(16.7)	3(6.0)	0(0.0)	1(11.1)	21(14.1)
Others	2(2.9)	0(0.0)	1(2.0)	0(0.0)	0(0.0)	3(2.0)
Symptoms in the last 1 week						
Itching	9(12.9)	2(8.3)	2(4.0)	1(14.3)	1(11.1)	15(10.1)
<i>Dryness</i>	7(10.0)	2(8.3)	2(4.0)	0(0.0)	0(0.0)	11(7.4)
Redness	8(11.4)	3(12.5)	3(6.0)	1(14.3)	0(0.0)	15(10.1)
Swelling	7(10.0)	2(8.3)	1(2.0)	1(14.3)	1(11.1)	12(8.1)
Cracking	5(7.1)	3(12.5)	2(4.0)	0(0.0)	0(0.0)	10(6.7)
Multiple	4(5.7)	2(8.3)	2(4.0)	0(0.0)	1(11.1)	9(6.1)
Others	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Breathing difficulty in the Past 12mths	4(5.7)	3(12.5)	7(14.0)	1(14.3)	1(11.1)	16(10.7)

Table 5. Eye, hearing, LBP problem of participants, and severity of injuries for total work-related problems, Jimma town, 2016

Characteristics	Projects					
	<i>Varnero</i> (<i>n=159</i>)	<i>Youtake</i> (<i>n=52</i>)	<i>Rama</i> (<i>n=103</i>)	<i>Kenisa</i> (<i>n=17</i>)	<i>Mura</i> (<i>n=24</i>)	<i>Total</i> (<i>n=355</i>)
	Numr (%)	Numr (%)	Numr (%)	Numr (%)	Numr (%)	Numr (%)
Eye problems the Past 12mths	11(16.9)	5(20.8)	9(18.0)	1(14.3)	1(11.1)	27(18.2)
<i>Symptoms</i>						
Irritation	9(13.8)	5(20.8)	7(14.0)	0(0.0)	0(0.0)	21(14.1)
Foreign body in eye	8(12.3)	2(8.3)	3(6.0)	1(14.3)	1(11.1)	15(10.1)
Conjunctivites	1(1.4)	0(0.0)	1(2.0)	0(0.0)	0(0.0)	2(1.3)
Multiple	2(2.9)	1(4.7)	1(2.0)	0(0.0)	0(0.0)	4(2.7)
<i>Last 1 week Symptoms</i>						
Irritation	2(2.9)	1(4.7)	2(4.0)	0(0.0)	0(0.0)	5(3.4)
Foreign body in the eye	1(1.4)	0(0.0)	1(2.0)	0(0.0)	0(0.0)	2(1.3)
Conjunctivites	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Hesring problems in the Past 12 months	5(7.1)	4(16.7)	5(10.0)	0(0.0)	0(0.0)	14(9.4)
Symptoms in the last 1 week	2(2.9)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	2(1.3)
Periodic health checkup	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Lower back pain in the Past 12mths	23(32.9)	9(17.3)	20(40.0)	0(0.0)	1(11.1)	53(35.6)
<i>Lumbar pain</i>	17(24.3)	6(25.0)	13(26.0)	0(0.0)	1(11.1)	37(24.8)
One/both knees	9(12.9)	5(20.8)	11(22.0)	0(0.0)	0(0.0)	25(16.8)
One/both ankle or feet	19(27.1)	8(33.3)	11(22.0)	0(0.0)	1(11.1)	39(26.2)
One/both hips or thighs	15(21.4)	7(29.2)	10(20.0)	0(0.0)	0(0.0)	32(21.5)
Multiple	13(18.6)	7(29.2)	9(18.0)	0(0.0)	1(11.1)	30(20.1)
<i>Medical treatment</i>	33(50.8)	7(29.2)	19(43.2)	1(14.3)	3(33.3)	63(42.3)
<i>Hospitalized days</i>						
< =24 hrs	15(21.4)	3(12.5)	11(22.0)	0(0.0)	1(11.1)	30(20.1)
>24 hrs	18(25.7)	4(16.7)	8(16.0)	1(14.1)	2(22.2)	33(22.2)
<i>Lost work days</i>						
< = 3 days	23(32.9)	6(25.0)	13(26.0)	1(14.3)	3(33.3)	46(30.9)
> 3 days	27(41.5)	5(20.8)	8(16.0)	1(14.3)	2(22.2)	43(28.9)
<i>No lost work days</i>	15(21.4)	13(54.2)	23(52.3)	5(71.4)	4(44.4)	60(40.3)
<i>Compensation</i>	2(2.9)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	2(1.3)

5.4. Magnitude of work- related injuries in the working departments

LBP and injured by object was comparatively high in daily laborers 21(39.6), and 20(36.4%), respectively. Falling was also comparatively high in plasterers 13(37.1%). Eye problem also high in painters 8(25.0%) and welders 7(21.2%). Skin disorders was high in masonry 15(50%), followed by plasterers 9(30%). Breathing difficulty also high in excavations 4(25%), and hearing problems was relatively high in drivers (machine operators) 4(28.6%).

Table 6. Magnitude of work related injuries by the departments, Jimma town, 2016

Departments	Injury						
	Falling injury	Injured by object	Skin disorder	Eye problem	LBP	Breathing difficulty	Hearing problem
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
Daily laborers	9(25.7)	20(36.4)	2(6.7)	4(12.5)	21(39.6)	2(12.5)	2(14.3)
Excavation	3(8.6)	9(16.4)	1(3.3)	6(18.8)	7(13.2)	4(25.0)	2(14.3)
Masonry	5(14.3)	14(24.5)	15(50%)	5(15.6)	9(17.0)	2(12.5)	1(7.1)
Plasterer	13(37.1)	8(14.5)	9(30%)	2(2.6)	8(15.1)	3(18.8)	2(14.3)
painters	4(11.4)	0(00.0)	2(6.7)	8(25.0)	3(5.7)	2(12.5)	0(00.0)
Welder	0(00.0)	2(3.6)	1(3.3)	7(21.9)	2(3.8)	2(12.5)	3(21.4)
Drivers or Operators	1(2.9)	2(3.6)	0(00.0)	0(00.0)	3(5.7)	1(6.2)	4(28.6)

5.5. Work environment observation

The observation shown that most working departments were with unsafe structures such as, work at heights by using insecure scaffolds, gangways and ladders, excavation work manually by using hand tools, and earth moving machines, lifting of materials like stone and cement manually and by using cranes, and hoists, chemical exposure like chromium hexavalent from cement, painting dyes, excessive cement dust, unguarded machine, exposed welding fumes, excessive noise, and so on.

Except Varnero construction industry there were no Safety officer that help in promoting health and safety conditions employees at work places. Work-related safety and health committees were not yet established in all industries. Warning signs and health and safety instructions or procedures did not exist in all working categories or departments. Similarly, all working sections had not first aid equipment, and fair compensation.

Regular visits and inspection on health and safety conditions of work places were not made at all levels. In addition, programs on prevention, awareness creation and capacity building were not undertaken. Based on the observation made most workers did not use personal protective devices at work places, most daily laborers use their own hand tools in the field which were not of the standard, and most production equipment lack appropriate protective arrangement. Moreover, training needs in connection with new employment, equipment, process, or other changes were not held accordingly.

In general, although the industries have a mutual agreement; the value of work-related health and safety services is being undermined.

Table 7. Work-related health and safety hazards identified through observation within construction industries, Jimma town, 2016

Working category	Hazards identified
<i>Excavation</i>	Dust, sharp injury, excessive heat
<i>Daily laborers</i>	Lifting heavy objects, Chemicals(such as concrete work), excessive noise, falling objects
<i>Masonry</i>	Chemicals(like Chromium Hexavalent), falling objects
<i>Plasterer</i>	Chemicals(cement), Work at heights(falling)
<i>Painter</i>	Chemicals(painting dyes), work at heights(falling)
<i>Welder</i>	Welding fumes
<i>Drivers or Operators</i>	Excessive noise, Wood and Cement dust, and unguarded machine, Sharp injury

5.6. Factors associated with work-related injuries

Bivariate and multivariate logistic regression analysis had been conducted to identify factors associated with work-related injuries.

In bivariate analysis sex, department, work hours per day, Health & Safety training, regular supervision, use of PPE, job satisfaction, sleeping disorder, drinking alcohol, chat chewing and smoking cigarette were associated with work-related injuries.

After ascertaining the existence of association between the explanatory variables and the dependent variable, all independent variables which showed association at P-value less than 0.25 with work-related injuries during bivariate analysis were fitted to multiple logistic regression model in the backward step wise method to see their independent effect on individual workrelated injuries.

Variables like sex, work hours per day, Health & Safety training, regular supervision, use of PPE, job satisfaction, and chat chewing showed a significant association with work-related injuries in the backward stepwise multivariate logistic regression analysis (Table 8).

Table 8. Factors associated with work- related injury, using multivariate logistic regression model, Jimma town, 2016

Variables	Injury status		OR(95% C.I)	
	Yes	No	Crude	Adjusted
<i>Sex[#]</i>				
Male	127(47.7%)	139(52.3%)	1.00	1.00
Female	22(24.7%)	67 (75.3%)	.359(.210-.616) *	.361(.186-.698) *
<i>Age group[†]</i>				
14-29	102(40.3%)	151 (59.7%)	1.480(.708-3.094)	—
30-44	31 (44.3%)	39(55.7%)	1.258(.544-2.909)	—
=>45	16 (50.0%)	16 (50.0%)	1.00	—
<i>Educational level[†]</i>				
Illiterate	11(32.4%)	23(67.6%)	1.494(.677-3.295)	—
Read & write	4(26.7%)	11(73.3%)	1.964(.597-6.466)	—
Elementary(1-8)	74(45.7%)	88(54.3%)	.849(.540-1.336)	—
Secondary and above	60(41.7%)	84(58.3%)	1.00	—
<i>Monthly salary[†]</i>				
<2000.00	84(39.6%)	128(60.4%)	2.032(.443-9.309)	—
2001.00-6000.00	61(44.9%)	75(55.1%)	1.639(.353-7.606)	—
>6000.00	4(57.1%)	3(42.9%)	1.00	—
<i>Work expriance[†]</i>				
<1 year	63(41.4%)	89(58.6%)	1.253(.771-2.037)	—
1-5 years	31(36.0%)	55(64.0%)	1.574(.890-2.785)	—
>5 years	55(47.0%)	62(53%)	1.00	—
<i>Work hrs per day[#]</i>				
=<8 hrs	25(19.5%)	103(80.5%)	1.00	1.00
>8 hrs	104(45.8%)	123(54.2%)	1.560(.997-2.439)	2.023(1.141-3.585) *
<i>Projects[†]</i>				
Varnero	70(44.0)	89(56.0)	1.00	—
Youtake	24(46.2)	28(53.8)	.167(.044-5.628)	—
Rama	50(48.5)	53(51.5)	.151(.043-4.539)	—
Kenisa	2(11.8)	15(88.2)	1.071(.159-7.221)	—
Mura	3(12.5)	21(87.5)	.182(.052-7.634)	—
<i>Departments[#]</i>				
Excavation	12(35.3%)	22(64.7%)	1.00	1.00
Daily laborer	48(35.6%)	87(64.4%)	1.450(.372-5.656)	1.650(.382-5.756)
Welder	7(53.8%)	6(46.2%)	.686(.124-3.748)	.986(.124-3.748)
Mason	40(50.0%)	40(50.0%)	.800(.200-3.199)	.870(.290-3.499)
Plasterer	32(50.8%)	31(49.2%)	.775(.190-3.157)	.975(.090-3.357)
Painter	6(28.6%)	15(71.4%)	2.000(.396-10.108)	4.000(.296-11.108)
Driver/Operator	4(44.4%)	5(55.6%)	1.467(.330-6.515)	2.467(.430-8.515)
<i>Health & safety training[#]</i>				
Yes	16(23.9%)	51(76.1%)	1.00	1.00
No	133(46.2%)	155(53.8%)	2.735(1.490-5.021) *	3.359(1.539-7.334) *
<i>Using PPE[#]</i>				

Yes	26(25.5%)	76(74.5%)	1.00	1.00
No	123(48.6%)	130(51.4%)	2.766(1.662-4.601) *	3.036(1.646-5.602) *
<i>Supervision[#]</i>				
Yes	46(30.9%)	103(69.1%)	1.00	1.00
No	103(69.1%)	46(30.9%)	2.239(1.439-3.484) *	2.176(1.279-3.701) *
<i>Job satisfaction[#]</i>				
Yes	82(37.3%)	138(62.7%)	1.00	1.00
No	67(49.6%)	68(50.4%)	1.658(1.074-2.56)*	1.812(1.071-3.066)*
<i>Sleeping disorder[#]</i>				
Yes	39(66.1%)	20(33.9%)	1.00	1.00
No	110(37.2%)	186(62.8%)	.303(.168-.546)*	.426(.211-1.861)
<i>Chewing chat[#]</i>				
Yes	65(58.5%)	46(41.5%)	1.00	1.00
No	84(34.4%)	160(65.6%)	.372(.234-.589)*	.495(.286-.859)*
<i>Drink alcohol[#]</i>				
Yes	28(50.9%)	27(49.1%)	1.00	1.00
No	121(40.4%)	179(59.6%)	.652(.366-1.160)	.852(.366-3.160)
<i>Smoking cigarette[#]</i>				
Yes	17(77.3%)	5(22.7%)	1.00	1.00
No	132(39.6%)	201(60.4%)	.193(.070-1.536)	.112(.029-1.435)

†: Variables **not candidate** for multivariate logistic regression analysis (p -value > 0.25).

#: **Candidate** variables, p -value reached less than 0.25 were kept in the subsequent analysis.

* Statistically significant at p -value less than 0.05, variables included in the final model.

CHAPTER SIX: DISCUSSION

6.1. Magnitude of work related injury in the construction industry

Because of low work-related hazards awareness, lack of workplace safety and health policy, and inefficient safety management systems; industrial safety and health problems are becoming major challenges in Ethiopia. Due to these issues the government, companies, and employees are facing measurable and immeasurable costs (Tadesse and Israel, 2016; Worku, 2011). Work related injuries remain the major occupational health problem among construction employees (Analysis, 2012; Manuscript, 2008; Lopez and Gilkey, 2014; Dong and Wang, 2010).

In this study the annual prevalence of injury among the construction industry employees was 42.0%. This finding is in line with a study from Ethiopia (38.7 %) (Adane et al., 2013), and 38.3 % (Tadesse and Israel, 2016). And significantly higher than that of studies done from Egypt (18.4 %) (Alazab, 2004), India (22.9 %) (Tadesse and Israel, 2016), and china 15.0% (Zheng et al., 2010). This dissimilarity in the prevalence of work-related injuries may be linked to the difference between the two countries in level of development, status of workforce, employees' level of awareness of hazard control and disease prevention accessibility of occupational health and safety services and diversity and complexity of work tasks, and workplace environments. Emphasis on preventive measures, such as short and long-term training as well as encouragement to use safety tools can effectively decrease the prevalence of work related injuries (Tadesse and Israel, 2016; Manuscript, 2008; Joffe and Mindell, 2005). The other reason might be connected to the difference in the method of data collection.

The major work-related health problems identified at the construction site during the study among construction workers in the order of magnitude were injured by object 55(36.9%), followed by lower back pain 53(35.6%), falling injury 35(23.5%), eye problem 32(21.5%), skin disorder 30(20.1%), breathing difficulty 16(10.7%) and hearing problem 14(9.4%).

6.1.1. Falling and injured by object

In this study injured by object and falling were 55(36.9%), and 35(23.5%) respectively. It accounts falling from height (16.1%), falling from the same level (7.4%), and injured by sharp object (24.8%), and strike by movable object (12.1%). This study was similar with another studies (Zheng et al., 2010; Saarela, 2006; Moradinazar et al., 2013; Kines, 2002; Adane et al., 2013). Faling injuries was high in departments like plasteres (37.1%), and masonry (14.3%). Injured by object

also high among daily laborers (36.4%), masonry workers (25.5%), and excavation workers (16.4%). The study was agree with anathor findings; plasterers and masons includes work at heights; they could slip, fall, injured with falling object, suffer severe injury and even be killed (Sheet, 2013; Note, 2006; Dong and Wang, 2010).



Figure 4. Mechanical injury, affected body parts by falling and harm with object, Jimma, 2016

As shown above these injuries affected body parts mainly hands (36.9%), legs (35.65), head (10.8%), eyes injury (3.3%), other (3.35) and multiple injury (25.5%).

6.1.2. Skin disorders

In comparison with other work-related health problems, skin disorders are more often and easily diagnosed. Skin disorders are also known as occupational dermatoses, because it is primarily caused by occupation (Rycroft and Frosch, 2006; Zorba et al., 2013). The commonest reaction of the skin to penetration through the barrier layer by a substance on its surface is an inflammation referred to as eczema. This may be because of chromium hypersensitivity (Sun and Chu, 2006; Mirabelli et al., 2012; Hardeep et al., 2008). Hexavalent chromium is a strong sensitizing agent. It forms water-soluble compounds in cement and have the capacity to penetrate human skin. Out of the total chromium concentration in cement, 50-80% of chromium is in hexavalent form (Hardeep

et al., 2008; Kuruvila, Dubey, and Gahalaut, 2006; Zorba et al., 2013). Irritants and allergens like cement and other chemical exposures at the work place may cause itching as the primary symptoms of contact dermatitis including redness, swelling, blistering, dryness and cracking. The type of eczema caused by contact with substances is called contact dermatitis (Finlan, 2014). Being occupational contact dermatitis responsible for 80% of the cases (Zorba et al., 2013). It includes irritant contact dermatitis (70–80%), and allergic contact dermatitis (20–25%) (Walls and Duckett, 2012; Zorba et al., 2013).

In this study, 50.0% masonry workers, and 30.0% plasterers were identified to have skin disorder relatively high compared to other departments. This study was also similar with other study conducted in Ethiopia (Hardeep et al., 2008), and also in Egypt found out that due to cement used in construction industry, 18% of the Egyptian construction workers had dermatitis (Alazab, 2004). Masonry workers, and Plasterer were highly affected with skin disorders (Peate, 2007; Sun and Chu, 2006). Masonry workers, plasterers and painters exposed for different chemicals; during visits most of the workers were observed to work without using PPE (figure 5).



Figure 5. Direct chemical exposure among masons, plasterers, and painters, Jimma, 2016

Due to this chemical exposure among these masonry, plasterer, and painters different skin disorders, eye problems, and other work related disorders will be happened. As mentioned above in this study skin disorders, and eye problems were high among masonry, and painters, (fig 6).



Figure 6. Skin disorders on masonry, and plasterers Jimma, 2016

6.1.3. Lower back pain

In this study LBP was high in daily laborers (39.6%). It may be due to daily laborers specially in the construction industry are highly participate in forceful activities like manual handling, Repetitive motions of different body parts, forceful movements, awkward postures, heavy lifting or whole-body vibration, carrying of different materials such as stone, cement, concrete, and so on. It was also similar with other studies conducted in Ethiopia and Seattle, (Seixas et al., 2008; Hardeep et al., 2008).

6.1.4. Eye injury

Construction Industry is the main industry in which eye injuries appears to be a sever health problem. In this study the eye injury prevalence was 21.5%. From this figure irritation (14.1%), mechanical eye injury and foreign body in the eye (13.4%), conjunctivitis account (1.3%), and multiple injury (2.7%). Painters and welders account (25.0%), and (21.9%) respectively. Like other departments in the construction industry; eye injury depends on the nature of work, and using of correct eye protection according to the type of hazard. Some departments, and using of PPE like safety glasses (for large particles released from cutting, sawing or grinding operations), face shields (prevent direct splash exposures), and chemical goggles (prevent exposure due to splashes and sprays) dramatically reduce the effect. During the inspection almost all painters and welders did without using PPE. Different paint chemicals, particles, and welding fumes may affect their eyes. Painters, and welders have an elevated risk of eye injury (Way, 2001; Peate, 2007). In a similar study in Ethiopia 16% (Hardeep et al., 2008), in Egypt, about 23.6% of the workers showed the prevalence of eye complaints like conjunctivitis and foreign bodies in the eyes (Alazab, 2004). In Gahanna eye irritation and itching accounts 11.3% (Ovenseri-ogbomo et al., 2012).

6.1.5. Respiratory and Hearing problem

In present study workers complained and physically examined about breathing difficulty and noise related problems were comparatively low (10.7%) and (9.4%) respectively. However, this was higher compared with Complaints about respiratory problems in Gondar, (Hardeep et al., 2008), and lower compared with construction workers in Egypt (Alazab, 2004). The construction sites inspected were dusty due to stone cutting, drilling, cement mixing, and other activities going on simultaneously and the workers were exposed to this airborne dust. It could be attributed to long exposure to dust without the use of personal protective devices, as no worker was found to wear a cloth mask or any other protective device. In this study respiratory problem was relatively high among excavation workers (25.0%), and plasterers (18.80%). Another study in US showed an overall prevalence of spirometry defined airways obstruction was 13.3% and was highest among masons, and plasterers (24%). Dust was also identified as potential exposure for excavation workers in Egypt, (Alazab, 2004). Cumulative exposures to cement dusts, and other some tasks resulting in exposures to different chemicals and dust were associated with the risk of airway obstruction (Welch, 2014; Bureau and Bls, 2013; Dement et al., 2015).

And hearing problem was high in drivers or operators, and welders (28.6%), and (21.4%) respectively. During site visits, the noise level was high especially at the department like driver or machine operators (concrete mixer, careen or hoist operators, earth moving machine or car drivers, operators of wood and metal working machines). Research shows that 38% of the workers in the Dutch construction industry complains about noise and that 17% of the workers complains about their hearing ability (McDonald, Chen, and Cherry, 2000). However, due to the non-availability of noise measuring devices, correct noise level measurement was not possible.

6.2. Factors associated with work- related injuries

This study revealed greater chance of work-related injuries in male workers than females. Females were 0.361 times less likely [AOR: 0.361, 95% CI: (.186, .698)] injured than males. It was also, similar with other studies conducted in Ethiopia (Adane et al., 2013; Hardeep et al., 2008). This difference in chance of getting work- related injury between the sexes of workers might be associated with several factors which can increase the risk of injury such as the difference in task (commonly males do harder tasks); work environment (males do the risky job than female specially in the construction site), work organization (males generally worked longer hours per day), and experienced higher proportion of injuries and so on, (*Work-Related Injuries Experienced by Young Workers in Australia, 2009–10*, 2013; Punnett et al., 2005). Working > 8 hours/day raised the odds of work related injury by 2.023 folds compared to those who work 8 hours/day or less [AOR: 2.023, 95% CI: (1.141, 3.585)]. This study was agree with the research conducted in Ethiopia, (Adane et al., 2013; Yiha and Kumie, 2010). The reason could be explained by the fact that work related injuries or diseases are the result of single as well as cumulative exposure. To be injured are associated with being exposed, and most work related injuries like dermatoses, respiratory, noise related problems, and others commonly need prolonged exposure from the work environment. So if the employee doing a spesific task for > 8 hrs per day, he or she will exceeds daily occupational exposure level (OEL). It will be effective to injury if the employees spent long hours in unsafe work place and working with out using PPE. E.g. according to OSHA stardands, the workers maximum daily exposure time is 8hrs, in an environment with noise level 85dB (A). And the other thing is fatigue, that may increases the likelihood of work related injuries, and that unusually long hours may also result in injuries related with breaking physical endurance limits (Mariammal, Jaisheeba, and Sornaraj, 2012; Alazab, 2004; Tadesse and Israel, 2016; Adane et al., 2013). The risk of work-related injury increased with job dissatisfaction [AOR=1.812, 95% CI (1.071, 3.066)]. It was also, similar with other studies conducted in Ethiopia (Tadesse and Israel, 2016; Takele and Kumie, 2001). An increasing number of studies have considered job satisfaction as prevalent and powerful factor in the occurrence of work-related injuries in the work environment. Job dissatisfaction may be associated with work environment, Leadership style, motivation and incentives, like working for long hours without enough rest, low payment, working in hazardeous job, unable to get health and safety services and so on. These may affect the employees to lose their work behavior and concentration. This is due to the fact that when the

workers are not satisfied with their job, they could not experience meaningfulness, greater responsibility, and better use of their knowledge and skills in their job and such situation leads to decreased safety in their work and increased work related injuries. In Egypt 51.2% of the disabling injuries were caused by human factors like lack of attention (Alazab, 2004). In Iran carelessness of workers and the lack of using protective tools in more than 90% of cases caused fracture (Moradinazar et al., 2013). Seven in 10 construction employers felt that the worker being careless was the main cause of work-related injury. Over two thirds (69%) of construction employers felt that the main cause of work-related injury was the worker being careless, (*Work Health & Safety Perceptions*, 2015). Basically, when job satisfaction is increased, on- task activities are improved, leading to greater attention to safety motivation, knowledge, and compliance. Thus, increasing employee job satisfaction could be as important as eliminating work related hazards in the workplace (Adane et al., 2013; Tadesse and Israel, 2016).

Workers who did not undergo vocational training on their current work were 3.359 times more likely to have injury than those workers who undertook vocational training [AOR: 3.359, 95% CI: (1.539, 7.334)]. This study was in line with a study conducted in Ethiopia (Adane et al., 2013; Yiha and Kumie, 2010). And similar with studies conducted in different countries (Demba, 2013; Halvani et al., 2012). In china prevalence of injury among no safety education was (16.2 per 100 workers) (Zheng et al., 2010). These finding indicates the importance of provision of training in prevention and control of work-related hazards and accidents. Injury prevention and safety education should include basic construction safety, machine operation safety, high working place safety, and chemical safety. According to the safety training requirements released in 2006 by the state administration of work safety, construction workers are required to receive at least 32 hr of vocational training before they first begin to work in construction industry and at least 8 hrs of safety training annually afterward (Zheng et al., 2010; Yiha and Kumie, 2010; Proffitt and Beacham, 2012; Halvani et al., 2012). The training is usually organized by the construction company and conducted by a certified safety specialist. Construction sites are, by definition, temporary places of work, where several firms are present at the same time to undertake work for short periods. On average, trained workers were present at construction sites for 10 months, while a systematic training program could have a greater impact if measured in the long term (Bena et al., 2009; Health, 2015; Adane et al., 2013). Regular workplace supervision also significantly decreased the occurrence of work related injuries. This study showed regular workplace

supervision reduced injury 2.176 times more likely [AOR: 2.176, 95% CI: (1.279, 3.701)]. It was agree with different studies (Takele and Kumie, 2001; Proffitt and Beacham, 2012; Dong and Wang, 2010). In Iran the lack of employers' supervision was identified as main cause of work related injury, it caused 80% deaths and 71% amputation (Moradinazar et al., 2013). The employer must ensure that employees are properly instructed and supervised in the safe operation of any machinery, tools, equipment, process, or practice that they are approved to use and act in a safe and healthful manner, and conduct their work in compliance with all applicable safety and health rules (Safety, 2005). Likewise, use of PPE showed statistically significant association with work related injury; construction workers who didn't use PPE were 3.036 times more likely to face injury compared to their counter parts [AOR: 3.036, 95% CI: (1.646, 5.602)]. It was also consistence with different studies. Especially, in developing countries the construction regulation broadly requires protective equipment since conventional occupational safety control measures like engineering, and admenstrative methods remain a challenge to implement. PPE is the last measure in the hierarchy of hazard control method, because it depends on workers' behavior (Tadesse and Israel, 2016; Kines, 2002; Johnstone, 2006). However, Lack of provision of PPEs from the employer and some of the workers didn't know the importance of different PPEs in prevention and control of exposure to different work related hazards and injuries in construction site were identified in the present study, (Adane et al., 2013; Tadesse and Israel, 2016; Takele and Kumie, 2001). In this study the odds of injuries among employees who did't chew chat were about 0.495 times less likely injured compared to they did, [AOR: 0.495, 95% CI: (.286, .859)]. This might be due to the fact that abuse of mind altering substances, like chat is likely to cause a change in the behavior and impair workers concentration and performance. A high blood level of such substances while at work will endanger both safety and efficiency, and be the cause of increased likelihood of mistakes, poor decision making and errors in judgment, (Tadesse and Israel, 2016).

Strengths and Limitations of the study

Strengths

- One year cross-sectional studies enable to see the overall magnitude of work-related injuries annually, so that it includes all seasons in the construction industries.
- The study stratified the construction industry in departments, and it enables to see the main type of injury for each work category.

Limitations

- Lack of medical records in the industries made impossible to see death prevalence.
- Absence of noise level, and dust measurement equipments.

CHAPTER SEVEN: CONCLUSION AND RECOMENDATION

7.1. Conclusion

The results of this study found high rates of work-related injuries among workers in the construction industry in the previous one year. The work- related injury rate was not different between constructin industries and work catagories. The work-related hazards or exposures were dissimilar among work categories. The complexity of injures as measured by rate of hospitalization and work days lost was also relatively high, which is likely to influence productivity.

In agreement to similar studies made, sex, working more than 8 hours per day, absence of health and safety training, chat chewing, job dissatisfaction, absence of personal protective devices and regular supervision among workers significantly increases the risk of work- related injuries.

Consistent to other similar studies, work environment observation showed that working sections lack occupational health and safety services that pose various mechanical, physical, chemical, Psychological, ergonomic and biological hazards. Similarly, the most study participants revealed that supervision on health & safety conditions of work places had never been made in the last 12 months.

7.2. Recommendations

Based on the findings of this study and the above conclusion made, the following issues are recommended to improve health and safety at work:

7.2.1. To the employers

- Safety Officer should be established for each industries (except, Varnero construction).
- Occupational safety and health committees should be established and run effectively.
- Ongoing health and safety information and / or training should be given to employees
- Regular supervision on health and safety conditions of work places should be emphasized accordingly at all levels.
- Standard quality personal protective devices should be available and its utilization should also be monitored regularly by the company.
- Workers should not spend more than 8 hours per day at work.
- Owners or contractors at construction sites should ensure safety measures to reduce accidents and injuries.
- There should be provision of first aid, and fair compensation for accident victims.
- Any injury events should be recorded properly and timely, and kept by the company.

7.2.2. To the employees

- They should work with compliance to all applicable health and safety rules
- They should avoid using of mind altering substance

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ANNEXES

Annex 1- English questionnaire

Jimma University College of Public Health and Health Science

Department Of Environmental Health, Science and Technology

Face to face interview questionnaire on “the prevalence and risk factors of work related injuries among construction workers in Jimma town, Southwestern Ethiopia”

Dear employee

This study will propose the acceptance of *the prevalence and risk factors of work related injuries among construction workers* of -----industry and you are chosen randomly using lottery method to participate in this study.

The purpose of this study is to assess *the prevalence and risk factors of work related injuries* that will be used as an input to prevent work-related injuries and deaths. There is no way in which participating in the study can cause harm to you. The study will involve various private life questions in order to attain the goal. I am asking you for your help. Here is a survey for you which take a few minutes to complete. There is no need to put your name on the survey and no individual response will be reported. It is your full right to refuse to answer any or all of the questions. If you don't want to participate you can. If you want to contact the principal investigator, the name of the investigator is “Abate Lette” and you can call on phone number 0912007280 any time you want.

Do you mind participating in this study please ?

Yes, please go to the next page. Put your signature-----

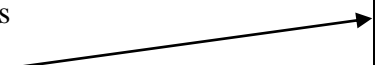

No, (Thank you very much!) Please return the questionnaire.

Thank you very much.

Section 1. Socio demographic Information

No	Questionnaire	Coding category	skip
101	How old are you?	-----	
102	Sex of worker?	1.male 2.female	
103	Marital status?	1.married 2.single 3.divorse 4.widow	
104	Religion?	1.Protestant 2.Orthodox 3.muslim 4.others specify-----	
105	Ethnicity?	1.oromo 2.amhara 3.gurage 4.others specify-----	
106	Educational level?	1.Can't read and write 2.Read and write only 3.Elementary school(1-8) 4.Secondary and above	
107	Residential area?	1.urban 2.rural	
108	Monthly salary in birr?	-----	

Section 2. Environmental Information




No	Questionnaire	Coding category	skip
201	How many years do you work in the construction industry?	-----	
202	How much hours do you work per day?	-----	
203	What is your current work category?	1. Excavations 2. Daily labor 3. Welder 4. mason 5. Plasterer 6. Painter 7. Carpenter	
204	Do you have received health and safety training?	1.yes 2.no 	207
205	If yes, when you received?	1.before starting the work 2.during work	
206	Do you have regular training?	1.yes 2.no	
207	Do you use PPE during work?	1.yes 2.no 	209
208	If yes, specify the type?	-----	
209	If no, why not?	1. No provision of PPE 2. Using PPE no value 3. Not comfortable 4. It reduce work performance 5. Others specify-----	
210	Is there regular work place supervision?	1.yes 2.no	

Section 3. Behavioral Information

No	Questionnaire	Coding category	Skip
301	Are you Satisfied with current job?	1.yes 2.no	
302	Do you have Sleeping disorder?	1.yes 2.no	
303	Do you chewing chat?	1.yes 2.no	305
304	If yes, how often?	1.Rarely (monthly) 2.Occasionally (weekly) 3.Frequently (daily) 4. Others specify-----	
305	Do you drink alcohol?	1.yes 2.no	307
306	If yes, how often?	1.Rarely (monthly) 2.Occasionally (weekly) 3.Frequently (daily) 4. Others specify-----	
307	Have you smoked more than 5 packs of cigarettes in total in your whole life?	1.yes 2.no	401
308	Do you still smoke?	1.yes 2.no	
309	If no, at what age did you quit smoking?	-----years	
310	How many cigarettes per day do you or did you smoke?	-----	
311	At what age did you start smoking?	-----years	

Section 4. Injury Related Information

No	Questionnaire	Coding category	Skip
401	Have you encountered any injures or diseases during work or due to your job in the past 12 months?	1.yes 2.no	
402	Do you encountered <i>Falling injury</i> in the past 12 months?	1.yes 2.no	405
403	If yes falling injury, which type of falling?	1.faling from high 2.falling from the same level	
404	How many times you encountered in the past 12 months? When?	-----	
405	Do you encountered <i>Hurt by Object or tool</i> in the past 12 months?	1.yes 2.no	408
406	If hurt by object, by which object?	1.sharp object 2.moving object	
407	How many times you encountered in the past 12 months? When?	-----	
408	Which body part/parts have been injured during the falling or/and hurt by object accidents? (multiple answers allowed, circle all reported)	1.head 2.eyes 3.hands 4.Legs 5.others specify-----	
409	Have you got medical treatment?	1.yes 2.no	
410	How many days you slept in the hospital?	-----	
411	How many work days lost by the injury?	-----	
412	Have you ever got compensation to any injury fairly?	1.yes 2.no	

413	Do you encountered <i>skin disorder</i> in the past 12 months?	1.yes 2.no 	430
414	If skin disorder, have you ever had an itchy rash that has been coming and going for at least 6 months and at some time has affected skin creases (folds of elbows, behind the knees, fronts of ankles, under buttocks, around the neck, ears or eyes)?	1.yes 2.no 3.don't know	
415	Have you ever had hand eczema?	1.yes 2.no	
416	Have you ever had eczema on your wrists or forearms (excluding fronts of elbows)?	1.yes 2.no 	427
417	How often have you had eczema on your hands, wrists or forearms?	1.Only once and for <u>less</u> than two weeks 2.Only once but for two weeks or <u>more</u> 3.More than once 4.(Nearly) all the time	
418	When did you last have eczema on your hands, wrists or forearms?	1.I have it now 2.Not now but within the past 3 months 3.Between 3-12 months ago 4.More than 12 months ago	
419	Did you first get eczema on your hands, wrists or forearms when you were above 14 years of age?	1.yes 2.no 	423
420	What do you think was the cause of the eczema on your hands, wrists or forearms when it started?	-----	
421	What was your occupation when the eczema started?	-----	

422	What were your major activates at work when the eczema started?	-----	
423	Have you visited a doctor as an adult for your hand or wrist/forearm eczema?	1.yes 2.no	
424	Have you noticed that contact with certain materials, chemicals or anything else outside your work makes your eczema worse?	1.Yes 2.No 3.Don't know	
425	Does your eczema improve when you are away from your normal work (e.g. weekends or holidays)?	1.Yes, usually 2.Yes, sometimes 3.No 4.Don't know	
426	For how long during the past 12 months have you been on sick leave or otherwise off work due to eczema?	-----weeks	
427	Have you had any of the following symptoms on your hands or wrist/forearms during the past 12 months? (multiple answers allowed, circle all reported)	1.itching 2. dryness 3.redness 4.swelling 5.cracking 6. others specify-----	
428	Do you have the problem currently?	1.yes 2.no	
429	At work are your hands exposed to water without protective gloves more than 2 hours per shift?	1.yes 2.no	
430	Do you encountered <i>breathing difficulty</i> in the past 12 months?	1.yes 2.no	446
431	If breathing difficulty, have you had wheezing or whistling in your chest at any time in the past 12 months?	1.yes 2.no	435
432	Have you been at all breathless when the wheezing noise was present?	1.yes 2.no	

433	Have you had this wheezing or whistling in the chest when you did not have a cold?	1.yes 2.no	
434	How many attacks of wheezing or whistling have you had in the past 12 months?	1.None 2.1-3 times 3.4-12 times 4.More than 12 times	
435	Have you woken up with a feeling of tightness in your chest at any time in the past 12 months?	1.yes 2.no	
436	Have you been woken by an attack of shortness of breath at any time in the past 12 months?	1.yes 2.no	
437	Have you been woken by an attack of coughing at any time in the past 12 months?	1.yes 2.no	
438	Have you ever had asthma?	1.yes 2.no	444
439	Was the diagnosis confirmed by a doctor?	1.yes 2.no	
440	How old were you when you had your first attack of asthma?	-----	
441	How old were you when you had your last attack of asthma?	-----	
442	Have you had an attack of asthma in the past 12 months?	1.yes 2.no	
443	Are you currently taking any medicine (including inhalers, aerosols or tablets) for asthma?	1.yes 2.no	
444	In the past 12 months, how often have you been unable to work because of respiratory symptoms?	1.Never 2.1-7 days 3.8-30 days 4.At least 31 days 5.Don't know	

445	Does the symptoms lessen or disappear during weekends and holidays?	1.yes 2.no	
446	Do you encountered <i>eye injury</i> in the past 12 months?	1.yes 2.no	451
447	If eye injury, which type of disorder you faced for the past 12 months? (multiple answers allowed, circle all reported)	1.eye irritation 2.forign body in the eye 3.conjunctivites 4.others specify-----	
448	What was your job at that time?	-----	
449	Have you got medical treatment?	1.yes 2.no	
450	Do you have eye problem now?	1.yes 2.no	
451	Do you encountered <i>hearing problem</i> in the past 12 months?	1.yes 2.no	463
452	If hearing problem, have you additional noisy work?	1.yes 2.no	
453	Have you ever worked in noisy area prior to this job?	1.yes 2.no	
454	Have you ever been in military services?	1.yes 2.no	456
455	If yes, have you ever had participate in battle war or exposed to high explosive sound or gunshot?	1.yes 2.no	
456	Had pre-employment hearing test?	1.yes 2.no	
457	Do you have any ringing/ trouble noise in your ear or head?	1.yes 2.no	
458	Have you ever had ear trauma or infection?	1.yes 2.no	
459	Have you ever had head injury?	1.yes	

		2.no	
460	Do you have ear problem now?	1.yes 2.no	
461	Do you fill that there is difference between two ears?	1.yes 2.no	
462	Have you got periodic health checkup?	1.yes 2.no	
463	Do you encountered <i>lower back pain</i> in the past 12 months?	1.yes 2.no	End
464	If LBP, Where did you have pain for the past 12 months? (multiple answers allowed, circle all reported)	1.Lumbar 2.One or both knees 3.One or both ankle/feet 4.One or both hips/thighs	
465	How many days of work have you missed because of pain during the past 12 months?	-----	
466	How long have you had your current pain problem?	-----	
467	Was your age is above 18 years during the starting of the problem?	1.yes 2.no	
468	What was your job at that time?	-----	
469	What do you think about the cause of this disorder?	-----	
470	Is your work heavy or monotonous?	1.yes 2.no	
471	Do you have this problem know?	1.yes 2.no	

ANNEX 2 Amharic Questioner

ጅም ዩኒቨርሲቲ

የህክምናና ጤና ሳይንስ ኮሌጅ

የኢንባይሮንመንታል ሃልዝ ሳይንስ እና ቴክኖሎጂ ትምህርት ክፍል

በግንባታ ስራ ላይ በተሰማሩ ሰራተኞች ላይ ለሚከሰቱ ጉዳቶችና በሽታዎች ጥናት ለሚደረግ መረጃ መሰብሰቢያ ቅፅ

ወደ ሰራተኞች

የዚህ ጥናት አላማ በግንባታ ስራ ላይ በተሰማሩ ሰራተኞች ላይ በሚከሰቱ ጉዳቶችና በሽታዎች ዙሪያ ሲሆን ስለዚህ አንተ ለዚህ ጥናት በዕድል ተመርጠህል።

የዚህ ጥናት አላማ በግንባታ ስራ ላይ በተሰማሩ ሰራተኞች ላይ የሚከሰቱ ጉዳቶችንና በሽታዎችን ለመዳሰስ ሲሆን የዚህ ጥናት ዉጤትም አደጋውን ለመቆጣጠር ወይም ለመቀነስ ዕንደ ግብአት ይውላል ። በዚህ ጥናት መሳተፍህ ምንም አይነት ጉዳት እንደማያስከትልብህ ለማሳወቅ እንወዳለን። ጥናቱ የግል ህይወትን የሚዳስሱ ጥያቄዎችን ይዟል። የጥናቱን አላማ ለማሳካት የእንተን እርዳታ እንጠይቃለን። ከዚህ ቀጥሎ በግል አንተን በመጠየቅ የሚሞሉ ጥያቄዎች አሉ። በመጠይቁ ላይ ስም መጻፍ አያስፈልግም። በጥናቱ ውጤት ላይ የግል ሁኔታን የሚገልፁ መረጃዎች (የግለሰብ መልሶች) ለብቻቸው አይቀርቡም። ሁሉንም ወይም አንዳንዱን ጥያቄዎች ላለመመለስ ትችላለህ በጥናቱ ለመሳተፍ የማትፈልግ ከሆነ መብትህ የተጠበቀ ነው ።

ታዲያስ መጠይቆችን ለመሙላት ፍቃደኛ ነዎት?

አዎ፤ ወደ ሚቀጥሉት ገጾች ይለፉ -----ፊርማ

አይደለሁም (አመሰግናልሁ፤) እናመሰግናለን

ክፍል 1 ግለሰባዊ መረጃዎች መጠይቅ

ተ.ቁ	መጠይቅ	መልስ	የሚታለፍ
101	ዕድሜዎት ስንት ነው?	-----ዓመት	
102	ጾታ?	1.ወንድ 2.ሴት	
103	የመኖሪያ ቦታ?	1.ከተማ(ጅማ) 2.ገጠር	
104	የጋብቻ ሁኔታ?	1.ያገባ 2.ያላገባ 3.የፈታ 4. መበለት ወይም በሞት የተለያዩ	
105	ሀይማኖት?	1.ፕሮቴስታንት 2.አርቶዶክስ 3.ሙስሊም 4.ሌላ ካል ይገለፅ -----	
106	ብሄር?	1.አሮሞ 2.አማራ 3.ጉራጌ 4.ሌላ ካል ይገለፅ -----	
107	የትምህርት ደረጃ?	1.ማንበብ ና መጻፍ የማይችል 2.ማንበብ ና መጻፍ ብቻ የሚችል 3.አንደኛ ደረጃ ያጠናቀቀ(1-8) 4.ሁለተኛ ደረጃ ና በላይ	
108	የወር ደመወዝ?	-----	




ክፍል 2 ከኢንዱስትሪው ጋር የተያያዙ መረጃዎች መጠይቅ

201	በግንባታ ስራ ለስንት አመት ሰርተዋል?	-----	
202	በቀን ለስንት ሰአት ይሰራሉ?	-----	
203	አሁን በግንባታ ፕሮጀክቱ ውስጥ ስራህዎች ምንድን ነው?	1.ቁፋሮ 2.የቀን ስራ 3.ብዩዳ 4.ግንባቻ 5.ለሳኝ 6.ቀለም ቀቢ 7. እንጨት ስራ	
204	በስራ ቦታ የራስን ጤንነትና ደህንነት መጠበቅን በተመለከተ ስልጠና ወስደው ያውቃለህ?	1.አዎ 2.አላውቅም	207
205	ከወሰዱ መቸ?	1.ስራ ከመጀመሪያ በፊት 2.በስራ ላይ እያለሁ	
206	መደበኛ ስልጠና ለየወሰዱ ነው?	1.አዎ 2.የለም	
207	ስራ በምትሰራበት ወቅት ሁሉ የአደጋ መከላከያ መሳሪያዎችን ይጠቀማሉ?	1.አዎ 2.አልጠወምም	209
208	ከተጠቀሙ ምን አይነት መሳሪያ ይጠቀማሉ?	-----	
209	ካልተጠቀሙ ለምን አይጠቀሙም?	1.ድርጅቱ ስለማያቀርብልን 2.መጠቀም ዋጋ ስለሌለው 3.ምቹት ስለሌለው 4.የስራ ፍጥነትን ስለሚቀንስ 5.ሌላ ካል ይገለፅ ----	
210	መደበኛ የሆነ የስራ ቁጥጥርና ክትትል ይደረጋል?	1.አዎ 2.አይደረግም	

ክፍል 3 የባህሪ ወይም የስነ ልቦና መረጃዎች መጠይቅ

301	አሁን በምትሰራው ስራ ደስተኛ ነህ?	1.አዎ 2.አይደለሁም	
302	የእንቅልፍ ችግር (አጥረት) አለብዎት?	1.አዎ 2.የለብኝም	
303	ጫት ይቅማሉ?	1.አዎ 2.አልቅምም	305
304	ጫት ምንያህል ጊዜ ይቅማሉ?	1. በየወሩ 2. በየሳምንቱ 3.ሁልጊዜ በየቀኑ 4.ሌላ ካል ይገለፅ -----	
305	አልኮል ይጠጣሉ?	1.አዎ 2.አልጠጣም	307
306	ምን ያህል ጊዜ ይጠጣሉ?	1. በየወሩ 2. በየሳምንቱ 3.ሁልጊዜ በየቀኑ 4.ሌላ ካል ይገለፅ -----	
307	በህይወትዎ ዘመን ከ 5 ፓኬቶች በላይ ስጋራ አጭሰዋል?	1.አዎ 2.አላጩስኩም	401
308	አሁንም ያጭሳሉ?	1.አዎ 2.አላጩስም	
309	ካላጩሱ በስንት አመትዎ አቆሙ?	-----አመት	
310	በቀን ስንት ስጋራ ያጭሱ ነበር?	-----	
311	በስንት አመትዎ ነበር ማጩስ ጀመሩ?	-----አመት	

ክፍል 4 የጤና ጉዳትን ወይም በሽታን የሚመለከቱ መረጃዎች መጠይቅ

401	ባለፈው 12 ወራት ውስጥ በስራ ምክንያት ማንኛውም አደጋ ጉዳት ወይም ከስራ ጋር የተያያዘ በሽታ አጋጥሞዎት ያውቃል?	1.አዎ 2.አላጋጠመኝም	
402	ባለፈው 12 ወራት ውስጥ የመውደቅ አደጋ ደርሶብዎታል?	1.አዎ 2.አላጋጠመኝም 	405
403	የመውደቅ አደጋ ከደረሰብዎት፣ ከየት?	1.ከከፍታ ላይ 2.ከመሬት	
404	ባለፈው 12 ወራት ውስጥ የመውደቅ አደጋ ስንት ጊዜ ደርሶብዎታል? ቀኑ መቼ ነበር?	-----	
405	ባለፈው 12 ወራት ውስጥ በቁስ ነበር ጉዳት ደርሶብዎታል?	1.አዎ 2.አላጋጠመኝም 	408
406	በየትኛው ቁስ ነበር ጉዳት የደረሰብዎት?	1.በስለታም ነገር 2.በተንቀሳቃሽ አካል 3.ሌላ ካል ይገለፅ -----	
407	አጠቃላይ ባለፈው 12 ወራት ውስጥ ምንያህል ጊዜ በቁስ ነበር ጉዳት ደርሶብዎታል? ቀኑ መቼ ነበር?	-----	
408	በአደጋ(በመውደቅ እና/ወይም በቁስ አካል: የተጎዳው የትኛው አካልዎት ነበር? (ከአንድ በላይ መምረጥ ይቻላል)	1.ቅንጭላት 2.አይን 3.እጅ 4.እግር 5.ሌላ ካል ይገለፅ -----	
409	ለደረሰብዎት ጉዳት የህክምና እርዳታ አግኝተው ነበር?	1.አዎ 2.አልተደረገልኝም	
410	ለምንያህል:ቀናት:ሆስፒታል:ተኝተዋል(ክትትል);አድርገዋል?	-----	
411	በጉዳቱ/በጉዳቶቹ ምክንያት ስንት ሳምንት ከስራ ቀርተሁል ?	-----	
412	ለደረሰብህ ጉዳት ትክክለኛ ካሳ ተከፍሎህል ?	1.አዎ 2.አልተከፈለኝም	
413	ባለፈው 12 ወራት ውስጥ የቆዳ ችግር ታይቶብዎታል?	1.አዎ 2.አልተከፈለኝም 	430

414	የቆዳ ችግር ካለበዎት፣ቢያንስ ለ6 ወራት ያህል ሄደት መጣ የሚል በቆዳዎት ላይ የሚያሳክክና አበጥ ያለ የሚያም ስሜት ፣ ብዙ ጊዜ በክርኖችህ መታጠፊያ፣ከጉልበቶችህ በጎላኛው ክፍል፣ከቁርጭምጭሚቶችህ ፊት፣ከቂጥህ በታች፣እንዲሁም በአንገትህ፣በጀሮችህና በአይኖችህ አካባቢ ታይቶብዎት ያውቃል?	1.አዎ 2.አልታየብኝ 3.አላወቅሁም	
415	በእጆችህ ቆዳ ላይ አበጥ ያለ ቀይ፣ደረቅና የተሰነታተቀ አይነት ምልክት ታይቶብህ ያውቃል?	1.አዎ 2.አልታየብኝም	
416	በእጅህና በከንድህ ላይ አበጥ ያለ ቀይ፣ደረቅና የተሰነታተቀ አይነት ምልክት ታይቶብህ ያውቃል?	1.አዎ 2.አልታየብኝም	427
417	ይህ ምልክት በእጆችህ ላይ ለመን ያህል ጊዜ ታይቷል?	1.አንድ ጊዜ ብቻ፣ከሁለት ሳምንት በታች 2.አንድ ጊዜ ብቻ፣ለ2 ሳምንትና በላይ 3.ከሁለት ጊዜ በላይ 4.ሁሉንም ጊዜ	
418	በእጆችህ ቆዳ ላይ አበጥ ያለ ቀይ፣ደረቅና የተሰነታተቀ አይነት ምልክቶች ለመጨረሻ ጊዜ የታዩት መቶ ነው?	1.አሁንም አለብኝ 2.አሁን የለብኝም ከ3 ወራት በፊት ነበር 3.ከ 3 እስከ 12 ወራት በፊት 4.ከ 12 ወራት በፊት	
419	ለመጀመሪያ ጊዜ ይህ ምልክት ሲታይብህ እድሜዎት ከ 14 አመት በላይ ነበር?	1.አዎ 2.አይደለም	423
420	ምልክቱ በእጅህ ላይ የታየበት ምክንያት ምንድን ነው ብለህ ታስባለህ?	-----	
421	ምልክቱ ሲጀምርህ ስራህ ምን ነበር?	-----	
422	በግዜው ዋና የስራ ድርሻህ ምን ነበር?	-----	
423	በሀኪም ታይተህ ነበር?	1.አዎ 2.አልታየሁም	
424	ከስራ በታ ውጭ ከተለያዩ ኬሚካሎች ወይም ሌላ ነገር ጋር የምታገርገው ንክኒ ምልክቶቹን ሲያባብስብህ አይተሀል?	1.አዎ 2.አይደለም 3.አላውቅም	

425	እሁድ ቅዳሜ ለበአል ከስራ ውጭ ስትሆን ምልክቶቹ ይጠፋሉ ወይም ይቀንሳሉ?	1.አዎ ሁል ጊዜ 2.አዎ አልፎአልፎ 3.ለውጥ የለውም 4.አላውቅም	
426	በዚህ ህመም ምክንያት ባለፈው 12 ወራት ውስጥ ስንት ሳምንት ከስራ ቀርተህህ?	-----ሳምንት	
427	ባለፈው 12 ወራት ውስጥ በእጅህ ላይ የትኞቹ ምልክቶች ታይተውብህህ? <i>(ከአንድ በላይ መምረጥ ይቻላል)</i>	1.የሚያሳክስ ስሜት 2.የእጅ መድረቅ 3.መቅላት 4.ማበጥ 5.መሰነጥጠቅ 6.ሌላ ካል ይገለፅ -----	
428	አሁን ምልክቱ በእጅህ ላይ አለ?	1.አዎ 2.የለም	
429	በአንድ ሽፍት እጅህን ያለምንም ግላብ ከ 2 ሰአት በላይ በውሀ ውስጥ ታስገባለህ?	1.አዎ 2. በጭራሽ	
430	ባለፈው 12 ወራት ውስጥ የመተንፈስ ችግር አጋጥሞህ ያውቃል?	1.አዎ 2.አላጋጠመኝም	446
431	የመተንፈስ ችግር ካለብህ፣ባለፈው 12 ወራት በየትኛውም ጊዜ የመቃተት ስሜትና በደረት አካባቢ ድምጽ የሚያሰማ ሳል ነበረብህ?	1.አዎ 2.የለም	435
432	የማቃተት ድምጽ በተሰማህ ጊዜ ሁሉ ትንፋሽ ያጥርህ ነበር?	1. አዎ 2. ለም	
433	ጉንፋን በሌለብህ ጊዜ ሁሉ ይህ የመቃተት ስሜትና በደረት አካባቢ ድምጽ የሚያሰማ ሳል ነበረብህ?	1.አዎ 2.የለም	
434	የመቃተት ስሜትና በደረት አካባቢ ድምጽ የሚያሰማ ሳል በባለፈው 12 ወራት ውስጥ ለምን ያህል ጊዜ ተከስቶብህህ?	1.ምንም የለም 2.1 እስከ 3 ጊዜ 3.4 እስከ 12 ጊዜ 4.ከ 12 ጊዜ በላይ	

435	ባለፈው 12 ወራት ውስጥ ከእንቅልፍ ስትነሳ በደረት አካባቢ የመጨናነቅ ስሜት ተሰምቶህ ያውቃል?	1.አዎ 2.የለም	
436	ባለፈው 12 ወራት ውስጥ ከእንቅልፍ ስትነሳ የመተንፈስ እጥረት ተከስቶብህ ያውቃል?	1.አዎ 2.የለም	
437	ባለፈው 12 ወራት ውስጥ ከእንቅልፍ ስትነሳ ሳል ተከስቶብህ ያውቃል?	1.አዎ 2.የለም	
438	አስም ነበረብህ?	1.አዎ 2.የለም	444
439	በሀኪም ምርመራ ተረጋግጦ ነበር?	1.አዎ 2.የለም	
440	አስም ሲይዝህ የስንት አመት ልጅ ነበርክ?	-----	
441	አስም ሲለቅህስ የስንት አመት ልጅ ነበርክ?	-----	
442	በባለፈው 12 ወራት ውስጥ አስም አሞህ ያውቃል?	1.አዎ 2.የለም	
443	አሁንስ የምትወስደው መድሀኒት(የሚሸተት ወይም በሚዋጥ)መልክ አለ?	1.አዎ 2.የለም	
444	በመተንፈሻ አካል በሽታ ምክንያት በባለፈው 12 ወራት ውስጥ ምን ያህል ቀናት ከስራ ቀርተህህ?	1.ምንም የለም 2.1 እስከ 7 ቀናት 3.8 እስከ 30 ቀናት 4.በትንሹ 31 ቀናት 5.አላስታውስም	
445	አሁንስ ቅዳሜ፣ ለበአል ከስራ ውጭ ስትሆን ምልክቶቹ ይጠፋሉ ወይም ይቀንሳሉ?	1.አዎ 2.የለም	
446	በባለፈው 12 ወራት ውስጥ የዓይን ጉዳት ወይም ህመም አጋጥሞህ ያውቃል?	1.አዎ 2.አላጋጠመኝም	451
447	የዓይን ችግር ተከስቶብህ የሚያውቅ ከሆነ በባለፈው 12 ወራት ውስጥ የነበረብህ ችግር? (ከአንድ በላይ መምረጥ ይቻላል)	1.የዓይን ማቃጠል 2.ብናኝ/ቁስ/ በዓይን ውስጥ መግባት 3.የዓይን ኢንፌክሽን 4.ሌላ ካል ይገለፅ -----	

448	በዚያን ጊዜ ስራህ ምን ነበር?	-----	
449	በህክምና ታይተህ ነበር?	1.አዎ 2.የለም	
450	አሁንም የዓይን ችግር አለብህ?	1.አዎ 2.የለም	
451	በባለፈው 12 ወራት ውስጥ የጆሮ ህመም አጋጥሞህ ያውቃል?	1.አዎ 2.አላጋጠመኝም	463
452	የመስማት ችግር ካለብህ፣በትርፍ ጊዜህ ጩኸት ባለበት ቦታ ተጨማሪ ስራ ትሰራለህ?	1.አዎ 2.የለም	
453	ይህን ስራ ከመጀመርህ በፊት ጩኸት ባለበት ቦታ ሌላ ስራ ሰርተህ ነበር?	1.አዎ 2.የለም	
454	በወታደራዊ ሙያ ሰርተህ ታውቃለህ?	1.አዎ 2.የለም	456
455	ከፍተኛ የፍንዳታ ድምጽ ባለበት ተኩስ ውስጥ ተሳትፈህ ታውቃለህ?	1.አዎ 2.የለም	
456	ይህን ስራ ከመጀመርህ በፊት የጆሮ ምርመራ አድርገህ ነበር?	1.አዎ 2.የለም	
457	በጆሮህ ውስጥ የሚያሰጨንቅ ወይም የሚረበሽ ድምጽ ይሰማ ይሰማህል?	1.አዎ 2.የለም	
458	ጆሮህን ህመም ይሰማህል?	1.አዎ 2.የለም	
459	ቅንጭላትህ ላይ ጉዳት ደርሶብህ ያውቃል?	1.አዎ 2.የለም	
460	አሁን የመስማት ችግር አለብህ?	1.አዎ 2.የለም	
461	በሁለቱ ጆሮዎችህ መካከል የመስማት ልዩነት እንዳለ ይሰማህል?	1.አዎ 2.የለም	
462	በየወቅቱ የጤና ምርመራ ይደረግልህል?	1.አዎ 2.የለም	

463	በባለፈው 12 ወራት ውስጥ የታችኛውን የጀርባህን ክፍል ህመም አሞህ ያውቃል?	1.አዎ 2.አላጋጠመኝም	አለቀ
464	የታችኛውን የጀርባህን ክፍል የሚሰማህ ከሆነ፣ በባለፈው 12 ወራት ውስጥ ምንህን ነበር የሚያምህ? <i>(ከአንድ በላይ መምረጥ ይቻላል)</i>	1. የታችኛውን የጀርባህን ክፍል 2. አንዱን/ሁለቱን ጉልበቶቻችን 3. አንዱን/ሁለቱን ቁርጭምጭሚቶቻችን 4. አንዱን/ሁለቱን ወገብ ወይም ጭኖቻችን	
465	በዚህ ህመም ምክንያት በባለፈው 12 ወራት ውስጥ ምን ያህል ቀናት/ሳምንታት ከስራ ቀርተህ ታውቃለህ?	-----	
466	ለምን ያህል ጊዜ ነው ይህ ችግር የቆየብህ?	-----	
467	ይህ ህመም ሲጀምርህ ዕድሜህ ከ18 አመት በላይ ነበር?	1.አዎ 2.አይደለም	
468	በዚያን ጊዜ ስራህ ምን ነበር?	-----	
469	ባንተ አስተሳሰብ የችግሩ ምክንያት ምንድንነው ትላለህ?	-----	
470	ከባድና እረፍት የሌለው፣ ለብዙ ሰዓት በመቆም/ በመቀመጥ/ የሚሰራ ስራ ትሰራለህ ነበር?	1.አዎ 2.አይደለም	
471	አሁን ይህ ችግር ወይም ህመም አለብህ?	1.አዎ 2.አይደለም	

ANNEX 3 afaan oromoon Questioner

Yuunivarsitii jimmaa Kolleejii fayyaa jimmaa universitii Muummee teeknooloojiif sayinsii fayyaa naannoo Kun qorannoo ragaa miidhaa fi dhukkuba hojjetoota hojii ijaarsaa irratti bobba'an quunnamuf Kan godhamu dha.

Unka yaadachiisaa

Jaallatamoo hojjetootaa

Kun unka qorannoo miidhaafi dhukkuba namoota ijaarsaa irratti bobba'an irraan kan gahan kan qoratu yeroo ta'u ati qorannoo kanaaf carraan filamteetta.

Kaayyoon qorannoo kanaa miidhaafi dhukkuba namoota ijaarsaa irratti bobba'an irraan kan gahan kan xiinxalu yeroo ta'u bu'aan qorannoo kanaas balaa kana to'achuuf ykn hiri'isuun galma isaa ta'a.

qorannoo kanatti hirmaachuun kee miidhaa sirraan gahu akka hinqabne siif ibsina. Qorannichi gaaffilee jireenya dhuunfaa kee sakatta'an ofitti qabatee jira. kaayyoo qorannoo kanaa galmaan gahuuf gargaarsa kee gaafanna. kanatti aananii dhuunfaan sigaafachuun gaaffileen guutaman jiru. unka gaaffii kanaa irrattis maqaa barreessuun hinbarbaachisu. bu'aa qorannoo kanaa irratti ragookee jireenya dhuunfaa ibsan qophaatti hindhiyaatan. Gaaffilee hunda ykn kan feete tokkos ta'u deebisuu nidandeessa. qorannoo kanatti hirmaachuu feeta yoo ta'e mirgi kee eegamaadha.

kanaaf unka gaaffii kanaa guutuuf iyyamamoodhaa?

Eeyyee gara fuulla itti aanutti darbaa,

_____ mallattoo.



Hinhirmaadhu (galatoomaa) isin galateeffanna.

Kutaa 1. Gaaffiiragaalee jireenya dhuunfaa

Lakka.	Gaaffilee	Deebii	Kan itti darbamu.
101	Umuriin keessan meeqa?	-----	
102	Saala?	1.dhiira 2.dhalaa	
103	Iddoo jireenyaa?	1.magaalaa jimmaa 2.baadiyyaa	
104	Haala fuudhaaf heerumaa?	1.kanfuudhe/heerumte 2.kan hinfuune/hinheerumne 3.kan hiike/hiikte	
105	Amantaa ?	1.poritistaantii 2.Ortodoksii 3.musiliima 4. kan biraa yoo ta'e ibsi.	
106	Qomoo?	1.oromoo 2.amaara 3.Guraagee 4. qomoo biraa ibsi.	
107	Sadarkaa barnootaa?	1. dubbisuuf barreessuu kan hindandeenye? 2. dubbisuuf barreessuu qofa kan danda'u. 3. Sadarkaa tokkooffaa kan xumurte. 4. Sadarkaa lammaaf isaa ol.	
108	Miindaa ji'aa?	-----	

Kutaa 2ffaa unka ragaalee industirichaan wal qabatan.

Lakka.	Gaaffilee	Deebii	Kan itti darbamu.
201	Waggaa meeqa ihojii ijaarssa keessa hojjettan?	-----	

202	Guyyaatti sa'a meeqa hojjettu?	-----	
203	Ijaarsa keessaa Gosi hojii kee ammaa maalidha?	1.qonnaa 2.hojii guyyaa 3.bayyaduu 4.ijaartuu 5.haxooftuu 6.halluu dibduu	
204	Leenjii yaalii of eeggannoo fudhattee kana dura?	1.eeyyee 2. Hinfudhanne. 	207
205	Yoo eeyyee jette yoom fudhatte?	1.osoo hojii kana hineegalin 2.erga hojii kana eegaltee	
206	Leenjii yeroo hunda qabduu?	1.eeyyee 2.hi'iyoo	
207	Yeroo hojii meeshaa of eeggannoo qabduu?	1.eeyyee 2.hiyyoo 	209
208	Eyyee yoo jette gosa maalii?	-----	
209	Miti yoo ta'e maalif?	1.Hobannoo isaa hinqabu 2.faaayidaa hinqabu 3. Hinmijaa'u. 4.Hojiif hin mijatu 5. Kanbiraa yoo jiraate ibsi?	
210	Superviisioniin yeroo hundaa qabduu?	1.eeyyee 2.hinjiru	

Kutaa 3 odeeffannoo amalaa/fedhii.

Lakka.	Gaaffilee	Deebii	Kan itti darbamu.
301	Hojii ammaattii gammaadde?	1.eeyyee 2.miti	

302	Jeequms hirribaa (hir'na) qabduu?	1.eeyyee 2.miti	
303	Caatii ni qamaatuu?	1.eeyyee 2.miti	
304	Eeyyee yoo ta'e ammam?	1.altokko tokko 2.darbee darbee ji"atti 3.ammaa ammaa 4. Guyyaa guyyaan.	
305	Alckoolii ni dhugduu?	1.eeyyee 2.miti	
306	Yoo eeyyee jette hammamiin?	1.altokko tokko 2.darbee darbee ji"atti 3.ammaa ammaa 4. Guyyaa guyyaan.	
307	Sigaaraa baakkoo shanii ol xuuxxaniittuu?	1.eeyyee 2.hiyyoo	311
308	Ammayyuu nixuuxxuu?	1.eeyyee 2.miti	
309	Miti yoo ta'e yoom xuuxuu dhaabdan?	-----	
310	Guyyaatti hammam xuuxxuu?	-----	
311	Umurii kamitti xuuxuu eegaltan?	-----	

Kutaa 4 Unka gaaffii Ragaa fayyaa waliin wal qabatan.

Lakka.	Gaaffilee	Deebii	Kan itti darbamu.
312	Ji'oota 12 darban keessatti sababa hojii irraan kanka'e miidhaan ykn hojii kanaan kan walqabatu dhukkubi isin qabee beekaa?	1.eeyyee 2.nan mudanne	

313	Isin mudatee beeka yoo ta'e balaa kamidha?	1.balaa kufuu 2. Miidhaa meshaa fi wantota adda addaa. 3. Midhaa gogaa foonii irra gahe. 4. Miidhaa afuura baafannaa. 5. Miidhaa gurraa/dhagahuu. 6. Dhukkubbii dugdaa.	
314	Kufaatiin balaa yoo isin irra gaheera ta'e eessaati?	1.iddoo olka'aa irraa 2.lafarraa	
315	Wanta akkamiin miidhamtan?	1. Wanta qara qabuun. 2. Wanta socha'uun. 3. Wnta biraan yoo jiraate naaf ibsaa?	
316	Walii gala ji'oot 12 darban keessa balaa maaliitu isin irra gahee jira?	-----	
317	Balaan kan miidhame qaama keessan keessaa kam ture?	1.mataa 2. Ija. 3.harka 4.miilla 5. Kanbiraan yoo jiraate naaf ibsaa. .	
318	Balaa isin irra gaheef gargaarsa yaalii argattaniittuu?	1.eeyyee 2. Naaf hingodhamne.	
319		-----	
320	Miidhaa kana irraan kan ka'e yeroo hammamiif hojii iraa haftan?	-----	
410	Balaa sirraa gaheef beenyaa argattanii?	1.eeyyee 2. Naaf laatamne?	
411	Rakina gogaa yoo qabaattan,yoo xiqqaatee ji'a 6 asitti dhufe	1.eeyyee 2.hinmullatne 3.hinbeeku	

	kanjettan,hoosisaa,dhiita,iddoo buusaa ciqilee,naannoo jilba,gulbii irra,iddoo taa'umsa gadi,akkasuma naannoo morma,naannoo ijaaf gurraa mullatee beekaa?		
412	Gogaa harka keessanii irratti mallatoon dhiita diimaa, qooraaf kan babbaqaqe fakkaatu mul'atee beekaa?	1.eeyyee 2. Hinbeeku.	
413	Gogaa harka keessanii fi ceequu (ciqilee) irratti mallatoon dhiita diimaa, qooraaf kan babbaqaqe fakkaatu mul'atee beekaa?	1.eeyyee 2. Hinbeeku.	424
414	Mallatoon kun yeroo hammamiif mul'ate?	1.altokko qofa.torbee lamaa gadi 2. altokko qofa.torbeetokko gadi 3 al lamaa ol 4. Yeroo hunda.	
415	Gogaa harka keessanii irratti mallatoon dhiita diimaa, qooraaf kan babbaqaqe fakkaatu yeroo dhumaaf kan mul'atan yoomidha?	1.amma qaba 2. Amma hinqabu ji'a sadii dura ture. 3. Ji'a 3 hanga ji'a 12 dura ture. 4. Jia'a 12 dura ture.	
416	Yeroo jalqabaa mallatoon kun isinirrati mul'ate umuriin keessan waggaa 18 ol ture?	1.eeyyee 2.miti	420
417	Mallattoo harka keessani irratti mul'atee sababi isaa maal jettanii yaaddu?	-----	
418	Mallatoon kun yeroo isin eegaluu hojiin keessan maal ture?	-----	

419	Yeroo sanatti gaheen hojii kee inni guddaan maal ture?	-----	
420	Ogeessa fayyaan ilaalamtee turtee?	1.eeyyee 2. Hinilaalamne.	
421	Iddoo hojii keen alatti keemikaala biraatiin mallattoon kun isinitti hammaatee beekaa?	1.eeyyee 2.miti 3.hinbeeku	
422	Sanbata xiqqaaf guddaa yks yeroo hojii malee ooltan mallattooleen kun nibaduu yks ni hir'atuu?	1.eeyyee yeroo hundaa 2. Eeyyee darbanii darbanii. 3. Jijjiirama hinqabu. 4. Hinbeeku.	
423	Sababa dhukkuba kanaan yeroo hammamiif hojii irraa oolte?	Torban-----	
424	Ji'oota 12 darban keessatti mallattolee akkamiitu isin irratti mul'atee beeka? (tokkoo ol filachuun nidanda'ama)	1.miira hoosisuu 2.qoorinsa harkaa 3.diimachuu 4.dhiita 5. tarsa'uu 6.kanbiraan yoo jiraate	
425	Amma mallattichi harka keessan irra jiraa?	1eeyyee 2.hinjiru	
426	Yeroo altokko gidduutti harkakee 'gilaavii' malee waltti aansaa sa'a lamaaf bishaan keessa nigashituu?	1.eeyyee 2. Hintursu.	
427	Yoo rakkina hafuura baafannaa qabaattan yeroo afuura baafattanis ta'e naannoo laphee keessaniitti dhukkubbiin dhagahamu jiraa?	1.eeyyee 2.hinjiru	431
428	Yeroo afuura guddaa baafattu hafuurri sixiqqaatti turtee?	1eeyyee 2. Hiyyoo.	

429	Yeroo qofaa (utaalloo) hinqabnetti aadnaa fi dhukkubbiin naannoo laphee keetti isinitti dhageessisu qofaa qabduu?	1.eeyyee 2.hinjiru	
430	Afuura baafannaa guddaaf naannoo laphheetti sagaleen dhagahamu ji'oot 12 darban keessatti yeroo hammamiif isinitti ka'ee beeka?	1.hnjiru 2.si'a 3 3. 4 hanga 12 4.12 ol.	
431	Ji'oota 12 darban keessatti yeroo hirribaa kaatan naannoo laphee keessaniitti dhiphinni isinitti dhagahamee beekaa?	1.eeyyee 2.hinbeeku	
432	Ji'oota 12 darban keessatti yeroo hirribaa kaatan hir'inni argansuu isin mudatee beekaa.	1.eeyyee 2.hinbeeku	
433	Ji'oota 12 darban keessatti yeroo hirribaa kaatan qufaan isin mudatee beekaa?		
434	Asimaa qabduturtanii?	1.eeyyee 2.hinqabu	440
435	Qorannoo ogeessaan mirkanaa'ee turee?	1.eeyyee 2. Hiyyoo.	
436	Asimaan yiroo isin qabe umuriin keessan meeqa ture?	-----	
437	Asimaan yiroo isin dhiise umuriin keessan meeqa ture?	-----	
438	Ji'oota 12 darban keessatti isin dhukkubee beekaa?	1.eeyyee 2.hinbeeku	
439	Qoricha amma fudhattu (kanfuunfatamu ykn kanliqqifamu) jiraa?	1.eeyyee 2.hinjiru	

440	Dhukkuba ujummoo afuura baafannaa irraan kan ka'e hammad hojii irraa haftan?	1.hinjiru 2. guyyoota 1 -7 3.guyyoota 8-30 4. yoo xiqqaate guyyoota 31 5. Hinyaadadhu.	
441	Sanbata ykn yeroo ayyaanaa hojii malee gaafa ooltu mallattooleen kun ni hir'atu yks ni baduu?	1eeyyee 2. Hiyyoo.	
442	Ji'oota 12 darban keessatti dhiee ykn dhukkubbii ijaa isin dhukkubee beekaa?	1.eeyyee 2.hinbeeku	446
443	Isin dhukkubee beeka yoo ta'e gosa kamtu sidhukkube beeke	Gubuu ijaa	
444			
445			
446	Rakkina gurraa qabda yoo ta'e yeroo boqonnaa keetti iddoo jeequmi (sagalee adda addaa) jirutti hojii dabalataa ni hojjettaa?	1eeyyee 2. Hiyyoo.	
447	Hojii kana osoo hineegalin iddoo sageeleen jeequmsaa jiruu hojii hojjettee beektaa?	1eeyyee 2. Hiyyoo.	
448	Hojii raayyaa waraanaa hojjettee beektaa?	1eeyyee 2. Hiyyoo.	450
449	Dhohinsi guddaa fi sagalee dhukaasa hirmaattee beektaa?	1eeyyee 2. Hiyyoo.	
450	Hojii osoo hin eegalin yalii qorannoo gurraa godhattanii beektuu?	1eeyyee 2. Hiyyoo.	

451	Sagaleen jeequmsaaf kan nama dhiphisu sitti dhagahama?	1.eeyyee 2. Hiyyoo.	
452	Dhukkubbiin gurra keessanitti nidhagahama?	1eeyyee 2. Hiyyoo.	
453	Mataa keerra rakkinni gahee beekaa?	1eeyyee 2. Hiyyoo.	
454	Amma rakkina dhageettii qabduu?	1.eeyyee 2. Hiyyoo.	
455	Adda addummaan dhageetti gurra keessan lamman jiru isinitti nibeekamaa?	1.eeyyee 2. Hiyyoo.	
463	Yeroo yerootti qorannoo nifayyaa isiniif ni ta'aa?	1.eeyyee 2. Hiyyoo.	
464	Ji'oota 12 keessatti mudhii kee gadi kan sidhukkuban yoo jiraatan kamidha?	1.dugda koo gara gadii 2.jilaba tokka/lammansaa 3. Gulbii tokko/lamman. 4.tokko/lamman ykn cinaacha	
465	Dhukkuba kana irraan kan ka'e hammam hojii irraa haftan?	-----	
466	Rakkinni kun yeroo hammamiif isin irraa tire?	-----	
467	Dhukkubi kun yeroo si eegale umuriinkeessan 18 ol ture	1eeyyee 2. Hiyyoo.	
468	Yeroo sana hojiin keessan maal ture?	-----	
469	Akka yaada keessaniit maddi dhukkuba kanaa maal jettu?	-----	
470	Hojii Ulfaataaf boqonnaa hinqabne yeroo dheeraaf taa'uun ykn ijaajjuun hojjettan tureeraa?	1eeyyee 2. Hiyyoo.	
471	Amma rakkina kana/dhukkubba kana amma qabduu?	1eeyyee 2. Hiyyoo.	

ANNEX 4. Observational Checklist

1. Are cranes and derricks restricted from operating within 20 feet of any electrical power line?
YES-----NO-----
2. Are rated capacities, operating speed, and instructions posted and visible to the operator?
YES -----NO-----
3. Is a fire extinguisher of at least 5BC rating provided on the crane?
YES-----NO-----
4. Do crane platforms and walkways have anti-skid surfaces?
YES-----NO-----
5. Is broken, worn, or damaged wire rope removed from service?
YES-----NO-----
6. Are exhaust pipes guarded or insulated where employees might contact them?
YES-----NO-----
7. Are guardrails, hand holds, and steps provided for safe and easy access to all areas of the crane?
YES-----NO-----
8. Are ladders with broken or missing rungs or split side rails tagged and taken out of service?
YES-----NO-----
9. Are metal ladders inspected for damage or signs of corrosion?
YES-----NO-----
4. Are portable wood ladders and metal ladders adequate for their purpose, in good condition, and provided with secure footing?
YES-----NO-----
5. Are areas around the top and bottom of the ladder kept clear?
YES-----NO-----
6. Are portable ladders used at such a pitch that horizontal distance from the top bearing to the foot of the ladder is about 1/4 of the working length of the ladder?
YES-----NO-----
7. Are ladders prohibited from being used in a horizontal position as platforms, runways, or scaffolds?
YES-----NO-----
8. Are portable ladders tied, blocked, or otherwise secured against movement?
YES-----NO-----
9. If simultaneous two-way traffic is expected, is a double cleat ladder installed?
YES-----NO-----

10. Are the rungs of ladders uniformly spaced? YES-----NO-----
11. Are the side rails of the ladder extending at least 36 inches above the landing?
YES-----NO-----
12. Are stairways in good condition and are stair rails provided for stairways having four or more risers?
YES-----NO-----
13. Are the rated load capacities of the powered industrial trucks clearly marked and not exceeded?
YES-----NO-----
14. Are raised loads kept as close to the ground as possible to prevent tipping while traveling?
YES-----NO-----
15. Are wire rope guardrail systems more than 1/4 of an inch in diameter or greater and flagged at 6 foot intervals? YES-----NO-----
16. Are canopies, screens, or toe boards installed to prevent falling objects?
YES-----NO-----
17. Are labeled covers secured over holes?
YES-----NO-----
18. Is the PFAS used to prevent falls from heights above 6 feet?
YES-----NO-----
19. Was the PFAS designed and installed by a qualified person to maintain a safety factor of two?
YES-----NO-----
20. Will the PFAS limit the maximum arresting forces imposed on an employee wearing a body harness to 1,800 pounds? YES-----NO-----
21. Is the PFAS rigged in such a manner that an employee can neither free fall more than 6 feet nor contact any lower level? YES-----NO-----
22. Are safety nets installed as close as practicable but no more than 30 feet below the walking working surface? YES-----NO-----
23. Are safety nets extended beyond the edges of the walking working surfaces 8 to 13 feet depending on the potential fall distance? YES--NO- -----
24. Is the potential fall area from the walking working surfaces on bridges to the nets unobstructed?
YES-----NO-----
25. Is the footing of the scaffold sound, rigid, and capable of carrying 4 times the maximum intended load? YES-----NO-----
26. Are defective parts on scaffolds immediately replaced or repaired?
YES-----NO-----

27. Are guardrails and toe boards installed on all open sides and ends of scaffold platforms?
 YES-----NO-----
28. Are scaffolds equipped with toe boards wherever there is a possibility that falling material could cause a hazard? YES-----NO-----
29. Are toe boards at least four inches in height?
 YES-----NO-----
30. When employees are working on suspended scaffolds, are life lines firmly anchored to an overhead structure and not to the scaffold? YES---NO-----
31. Are employees wearing body harnesses attached to life lines?
 YES-----NO-----
32. Has a chemical information list been compiled?
 YES-----NO-----
33. Have material safety data sheets (MSDS) been obtained or developed for all substances on the chemical information list?
 YES-----NO-----
34. Is adequate ventilation provided? YES-----NO-----
35. Is protective equipment used to protect against over-exposure?
 YES-----NO-----
36. Is appropriate PPE provided and using in each departments?
 YES-----NO-----
37. Is there excessive noise in the workplace difficult to communicate nearby workers?
 YES-----NO-----
- Have work areas where noise levels make voice communication between employees difficult been identified and posted? YES-----NO-----
38. If they use ear protectors, are employees properly fitted and instructed in their use and care?
 YES-----NO-----