OCCUPATIONAL INJURIES AND ASSOCIATED FACTORS AMONG BUILDING CONSTRUCTION WORKERS IN BOLE SUB CITY, ADDIS ABABA, ETHIOPIA.

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Occupational In juries a nd A ssociated Factors among B uilding C onstruction Workers in Bole Sub City, Addis Ababa, Ethiopia

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Acronyms

AAU: Addis Ababa University

AOR: adjusted odd ratio

COR: crude odd ratio

CSA: Central Statistical Agency

DC: Data Collector

ETB: Ethiopia Birr

GDP: Gross Domestic Product

ILO: International Labor Organization

OSH: Occupational Safety and Health

PI: Principal Investigator

PPE: Personal Protective Equipment

SPSS: Statistical Product and Service Solution

US: United State

WHO: World Health Organization

Abstract

Background: Occupational injury is an unintentional physical damage or injury resulting from an occupational accident. In developing countries, an occupational injury is one of a major problem in the field of public health. This study aims to assess prevalence and factors associated with occupational injury among level one general contractor firm building construction workers in Bole Sub –city, Addis Ababa.

Methods: Institutional-based cross-sectional study was conducted in 12 licensed level one General contractor firms in Bole sub-city from March 01-17, 2017. Stratified sampling technique was used which includes 804 study subjects. Data were collected via face to face interview; Data entry and analysis were used Epi data version 3.1 and SPSS version 21 software package respectively. Descriptive statistics mean, frequency and percent were performed for most variables, bivariate analysis were preformed, Variables with 95% confidence intervals and P value at <0.2 during the bivariate analysis were included in the multivariate logistic regression analysis to see the effect of confounding variables.

Result A total of 278 (34.6%) respondents reported occupational injuries during the past 12 months giving an overall annual prevalence rate of 346 injuries per 1000 construction workers. Of the total 278 injured respondents 216(77.7%) were hospitalized, the main cause of injury were fight by sharp object 166 (59.7%) and hit by falling object 47(16.9%). Sex (AOR [95%CI] = 2.85[1.17, 6.93]) and employment condition (AOR [95%CI] = 2.92 [1.47, 5.83]) were significantly associated with occupational injury. Working environment variable like regularly machines works safe guard (AOR [95%CI] = 2.17 [1.12, 4.19]) and work involves manually handling activity (AOR [95%CI] = 2.22 [1.02, 4.59]) were associated with occupation injury. Using Personal protective equipment (PPE) all times, drinking alcohol, chewing chat and work satisfaction were statically significantly associated with occupational injury. The odds of occupational injuries were 2.34 times higher among all time non-users PPE when compared with user (AOR [95%CI] = 2.34[1.24, 4.42]). Drinking alcohol increased the odds of occupational injuries by about three folds as compared to those who are not drink alcohol (AOR [95%CI] = 3.01[1.39, 6.90]).

Conclusion and Recommendation: - The report of this study indicated relatively lower prevalence of injury among building construction employees compared to other studies this might be machine safe guarded, regular maintenances, and use of personal protective equipment all times. So, it is recommend that workers should be conducted for regular monitoring of substance abuse in workplace and use of personal protective equipment all times had significantly contributed to reduce risks of occupational injuries.

Key words: **Occupational injury, associated factors, construction worker, General contractors firm**

1. Introduction

1.1. Background

Occupational injury is a death, unintentional physical damage resulting from an occupational accident. It is fatal or non-fatal injury (1, 2).

According to International Labor Organization 2011 report estimated that 331.5 million occupational accidents and Due to this, 2.34 million deaths occur across the world each year from occupational accidents and diseases(3). Similarly, the overall annual rate of occupational accidents, fatal and non-fatal, is estimated at 270 million, Some 160 million workers suffer from work-related diseases and about two-thirds of those are away from work for four working days or longer as a result(1, 4, 5).

The construction industry is one of the highest injury rates occur in the world (6, 7). In addition, currently, this sector presents a main public health problem resulting in serious social and economic consequences. But, the burdens of occupational injuries are mostly preventable by use of appropriate occupational safety and health services (8).Among all industries, Construction is one of the most hazardous industries for workers. It had the second and the fourth highest rate of non-fatal and fatal injuries respectively. Hazards in construction work such as, in excavations include, working at heights; use of power tools and heavy equipment and working in confined spaces. The leading causes of death among construction workers are falls from elevation, being struck by vehicles and equipment, electrocution, machine-related incidents, and being struck by objects(7).

In 2015, US bureau of labor statistic reports shows that roughly 2.9 million non-fatal workplace injuries and illnesses, of which 2.8 million were injuries in private industry employers, which occurred at a rate of 3.0 cases per 100 equivalent full-time workers(9).

The recent report of china, Hong Kong special administrative region, department of labor shows that 3863 occupational injury occurs in the construction industry. Of which 43 of them are fatal. The major type of accident occur in this sector are slip, trip or fall on the same level, striking against or struck by moving object and fall of a person from the height. Among this type fall of the person in height is very fatal(10).

Every year 54,000 workers die and 42 million occupational injuries occur in sub-Saharan Africa, that cause at least three days' absence from work(1).

According to Ethiopia labor statistics development program with ILO, improving working environment and strengthening occupational health and safety are used for enhancing work efficiency at any industry (11, 12) The majority of developing country like Ethiopia, occupational health and safety aspect has been given less attention and workers who have been done in construction industry are work- related injury occur very high. This is due to illiteracy, poverty, lack of health, and safety training and information on health hazards and risks at the workplace(13). Additionally, there is no systematic recording of occupational injury among the workers in the construction area. However, occupational injuries among these workers were high due to different factors and there was no any measure taken before to control and prevent occupational injury occur in construction workers due to lack of scientific information(14). Therefore this study intends to assess the prevalence and associated factors of occupational injury among the General contractor firm construction workers in Bole sub city.

1.2. Statement of the problem

Globally, about millions of working age group peoples are work under poor and risk environments, due to these occupational injuries and diseases continue to be the leading cause of work-related deaths(15).

Recently WHO/ILO report shows that every 15 seconds, a worker dies from occupational accident or disease(16) Every 15 second, 153 workers have, every day, 6,300 people die as a result of occupational accidents or work-related(15). The impact of these, the economic burden of occupational injury that means the direct and indirect cost 1.8%–6%GDP in average 4% of national domestic product in worldwide(16-18). And also, the economic burden of the construction industry, total costs of fatal and non -fatal injuries were estimated at $11.5billion(19). According to some studies, the construction industry in the world is rapidly growing at a rate of 5.5% on average. This reality is also experienced in the Ethiopian context; it reaches to 12% in the year 2014/ 15(20). However, a survey was done by International Commission on Occupational Health members from 47 Industrialized and Industrializing countries, the estimated coverage of workers with OSH services was only 18%(16)

In developing countries, an occupational injury is one of an epidemic problem in the field of public health as defined World Health Organization(21).It is estimated that construction workers are three times more likely to be killed and twice as likely to be injured than workers in any other occupation(7). Due to favorable conditions for investment construction industry is very fast growing in developing country like Ethiopia, and information about work-related health and safety have the essential for reduction of occupational injury from this increasing(22). Several researches show that the major causes of accidents are related to the unique nature of the construction industry, human behavior, difficult worksite conditions, and poor safety management (23-25). It is the risk of having work-related injury is 10 to 20 times higher than that of developed countries(4, 26)

Many developing countries like Ethiopia the death rates among workers are higher than developed country, and occupational injuries and disease are largely undocumented, and also the occupational health and safety measure implemented in the will of politically (27). In a country level, three consecutive year report show that 8836 accident occur, of which 23 are fatal, out of fatal accident 6(38.3%) of occur in the construction industry. Due to the accidents around 33,247, days were lost without work. The severity rate for the accident is found to be 1.93 hours out of 1000 hours of work. The frequency rate was an average around 21hours out of one million worked hours in the consecutive three years. This look like as if it is negligible severity rate in terms hours lost but it does not show the real situation due to under-reporting of accidents statistics from 75% the country (14).

Miscellaneous studies show that the housing conditions of Addis Ababa don't meet most of the requirements of buildings where human lives or used it as an office or commercial purpose(28). Irrespective of this, the construction industry is at its booming stage, especially in Addis Ababa. Hence, implementation of occupational health and safety rules had a major problem in developing country. In Ethiopia, some work has been done on occupational health and safety aspects of building construction workers and as per literature review, there is lack of data about the prevalence and associated factors of occupational injuries among these workers. Therefore, this study attempted to contribute in determining prevalence and factors.

1.3. Significance of the study

An occupational injury is one of the most prevalent among construction industries. Reports of developing countries show work-related injuries are the most commonly reported occupational illness and reasons for long-term sick leave and disability pensions. Apart from personal suffering, these conditions impose a major financial burden on the community, on employers and on individuals. There is less information about the prevalence and associated risk factor of work-related injuries among building construction workers population in developing countries like Ethiopia when compared to industrialized countries.

This study provides baseline information for policy makers and researcher about work-related injury to incorporate in National Occupational Health and Safety Policy according to the context of our country, will provide valuable information for researchers for further investigation, also for employer, employee and to design a strategy to prevent work-related injury in this segment of the population.

2. Literature review

Occupational safety and health broadly defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the place of work that could damage the health and welfare of workers, taking into account the possible impact on the surrounding communities and the general environment(1). Globally, hundreds of millions of people are working in unsafe conditions. Among many industry construction industries is considered as the extremely hazardous working environment, as a result, the health status of construction workers need to be careful attention, during and out of the industry(22).

A Recent simulation of the ILO shows that in Ethiopia the economy lost over US 234 million (7%) annually from 1992-2002 because of labor loss. The accidents are reported only from around 10% of the undertakings that are covered by the legislation. Out of the all occupation accident 19 .5% of reported by the construction industry, As a result of many predisposing factors, the situation of OSH in Ethiopia remains to be at its premature stage. Presently, there is no much strength in the OSH system in relation to policy, implementation of legislation, infrastructure, skills, and capacity etc. all in all the weakness predominates (14).

Many researches are done in construction workers occupational hazards, yet only some countries to identify the health status of construction workers by routine surveillances(22).The majority research finding shows that the main risk factors for workers in the workplace related to occupational injury are severity, types of injury, and occurrence. whereas, the issue of PPE even if it is taken care by the bargaining, is not well backed by the necessary studies and evaluation of workplace hazards and their impact on health and safety(14).

2.1. Prevalence of occupational injury

Prevalence of work-related injury in the workplace among construction workers had in USA 39.9% (29)Japan35.6%(30), India 22.9% in the whole one year period.

In 2013, Study conducted in India results show that the prevalence of occupational injury among construction workers had 12.1% in less than one year period(31).

Two Study done in north Africa, Egypt show that the 12 month prevalence of occupational injury among construction workers 18.4 %(24) and Mit-Ghamr City, Dakahlia Governorate 46.2%(32).

Cross sectional Study conducted in Ethiopia, Gondar one year prevalence occupational injury among construction workers were 38.7%(23) and study done in our country Afar Regional State, among Tendaho Agricultural development Social company workers and North Gondar Zone among small and medium scale industry workers annually prevalence of occupational injury rate 335/1000 and 783/1000 respectively was recorded per a single year(33, 34). Another study done in Addis Ababa among building construction over all annual prevalence of occupational injury were 38.3%(25).

2.2. Socio- demographic determinants of occupation injury

Association between socio-demographic variables and occupational injury in different investigators result show that significantly association. such as gender significance association with work-related injury both developed and developing countries like Canada(35), Japan(30), Germany(36), China, India, and Ethiopia, male workers were about 2.5 times more likely to report occupational injury than female workers. In another word, the prevalence of occupational injury male had higher risk than female (23, 34, 37). In contrarily , another study conducted in Ethiopia, Gondar, Afar region, and Addis Ababa shows that female workers had higher occupational injury than a male(25, 33). Occupational injury has on significance statistical association with a gender of the worker(34, 38).

Investigators at different places indicated that younger or < 30 years workers suffer more occupational injury at a higher rate than older workers(37, 39-41).The study conducted in India a matched case-control study of occupational injury in underground coal mine workers in India result sow that age 45 and above had greater risk for work related injury, however the type of injury had most time occur in under 45 age group(42). In addition, another Case -Control study conducted in Textile Factory Workers in Amhara Regional State Ethiopia, show that there is significance association between ages with occupational injury in the workplace(33, 37). However, the prevalence of occupational injury is no significance association with age(23).

The study was done in India, the socio-demographic factor like education level, age, and marital status had a significant contribution to occupational injury (30, 40, 43). And also recent Cross-sectional study done in Ethiopia, Amhara region among municipal solid waste collectors show that education level, monthly salary, and work experience are significance associated with severe occupational injury (33, 44). On the other hand, educational status of the worker has not significantly associated with magnitude of injury(34, 38).

Institutional based cross-sectional comparative study done in Ethiopia, Gondar among the workers of small and medium –scale industry show that, worker experience had highly or significantly association with occupational injury(34, 36, 41), Less experienced in their current job or less familiar with equipment and machinery has the ability to increase the risks of work place accidents (39). And also, worker experience is necessarily for in construction sector to reduce occupational injury. However, experienced workers in particular construction had appeared to be at particular risk of occupational disability (45).

2.3. Common occupational injuries, causes, and parts of the body affected

Most study show that the leading cause of occupational injury among construction workers are falling ground level, struck by an object, cutting by sharp object and slipping (23-25, 32, 46). Study among Egyptian workers in construction industry reported that head 23.7%, Upper limb 15.1%, lower limb and trunk13.8% each and eyes 14.6% were the parts of the body commonly affected(24).similar study show that upper and lower limb, finger/hand/injury are the most common body part of injury among construction workers(25, 32, 40)

Questionnaires-based survey conducted in Ethiopia, Gondar among construction worker show that the major occupational problem are skin disorder 16%, eye problem and headache 15%, musculoskeletal problem and harm by sharp instrument 14%(47)

2.4. Working environment determinants of occupational injury

Different country study showed that worked hour per day, work place supervision, and health and safety training were significant association with occupational injury(30,32, 33,34,37).

Study done in Ethiopia nor th Gondar zone among small-and medium-scale factory workers revealed that risk of occupational injury decreased with job satisfaction and work place supervision(34). Study done in our country on textile factory workers indicated that workers who did not train on health and safety were 1.8 times more likely to report work-related injury than workers who trained. But, health and safety information access didn't show significant association to the occupational injury (37).another study done in Addis Ababa health training did not show significant association with the occurrence of occupational injury(25).

Evidences from literatures dictating the work environment determinants of occupational injury evinced, involving in activities requiring manual handling exposes workers to injury considerably (56).

2.5. Behavioral determinants of occupational injury

Both developed and developing countries the major determinant or risk factors of occupational injury in workplace are workplace stress, tobacco, and drug and alcohol consumption in the workplace(12, 48). Different investigators emphasize that factors work-related injuries are the use of personal protective equipment, work experience, and khat chewing were greatly associated (1, 12, 25, 31, 37).

Cross- sectional study conducted among municipal solid waste collector in Ethiopia show that Utilization of personal protective equipment (PPE) in the household was statistically associated with injury. As compared to workers who used personal protective equipment while being on duty, odds of injury among workers not used personal protective equipments was 2.62 higher(49). A similar study also conducted in Ethiopia odds of occupational injury among non-users was 1.5 times higher than personal protective equipment(PPE)users (34).Another study done in Ethiopia among municipal solid waste collector workers, work experience, monthly salary, job category, sleeping disturbance, and job related stress was significantly associated with occupational injury (44).

A cross-sectional study was done in Mit-Ghamr City, Dakahlia Governorate, Egypt among building construction workers extended work hours, short duration of work, job dissatisfaction, lack of vocational training, working overtime and job stress were significantly associated with occupational injury(13, 23, 32, 50). A case-control study done in India show that illiteracy, alcohol consumption, big family, and disease and risk-taking behavior was associated with injury(13, 51).

Finally, the prevalence and factors that contribute the occurrences of injury in workplace in Ethiopia not well studied. And also, the difference between occupational injury PPE user and non-PPE user among Construction worker are not studied. So, this study will provide baseline information for policy makers to design strategy, to give priority to prevention and control of occupational injuries to have healthy workforce and sound economic development. The result of this research is expected to be important for practitioners and researchers on how to deal with, incorporate and identify problems related to ergonomic aspects to assess work-related injuries in the construction industry.

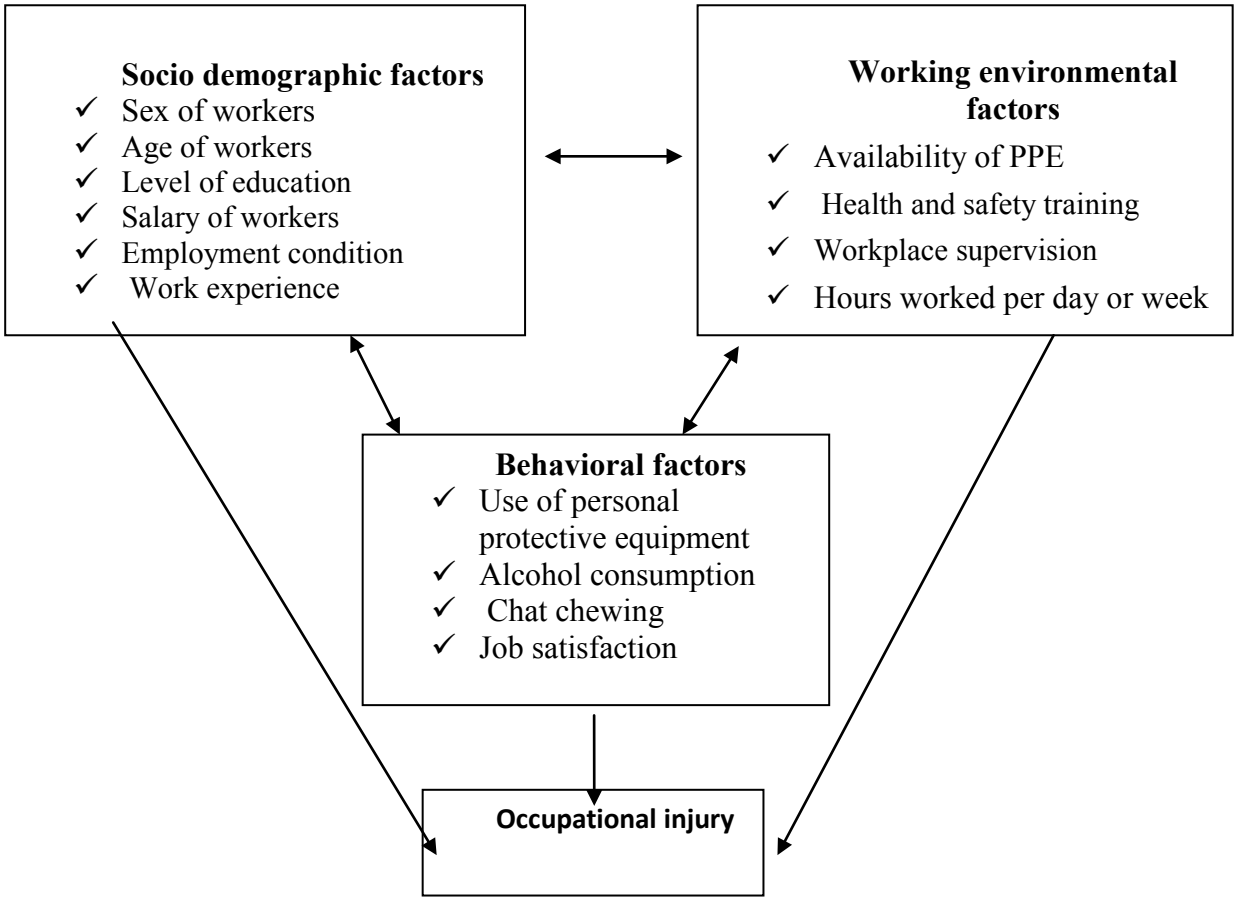


Figure 1 Conceptual framework adapted from the literatures review.

In summary, the conceptual framework (figure-1) illustrates that; there are several factors influencing occupational injury socio- demographic factors, and working environmental factors and behavioral factors, the relationship between factors that may contribute to increase or decreases occupational injury and also The framework shows: a bilateral association is considered within socio-demographic factors, working condition environmental and behavioral factors especially use of personal protective device and personal behavior which potentially influence the presence and the absence occupational injury in the construction site. Among three main factors, behavior factors are the proximate factors.

The findings of the study are hoped to contribute to the planning and implementation of interventions to improve the occupational injury among construction workers.

3. Objective

3.1. General Objective

- ✓ To assess the prevalence and factors associated with occupational injury among building construction workers in Bole sub-city, Addis Ababa.

3.2. Specific objective

- ✓ To determine the prevalence of Occupational injury among building construction workers.
- ✓ To identify factors associated with Occupational injury among building construction workers.

4. Methodology

4.1. Study area

The study was conducted in Addis Ababa, Bole sub-city. It is one of the largest sub cities among ten sub city of Addis Ababa. It has an area of 122.08 km^2 hectares and a total population of 343,856 with female 182,247and male 161,609(52). Based on the ministry of works and urban the classification of contractors by four categories these are General contractor, building contractors, road contractors and specialized contractors among these contractors General contractors very large. Additionally, According to Addis Ababa bureau of trade, the total licensed contractors in the city is 13 ,557, of which 8,140(60%) are General contractors and 5,189(45) are building contractors. Specialized and road contractors are very low relatively the other. Whereas among all General Constructors only 35 General contractors firms found in 14, woreda of Bole sub-city. A number of persons engaged in General constrictors are 107,360, of which 12,395 in public and 94,966 in privet. The study areas focus on only privet level one GeneralcontractorfirmtheseareJV,Giga,Genet,Sunshine,Yotek,Shade,Mekonen,mela,Roze,Beaeka , Aser and Tekleberhan Ambaye contractors. Additionally, a rough estimation that 15,456 workers work in there

4.2. Study design

Institutional -based cross-sectional study was conducted.

4.3. Study period

Data collection was conducted from March 01-17, 2017.

4.4. Source population

Source population were all building construction employees currently working in those level one General contractors firm found in Bole sub-city.

4.5. Study Population

Selected workers who were directly involved in the building construction are considered as the study population.

4.6. Study subjects

Workers who are directly engaged in the building construction work process were selected from the list of employees taken from the Payroll.

4.6.1. Inclusion Criteria

All employees who were directly involved in the process of construction in the last 1 year were included in the study until the required sample size were obtained.

4.6.2. Exclusion criteria:

Administration and other supportive staffs are excluded and also building construction workers who were seriously ill or hospitalized and those unable to respond to data collection excluded. Workers who are absent from work for any reason during the time of data collection were excluded from the study.

4.7. Sample size determination

The required sample size was determined by using single population proportion formula for first objectives. But, for the second objective it was calculated by using double population proportion formula.

For the first objective, the sample size were calculated by using single proportion formula based on the following assumption, the prevalence of occupational injury among construction work is 38.3%(25)

$$n = \frac{\left[\left(Z\frac{\alpha}{2}\right)2*p(1-p)\right]}{d2}$$

- ✓ Where sample size Proportion of work-related physical injury score = 38.3%
- ✓ Z α/2- standard normal distribution = 1.96
- ✓ CI- Confidence interval = 95%
- ✓ D-margin of error (4%) n= (1.96)2 (0.5) = 566.
- ✓ Add as contingency 5% of the total sample size for the first objective is **594 workers**

The sample size for the second objective were calculated by using double population proportion formula

- ✓ Proportion of occupational injury among PPE user was assumed to be 50%
- ✓ Assuming a minimum of 10% difference detection rate among PPE users and non-users in construction workers and odd of occupational injury among non-users was assumed 1.5 times higher than PPE users(34, 49).

$$n1 = \frac{\left[Z\frac{\alpha}{2}\sqrt{\left(1+\frac{1}{r}\right)P(1-P)} + Z\beta\sqrt{P1(1-p1)+\frac{p2(1-p2)}{r}}\right]2}{(P1-P2)2}$$

n1 = Number of sample

P1= proportion of occupational injury among PPE users = 50%

P2= proportion of occupational injury among PPE non-users = 60%

P=pooled proportion = $p = \frac{p1+rp2}{1+r}$, p= (0.5+0.6)/2=0.55

Z $\alpha/_2$=0.05 the probability of committing try or error (1.96)

β= the probability of rejecting a true difference 20%

r=the proportion of n_1 to n_2 is 1 to 1 n_1=389+n_2=389

By considering 5% non-response rate $\mathbf{n}_{total}$ = 817

Accordingly, a double population proportion formula will be yield the largest sample size which will be **817**

So, the final sample size will be 817 workers

4.8. Sampling technique/procedures/

Bole sub-city have 35 level one General contractor, among those General contractor 12 firms (JV(51),Giga(46),Genet(41),Sunshine(104),Yotek(102),Shade(40),Mekonen(37),mela(82),Roze(29),Beaeka(76),Aser(90), and Tekleberhan Ambaye(106)contractors)used simple random sampling method (selected by lottery sampling technique), then each firm Based upon the job department, the study populations were stratified in to seven different strata i.e. daily laborer, plasterer, carpenter and Roofers, mason, welder /electrician, driver/operator and painter. The numbers of samples from each stratum were determined by using proportional allocation formula. The study subjects were recruited by deriving an assumption that factors of occupational injury were homogeneous on each construction site. Finally, each study subject were selected used systematic simple random sampling technique by worker payroll list**,** At the time of data collection, workers who were absent from work for more than a week prior to data collection were replace by other workers rather than considering them as non-responses. So that, none response only for those who were absence from at the time of data collection and not accessed on the second day revisit.

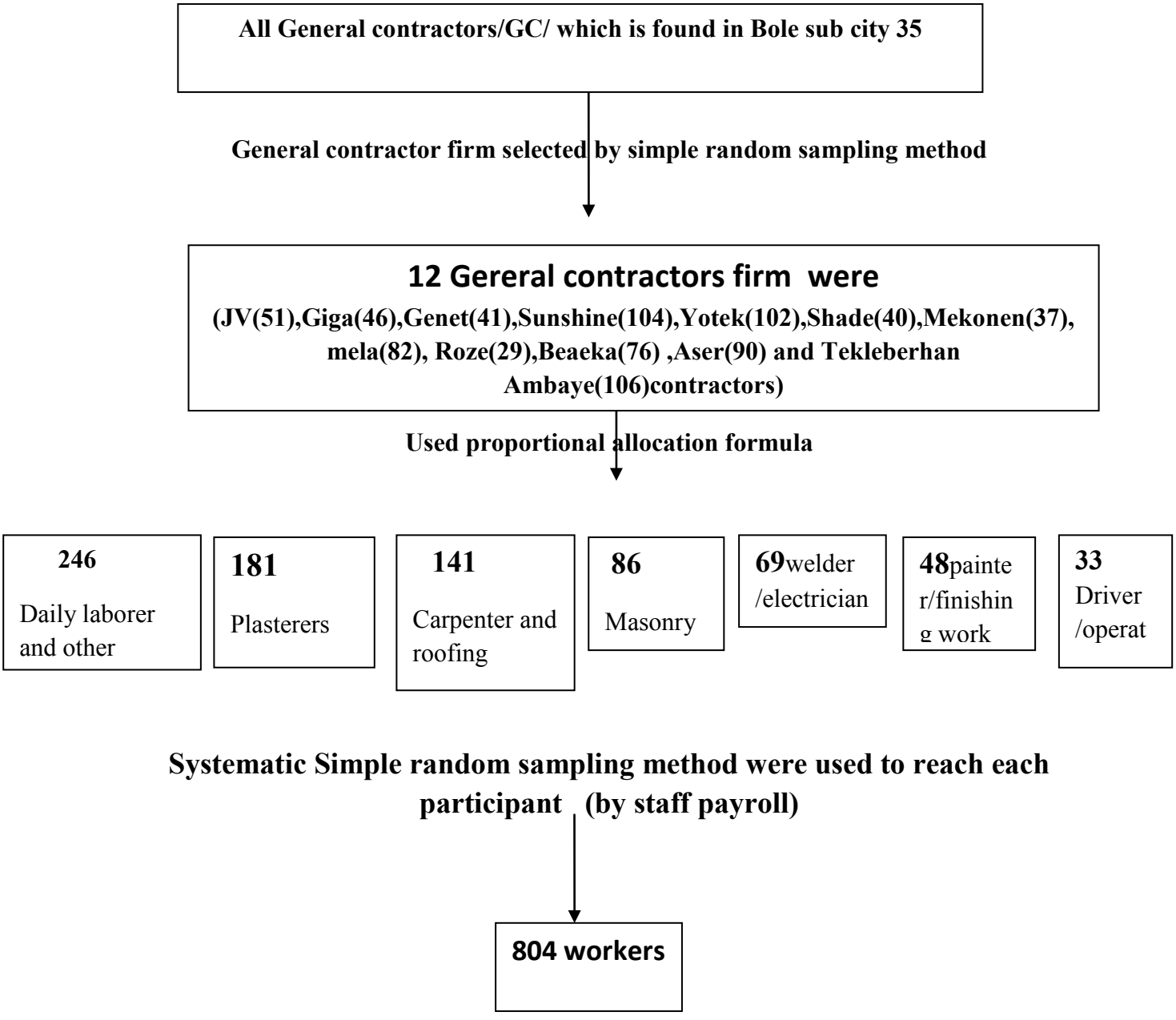


Figure 2: Diagrammatic presentation of sampling procedure

4.9. Data collection

Data were collected using pretested and structured Amharic questionnaire via face to face interview of the study participants. The questionnaire focused on socio demographic, behavioral, and environmental factors that can determine an occupational injury within the construction area. And also, we used observational cheek list for cross checking mechanism for data quality. Data were collected by six BSc environmental health profession and two supervisors who have BSc in Environmental health (MPH) after two days of training. Additionally principal investigator was engaged in checking the completeness of questionnaires during data collection

4.10. Definition of Operational terms

Occupational injury:-Any physical injury or damage (like - fatal injury, non-fatal injury, hospitalized, first aid and day absent etc.) is resulting from an accident in the course of construction work in the past 1 year prior to this study (27).

Job satisfaction: a state of pleasurable emotional feeling reported by the worker as the result of one's job. It is a subjectively perceived response of in study participants to their job(44).

Personal Protective Equipment:-Utilization of specialized clothing or equipment worn by employees for protection against health and safety hazards. Workers were classified as those who used PPE when they observed wearing the PPE(such as, Like Glove, Ear plug, Respirators, Helmet, Overalls, Goggles; Face shield and Boots/shoes) that necessary to be worn during a particular activity(27).

Permanent employee:-Any contract of employment between employee and employer concluded for an indefinite period (25).

Temporary employee:-any employment contract between employee and employer made for defined period (25).

Cigarette smoker: - An employee who were smoking one cigarette a day or occasional for at least 1 year(53).

Alcohol drinker: - An employee who drinks alcohol at least five drinks per week for men and two drinks per week for women for at least 1 year (53).

Khat chewer: - An employee is chewing khat/a mild psychoactive substance/ three times a week for at least 1 year (25).

General construction:- is the construction of dwellings, office buildings, farm buildings, stores, and public & utility buildings, etc., or motorways, streets, bridges, tunnels, railways, airfields, harbors, etc(54).

4.11. Study Variables

4.11.1. Dependent Variables

- ✓ Occupational injury

4.11.2. Independent variables

- ✓ Socio-demographic factors (Sex, A ge, R eligion, Marital s tatus, Educational s tatus, working experience, and employment condition)
- ✓ Working E nvironmental f actors(Availability o f PPE, Health an d s afety t raining ,Health and safety supervision, and Hours worked per week or day)
- ✓ Behavioral factors (smoking, chewing khat, alcohol, job satisfaction and Use of PPE)

4.12. Data quality management

The s tudy e mployed a questionnaire t hat were translated f rom E nglish to A mharic (back to English as well to confirm consistency), Training of data collectors & supervisors on all aspect of data collection tools, questioning techniques, ethical issues, and role played on how to fill the questionnaire. Principal i nvestigator and s upervisors made s pot-checking a nd reviewing t he completed que stionnaires t o ensure completeness a nd consistency of t he i nformation c ollected. The i nterview que stionnaire was p re-tested on 40 respondents at M ela l evel o ne g eneral contractor firm c onstruction s ite in or der t o i dentify pot ential pr oblem a reas, unanticipated interpretations and cultural objections to any of the questions. Based on t he pre-test results, the questionnaire was adjusted contextually.

4.13. Data processing and analysis

Data entry and the analysis were conducted using EpiData version 3.1 editing, coding, cleaning, and checking then t ransport t o SPSS ve rsion 2 1 software packages f or f urther an alyses. Descriptive s tatistics such a s f requency, p ercent, m ean, a nd m edian were employed f or m ost variables. Bivariate and multivariate logistic regression analysis were done to evaluate the degree of a ssociation between determinant f actor a nd occupational i njury and Crude O dds ratio w ith

95% confidence intervals and significance level at $P < 0.05$ were used to see the association between determinant factors and occupational injury. multivariate logistic regression analysis, Variables with 95% confidence interval and P-value <0.20 during the bivariate analysis were included in the multivariate logistic regression analysis to see the relative effect of confounding (25). Adjusted odd ratios with 95% confidence interval were calculated. The data were displayed by tables and statements.

4.14. Ethical consideration

The study was conduct after getting ethical clearance from research ethics committees (REC) of the school of public health, AAU. Support written letters to Bole sub-city housing and construction office and each general construction firm. The objective of the study, expected benefits and risks, then how much time it takes to complete the interview and the fact that they have the right to decide not to participate or discontinue the interview were informed to participate. Privacy and confidentiality were ensured. We get permission at all level site manager.

For each participant were reassured oral consent for confidentiality of the information they provide to this study on unsigned questionnaires. The explanations and interviews was conduct by local language, Amharic. If there were an incident that results in injury to the worker while interviewing, first aid service and immediate referral to the surrounding clinic were arranged prior to the data collection. However, injured study participants informed on common causes and methods of preventing occupational injuries by the interviewer after completing the interview.

4.15. Dissemination of findings

A detailed report of this study which consists of the main findings will be disseminated to Addis Ababa construction bureau, Addis Ababa Labour and Social Affair Bureau, Addis Ababa Health Bureau, and Ministry of Labour and Social Affair. In addition effort will be exerted to publish the study findings in the international journal.

5. Result

5.1. Socio-demographic characteristics

A total of 804 participants were interviewed for this study with the response rate of 98.4%. Of the total participants 661(82.2%) were male workers, under the age of 30 years663 (82.5%) and the mean age 24.77 (SD ±5.019); regarding to marital status of workers majority of them were single 485 (60.3%), about educational level of worker 381(47.4%) completed primary level. 495 (61.6%) are orthodox followers, 495(61.6%) were Amhara ethnicity group, 423 (52.6%) are temporary employed workers and about 550(68.4%) were below two years' work experience; the mean of monthly salary of the workers were 3137.29(SD ±1339.43). (Table 01)

Table 01 Selected s ocio-demographic determinants o f o ccupational in jury among l evel one General contractor firm building workers, in Bole sub city, Addis Ababa, March, 2017

Variable	No.	Percent (%)
Sex		
Female	143	17.8
Male	661	82.2
Age		
<30	663	82.46
≥30	141	17.53
Education status		
Illiterate and can read and write	80	9.9
Primary (1-8)	381	47.4
2nd and above	343	42.6
Employment condition		
Temporary	423	52.6
Permanent	381	47.4
Work Experience		
≤2year	550	68.4
>2year	254	31.6
Department		
Daily library and other helper	246	30.6
Plasterer	181	22.5
Carpenter & roofers	141	17.5
Masonry	86	10.7
Plumb/wilder	69	8.6
Finishing/Pinter	48	6.0
Operator/driver	33	4.1
Monthly salary		
910-2000	236	29.35
2001-5000	496	61.69
5001-7800	72	8.95

5.2. Availability and utilization of personal protective measure

Half of the respondents utilize PPE on duty and 198(49%) were use helmet, among PPE utilize on duty respondent 296(73.3%) were used PPE all times. The majority worker reason for not use PPE were not fill discomfort and no access. Among PPE user on duty respondent fifty percent of PPE supplied by institution and the rest bought by workers by themselves. (Figure 03, 04 a nd table 02).

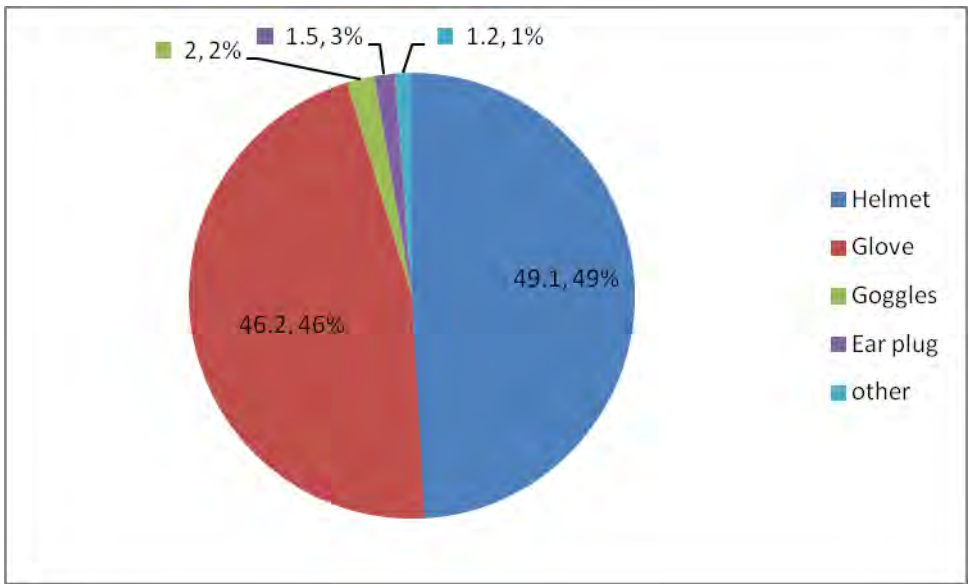
Table 02 Availability and utilization of PPE and safety training of level one General Contractor firm Building workers Bole sub city, Addis Ababa, March 2017.

Variables	Frequency	Percent (%)
PPE on duty (n=804)		
Yes	404	50.2
No	400	49.8
PPE all the time(n=404)		
Yes	296	73.3
No	108	26.7
From where do you get PPE (404)		
supplied by institution	203	50.4
You buy it for your self	201	49.6
Reason for not use PPE for all time (n=108)		
Not to fill discomfort	33	30.6
To safe time	10	9.3
Not aware of risk	12	11.1
careless/negligence	21	19.4
No access	32	29.6
First training(n=804)		
Yes	25	3.1
No	779	96.9
On job training(n=804)		
Yes	29	3.6
No	775	96.4

Table 0 3 Distribution o f be havioral f actors o f l evel one G eneral c ontractor f irm a mong the Building construction workers of Bole sub city, Addis Ababa, March 2017.

Variables	Frequency	Percent (%)
Smoke cigarette(n=804)		
Yes	6	0.7
No	798	99.3
Drinking alcohol(n=804)		
Yes	216	26.9
No	588	73.1
Chewing chat (n=804)		
Yes	105	13.1
No	699	86.9
Sleeping disorder (n=804		
Yes	100	12.4
No	704	87.6
Job satisfaction (n=804)		
Yes	659	82.0
No	145	18.0

Among t he t otal 404 (50.1%) w ho a re us e at l ist one P PE. M ajority w orkers us e h elmet 198(49.1%).



Finger 03: Types of protective Equipment used by level one General Contractor firm among building construction workers Bole sub-city, Addis Ababa, March, 2017.

5.3. Occupational injury related issue

The to tal prevalence o f occupational i njury i n l ast 12 m onth was 278 (34.6%) 95%CI (31.29, 37.86). Above half of respondent 147(52.9%) frequency of occurrence of injury in last 12 month were one times. Among those injured workers 131(47.1%) of them did not remember the exact day of t he week w hen injury ha d oc curred, f ollowed b y F riday 50(18%) a nd Wednesday26 (9.4%). A mong t he i njured w orkers 175 (62.9%) of injury oc cur at afternoon time o f th e d ay when i njury ha d o ccurred. Lower leg 134(48.2%) a nd hand 52(18.7%) were th e mo st in jured body part of respondent. The report shows that types of accident occur in workers were Hurt by Sharp obj ect 165(59.6%), hit b y f alling o bject 47(17%) a nd falling f rom h eight 29(10.4%) respectively .Occurrences of occupational injury in two week were 48(6%) and frequency of all of injuries occurred were one time. The main reason of injury occurrence were due to not using PPE, 129(46.6 %) and the working behavior of construction work 80 (28.8%). Fifty one percent (51.1%) of injured workers work place were both ground and at high. Among the total injured worker 216(77.3%) of were visited hospital and 27(12.5%) of workers were greater than 7 day absent from work because of injury. (Table 04)

Table -04 Distribution of injured body parts and types of injuries during last one year among level one general contractors building construction worker Bole sub-city, Addis Ababa, March, 2017.

Variables	Frequency	Percent
Occupational injury		
In the last 12 month (n=804)	278	34.6
Number of occurrence (n=278)		
One times	147	52.9
Two times	88	31.7
>3times	43	15.5
Occupational injury(n=804)		
In the last two week	48	6
Injury body part(n=278)		
Lower leg	134	48.2
hand	52	18.7
Eye	24	8.6
Lower arm	12	4.3
Toe	12	4.3
Upper arm	11	4.0
Head	10	3.6
Fingers	7	2.5
other	16	5.8
Types of accident(n=278)		
Hurt by Sharp object	166	59.7
Hit by falling object	47	16.9
Falling from height	29	10.4
stuck against an object	16	5.8
Falling at ground level	1	0.4

5.4. Working environment related variable

Respondents were asked about working hours per day 727 (90.4%) works less or equal to 8 hours per a day. Ninety five percent 764(95.0 %) of workers were not done regular health and safety supervision work place, 775(96.4%) of did not have safety training in Connection with new employment, equipment, or work process, and also sixteen percent 489(60.8%), of workers involve manual handling activity like pulling, pushing, carrying, and lifting. Among those 311(63.6%) of were carrying very heavy (greater than50kg) on average 4 hours and above 292(59.6%) time spend at this work per day.

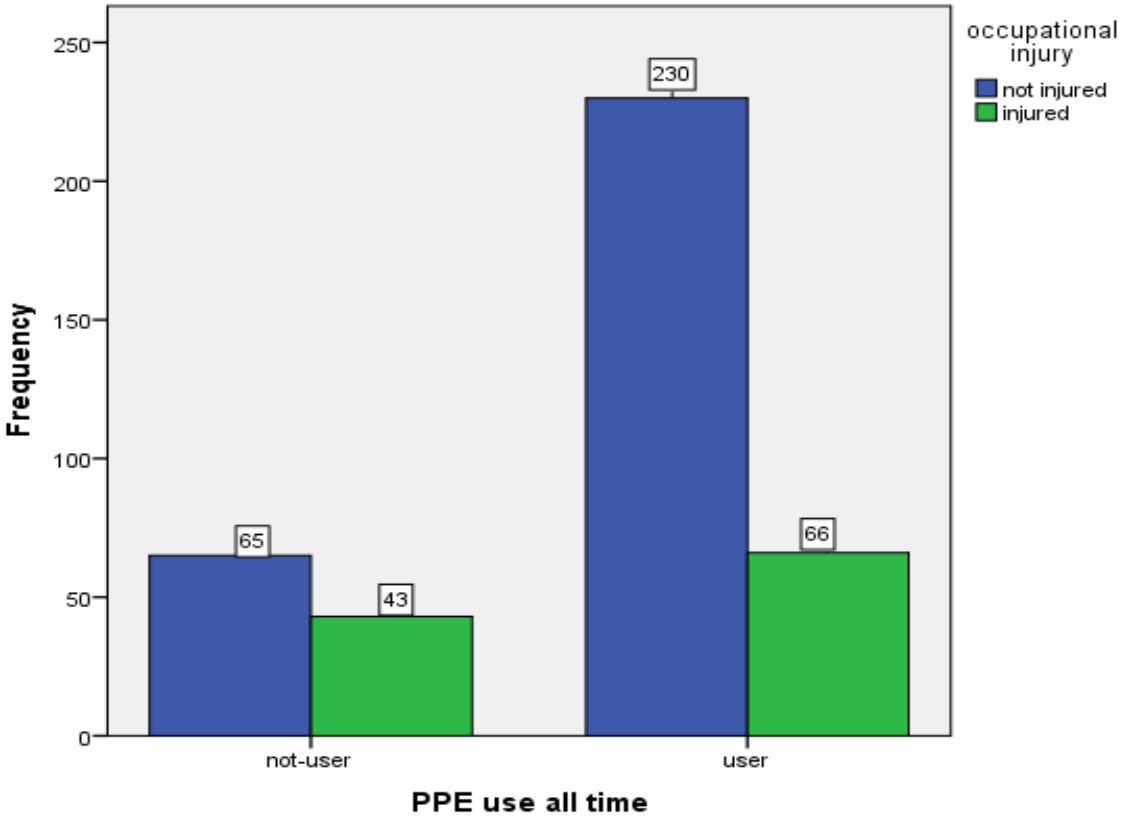


Figure 04: The distribution of users PPE all time with occupational injury on level one General Contractor among building construction workers, Bole sub-city, Addis Ababa, March, 2017.

5.5. behavioral associated variables

Among the total of respondent only 6 (0.7%) smoke cigarette, 215(26.7%) drink alcohol and 105(13.1%) chew chat, 98(12.2%) have sleeping disorder, and 145(18%) of workers are not satisfied on their job/works/

5.6.Observational finding

Regarding to observational result of this study all most all environmental health and safety factors in construction area such as equipment not put in correct place, sign of warning and safety rule, first aid equipment, electrical panel knock out in place, training of workers, supervision of work place by safety professionals, hammers kept free of splinters, covered wall and floor opening and portable circular saws equipped with protective guard were not fulfilled within the working site.

5.6. Bivariate analysis

Among socio-demographic variables like marital status, educational level, monthly salary, work experience and employment condition were showed significant association with occupational injury.

Regarding to marital status unmarried workers were 1.52 more likely injured than married worker (COR [95%] =1.52[1.16, 2.14]). Worker who had earn monthly salary birr (916 -2000) were 2.66 times higher occupational injured than those of earn month salary greater than birr (5000-7800) (COR [95%Cl] = 2.66[1.47, 4.81]). and worker who have less than two year work experience were 2.06 times higher injured than those of worker who have greater than two year work experience (COR [95%Cl] = 2.06 [1.47, 2.88]). And also, workers who had employed temporary 1.45 times higher associated with occupational injury than those of workers who had employed permanently (COR [95%Cl] = 1.45[1.08, 1.95]).

Bivariate analysis of environmental condition with respect to occupational injury, regular health and safety supervision on work place (COR [95%Cl] = 5.03 [1.77, 14. 29]), involves manual handling activity (COR [95%Cl] = 1.85 [1.36, 2.53]), machine safe guarded (COR [95%Cl] = 3.29 [2.07, 5.25]) regular maintenances (COR [95%Cl] = 2.39 [1.64,3.49]) and safety training (COR [95%Cl] = 3.42 [1.18,9.92]) were statically significantly associated with occupational injury. Workers who working didn't regular health and safety supervision work places were 5.03 higher occupational injured than those of worker who work regular health and safety supervision work place. (Table 05)

The crude analysis of behavioral determinants of occupational injury use PPE on duty(COR [95%Cl] = 1.96 [1.46, 2.64]) ,use PPE all time (COR [95%Cl] = 2.25 [1.40, 3.61]), drink alcohol (COR [95%Cl] = 6.01 [4.28, 8.42]), chewing chat(COR [95%Cl] = 3.08[2.02, 4.68]), and work satisfaction(COR [95%Cl] = 6.78 [4.55, 10.10]) were significantly associated with occupational injury. Workers who couldn't use PPE on duty and couldn't use PPE all time were 1.96 and 2.25 times higher injured than those of worker who use PPE on duty and PPE use all time respectively. But, sleeping disturbance didn't show significantly associated with occupational injury. (Table 05)

Table 05 Selected s ocio-demographic a nd oc cupational s afety de terminants of oc cupational injuries, among level one general contractors firm building construction workers Bole sub-city, Addis Ababa,March,2017.

Variables		Occupation injury (n=804)		COR (95%)CI	P-Value
		No	Yes		
sex	Male	423(64%)	238(36%)	1.45(0.97, 2.16)	0.07
	Female	103(72%)	40(28%)	1.00	
Age	≤30	455(64.36%)	252(35.64%)	1.51(0.94,2.43)	0.09
	>30	71(73.2%)	26(26.8%)	1.00	
Education status	Illiterate	44(55%)	36(45%)	1.76 (1.07, 2.88)	0.03
	1^{o}	284(65.1%)	133(34.9%)	1.15(0.85, 1.57)	0.37
	2^{o} And above	234(68.2%)	109(31.8%)	1.00	
Marital status	married	224(71.6%)	89(28.4%)	1.00	
	Single	302(61.5%)	189(38.5%)	1.52(1.16, 2.14)	0.01
Monthly salary(ETB)					
	916-2000	125(53%)	111(47%)	2.66(1.47, 4.81)	0.001
	2001-5000	347(70%)	149(30%)	1.29(0.73, 2.27)	
	5001-7800	54(75%)	18(25%)	1.00	
Work experience	≤2years	333(60.5%)	217(39.5%)	2.06(1.47, 2.88)	<0.001
	>2years	193(76%)	61(24%)	1.00	
Employment condition					
	permanent	266(69.8%)	115(30.2%)	1.00	
	Temporary	260(61.5%)	163(38.5%)	1.45(1.08,1.95)	0.013
PPE use on duty					
	No	231(57.8%)	169(42.1%)	1.97(1.46,2.64)	<0.001
	Yes	295(73%)	109(27%)	1.00	
PPE use all time					
	No	65(60.2%)	43(38.8%)	2.25(1.40,3.61)	0.001
	Yes	230(77.7%)	66(22.3%)	1.00	
Working hours					
	≤8hours	501(68.9%)	226(31.1%)	1.00	
	>8hours	25(32.5%)	52(67.5%)	4.61(2.79,7.62)	0.001
Machines safe guarded					
	No	401(61.2%)	254(38.8%)	3.29(2.07,5.25)	<0.001
	Yes	125(83.9%)	24(16.1%)	1.00	
Machines maintained					
	No	369(60.1%)	236(39%)	2.39(1.64,3.49)	<0.001
	Yes	157(78.9%)	42(21.1%)	1.00	
Work supervision					
	No	490(64.1%)	274(35.9%)	5.03(1.77,14.29)	0.002
	Yes	36(90%)	4(10%)	1.00	
Safety training					
	No	501(64.6%)	274(35.4%)	3.42(1.18,9.92)	0.02
	Yes	25(86.2%)	4(13.8%)	1.00	
Work involves manual handling activity					
	No	232(73.7%)	83(26.3%)	1.85(1.36,2.53)	0.02
	Yes	294(60.1%)	195(39.9%)	1.00	

5.7. Multivariate analysis

To reduce extreme number of variables, P value less than 0.2 during the bivariate analysis were included in the multivariate logistic regression analysis to see the relative effect of confounding variables.

Among socio-demographic variables such as sex, employment condition, monthly salary, and work experience were significantly associated with occupational injury. Male workers were about 2.85 times (AOR [95%CI] = 2.85[1.17, 6.93]) more likely to report occupational injury than female workers. Odds of occupational injury for workers who were temporary employed 2.92 times (AOR [95%CI] = 2.92 [1.47, 5.83]) higher injured than those of permanently employed workers.

The multivariate logistic analysis for behavioral and environment determinants of occupational injury like use of PPE use all time (AOR [95%CI] = 2.34[1.24, 4.42]), drink alcohol (AOR [95%CI] = 3.01[1.39, 6.90]), chewing chat (AOR [95%CI] = 2.93 [1.08, 7.95]) , job satisfaction (AOR [95%CI] = 12.12[5.15, 28.61]),machine always safe guarded (AOR[95%CI]= 2.17 [1.12, 4.19]), and involve manual handling activity(AOR [95%CI] = 2.22 [1.07,4.59]) showed significant association with the occupational injury.

The analysis showed workers who didn't use personal protective equipment all times had more than 2.34 times higher the odds of having occupational injury than workers who uses personal protective equipment all time. The odds of having occupational injury in workers who had drink alcohol were three times higher than who didn't drink alcohol. Workers who were unsatisfied by their work, workers who were chewing khat , workers who had working with not guarded machines and workers who were involve manual handling activity like pulling, pushing, carrying, and lifting also showed significantly associated with occupational injury.(Table 06)

Table 0 6: Summary o f logistic r egression a nalysis o f s ocio-demographic, E nvironmental a nd Behavioral f actors on o ccupational i njury among level o ne G eneral co ntractors f irm building construction workers in Bole- sub city, Addis Ababa, March, 2017.

Variables	Occupation injury (n=804)		Cured OR (95%)CI	Adjusted OR (95%)CI
	No	Yes		
Sex				
Male	423(64%)	238(36%)	1.45(0.97, 2.16)	2.85(1.17,6.93)*
Female	103(72%)	40(28%)	1.00	1.00
Employment condition				
Temporary	260(61.5%)	163(38.5%)	1.45(1.08, 1.95)**	2.92(1.47,5.83)**
permanent	266(69.8%)	115(30.2%)	1.00	1.00
Work experience				
≤2years	333(60.5%)	217(39.5%)	2.06(1.47,2.88)**	0.46(0.28, 0.97)*
>2years	193(75.4%)	63(24.6%)	1.00	1.00
Monthly salary				
916-2000	125(53%)	111(47%)	2.66(1.47, 4.81)	0.37(0.15, 0.91)*
2001-5000	347(70%)	149(30%)	1.29(0.73, 2.27)	1.08(0.59, 1.97)
5001-7800	54(75%)	18(25%)	1.00	1.00
Work involves manual				
No	232(73.7%)	83(26.3%)	1.85(1.36, 2.53)**	2.22(1.07, 4.59)*
Yes	294(60.1%)	195(39.9%)	1.00	
Machine safe guarded				
No	401(61.2%)	254(38.8%)	3.29(2.07, 5.25)**	2.17(1.12,4.19)*
Yes	125(83.9%)	24(16.1%)	1.00	1.00
PPE use all time				
No	65(60.2%)	43(38.8%)	2.25(1.40, 3.61)**	2.34(1.24,4.42)**
Yes	230(77.7%)	66(22.3%)	1.00	1.00
Drink alcohol				
No	450(76.5%)	138(23.5%)	1.00	1.00
Yes	76(35.2%)	140(64.8%)	6.01(4.28, 8.42)**	3.01(1.39,6.90)**
Khat				
No	482(70%)	217(30%)	1.00	1.00
Yes	44(41.9%)	61(58.1%)	3.08(2.02, 4.68)**	2.93(1.08, 7.95)*
Work satisfaction				
No	42(29%)	103(71%)	6.8(4.55, 10.10)**	12.12(5.15, 28.61)*
Yes	484(73.4%)	175(26.6%)	1.00	1.00

Note ® - Reference group, ** significant at P-value < 0.01, * Significant at P-value <0.05

6. Discussion

This institution-based cross-sectional attempted to assess the prevalence and factors associated with occupational injuries in the last 12 months among the level one General contractor building construction workers in Bole sub-city, Addis Ababa.

The study result showed that overall prevalence of occupational injury in the last 12 month was 278(34.6%), when we compare with different country study like USA 39.9 %(29), Japan 35.6 %(30) and also in north Africa Egypt Mit-Ghamr City 46.2%(32) alien with Japan study. But, Egypt higher reported than this study this is could be study area difference and sample population difference. In this study, a minimum of a year experience in construction worker is mandatory to be recruited as study participants whereas Egypt workers minimum of two year work experience mandatory to be recruited as study participants; Study done in Ethiopia, Gondar 38.7%(23)and Addis Ababa 38.3% ,84.7%(25,55) higher prevalence reported. so, this discrepancy may be because of our study area only level one general contractor firm whereas study done in Addis Ababa include one to five level contractor firm and study done in Gondar nothing has been mentioned about level of contractor. And also another reason for higher prevalence sample size deference and sample population. In this study, a minimum of a year experience in construction worker is mandatory to be recruited as study participants, whereas nothing has been mentioned in both studies. In contrary, study done India, 22.9%(31) and Egypt,18.4%(24) have lower prevalence reported than our study. This difference may be safety concern; awareness and education of workers in these countries are greater than ours with regard to this sector. Also the study area also in these studies were done in big construction companies, not included small ounces, that give concern for health and safety for their workers.

Different studies report shows that male workers were significantly associated with occupational injury (23, 30, 34,35,37) which alien with this study (AOR [95%CI] = 2.85[1.17, 6.93]). The odds of occupational injury for male 2.85 times more likely injured than those of female workers. This is may be construction work more done by male; male workers were more expose substance abuse like alcohol and chat, and also female workers could take their health and safety responsibility, use PPE than males.

Based on our findings temporary workers were 2.92 times more likely injured than those of permanent workers. This is supported by studies conducted in Iran (57) and Ethiopia (45) may be

explained as higher injuries reported on temporary workers were because of temporary workers do not get a chance to work for a whole year like the permanent, health and safety awareness of temporary workers was less than those of permanent workers, lack experience on specific tasks and lack of job security can play an important role in occurring accidents for such workers.

This study find out that the odds of injuries among employees who have less or equal to 2 years work experience were 54% less compared to those who have more than 2 years work experience. The possible explanation for this may be that those employees who have greater than 2 years work experience could be accustomed to the work environment and developed false consciousness of safety which drive them not to obey with safety precautions including proper use of PPE. It might also be due to the fact that the lack of safety awareness programs in the workplaces. This study supported by different study done Addis Ababa and Gondar (25,34, 36, 41).

Another important finding of this study was the odds of injuries among employees who earning monthly salary 916-2000 ETB were 63 % less compared to those who earning 5001-7800 ETB. This may be explained as higher payment is related with high experience, and higher educational status, although this factor was significant in this study and workers with lower experience and educational status are usually placed in working sections involving manual contact with machines and others.

This study find out the leading cause of occupational injury among construction workers were hurt by sharp object 165(59.6%), follow hit by falling object 47(17%) and Falling from height 26(10.5%) . this result is relatively similar to study done Egypt (24). In this study the main type of injuries were Lower leg 134(48.2%), hand 52(18.7%) and eye 12 (8.9%). This result was consistent with report of Egyptian construction workers (24). This is might be the working behavior of construction industry.

According to study result showed that severities of occupational injury were among 278 injured workers 216(87%) visited hospitalized. Because of this 27(12.5%) of participant had lost greater than 7 days of work (168 hours work absent). This result supported by study done in Gondar and Addis Ababa (34, 38,55). It might also be due to construction industry is one of the hazardous and working behavior of construction industry.

Evidences from literatures dictating the work environment determinants of occupational injury evinced, involving in activities requiring manual handling exposes workers to injury considerably (56). Comparably, this study indicated that manual handling activity of very heavy and heavy objects like pulling, pushing, carrying, and lifting was significantly associated with prominent injury presence.

Another finding of this study were the Odds of occupational injury among non PPE users all times was 2.34 times higher than PPE users all times(AOR [95%CI] = 2.34[1.24, 4.42]). Compare to study done in north Gondar zone work-related injury among Small and Medium-Scale Industries workers (34) and Addis Ababa city municipal solid waste collectors (49) this slightly variation might be study population difference and the working activity of the sector. But, our result study consistent with study had done in Addis Ababa (25).

According to this study result showed that behavioral variable such as smoking cigarette and sleeping disturbance didn't associated with occupational injury. This study was supported by Addis Ababa, Amhara Regional State and India construction workers study result (25, 31, 37).

This study also indicate that workers who drink alcohol were three times more likelihood to be being injured than those who do not consume alcohol AOR [95%CI] = 3.01[1.39, 6.90]) it is consistent with study in Germany and Addis Ababa(25, 48). This might be due to the fact that smoking and drinking are proxy indicators of a certain degree of risk tolerance, a high blood level of such substances during work will endanger both safety and efficiency, and be the cause of increased likelihood of mistakes, poor decision making, and errors in judgment. As the result of this fact, the construction industry safety policy should consider control of substance abuse at workplace.

According to this study the odds of injury among who were not satisfied with their job were 12 times more likely being injured compared to those who satisfied with their job (AOR [95%CI] = 12.12[5.15, 28.61]). The possible explanation for this may be workers who satisfied by their work may have positive thinking about the physical environment and always take necessary safety precautions and when job satisfaction is increased, on - task activities are enhanced, leading to greater attention to safety motivation, knowledge, and compliance. And also this study

supported by with case control study among coal mining factory workers in India (40), and study done in Ethiopia (23, 30).

Even though most quantitative environmental factors didn't show association to occupational injury, the observational checklist result showed environmental health and safety matters such as ladders were not inspected, portable circular saws were not equipped with protective guards, unsafe handling of material not prohibited by supervisors, working site had no electrical panel knockout in a place; hammers were not kept in free of splinters this can be explained by the absence of training and supervision of working site by health and safety professional regularly that could motivate workers to be safer and instruct them in correct safety behaviors.

7. Strengths and limitations of the study

Strength

- ✓ The sample size and response rate of this study was large relatively other study done before.
- ✓ Use of face to face interview during data collection reduce non response rate, permit clarification of questionnaires and addressing all participants who differ in educational status.
- ✓ Since there were no study done on prevalence and associated factors of occupational injury in level one General contractors firm construction work site the finding will serve as base line information for further research and important for policy makers to design strategy to prevent and control occupational injury.
- ✓ The use of observational checklists for the whole working environment will give strength for the quantitative findings of environmental associated factors of occupational injury.

Limitations

- ✓ Occupational disease not includes this study due to one year period prevalence study and temporary workers may not develop occupational disease and also sign and symptom or not recognized within one year.
- ✓ Lack of similar studies particularly in Ethiopia made difficult in comparing results in building construction sectors.
- ✓ The study did not find fatality and severe injuries occurred within the past one year due to study participants were employees present in work during my study, did not find the severely injured workers because they might be in hospitals as well as in their home.
- ✓ The study was a one -year cross sectional study. The possibility of recall biases resulting in under or over reporting and misreporting of events was likely.

8. Conclusions and recommendations

Conclusions

- ✓ The report of this study indicated relatively lower prevalence of injury among building construction employees compared to other studies
- ✓ The Use of personal protective equipments in all time was found to be important factor to decrease occupational injury.
- ✓ Awareness and education is needed especially for disadvantaged/high risk groups like male, higher income, higher work experience, and temporary workers because they showed significant associations on the occurrences of occupational injury.
- ✓ Worker who didn't involve manual activity and workers work on always safe guarded machine were significant factors to reduce work related injury.
- ✓ Since behavioral factors such as alcohol use, chewing chat and job satisfaction had significant association on the occurrences of occupational injury.

Recommendation

- ✓ Ministry of H ealth, A ddis A baba he alth bure au, Labor a nd S ocial A ffairs bure au, A ddis Ababa house construction bureau and level one general contractor should have an integrated emphasis to reduce occupational injury by setting safety regulations on construction industry.
- ✓ The M inistry of Labor a nd s ocial a ffairs s hould a ssign oc cupational he alth and s afety professionals for monitor working site that will important for reinforce and remind the basic health and safety matters fulfillment.
- ✓ Contractors, who s elect employees duri ng recruitment, should consider i mportant socio-demographic a nd behavioral f actors s uch a s work experience, chewing ch at and a lcohol consumption status, etc.
- ✓ The s upervisors of t he c onstruction area s hould t ry to i dentify t he ne eds of w orkers continuously in order to assure their work satisfaction.
- ✓ Workers should be conducted for regular monitoring of substance abuse in workplace and promote the use of personal protective equipment all times had significantly contributed to reduce risks of occupational injuries, Check and monitor substance use workers before they start their jobs.
- ✓ Further case-control a nd cohort s tudy should be c onducted e specially on t he employment type of workers and occupational injuries.

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10. Annexes

Annex 1: English version questionnaire

Addis Ababa University School of Public Health

Questionnaire on the Assessment of Occupational Injury and Associated Factors among Building Construction Workers in Bole sub city, Addis Ababa, 2017G.c

Questionnaire ID: _____

Name of construction site by code _____Address by code_____

Consent Form

Hello! My name is ……. We are interviewing with construction workers who had direct involved in construction work. The objective of this study the prevalence and factors associated with occupational injury among construction workers, level one General contractor in Bole sub, Addis Ababa. You are selected randomly and we are requesting you to answer the questions that we have prepared for you.

We will ask you a series 50 of questions which will take 20-30 minutes of your time. Your answers to these questions will remain confidential. Your name will not be written on questionnaire. You have the rights to withdraw from the study at any stage or to restrict the information you provide from being used as a part of the data analysis. There is no anticipated risk except time consumption with expected benefits.

Confidentiality: - Any information forwarded will be kept private and his/here name will not specified

Do you agree to participate in the study?

A. Yes ---------- continue with the interview

B. No -------- go to the next interview

Thank you for being voluntary to participate in the study.

I have been briefly informed about the study and I clearly understood the objective. Therefore, I hereby approve my consent to take part in the study as an Interview With my signature.

Identification number of respondent's_____Signature_____ Date_____

Name of data collector_____ Signature_____ Date_____

Part I socio-demographic characteristics of respondents Assessment of prevalence and Factors affecting occupational injuries among level one general contractor firm building construction workers in Bole sub city, Addis Ababa.

Questionnaire Identification number----------

No	Question	Possible response	Code	Remark
101	Sex	0. Male 2. Female		
102	Age	----------in years		
103	Religion	0. Orthodox 1. Muslim 2. Protestant 3. Catholic 4. Others		
104	Ethnicity	0.Amara 1.Oromo 2.Tegera 3.SNNP		
105	Marital status	0. Married 1.Single 2. Divorced 3.Widowed 4. Separated		
106	Educational status	0.Illitrate 1.read and write 2.Primary school(1-8) 3.Secondary school(9-12) 4.Technical and vocational 5. Degree or higher		
107	Employment pattern	0. Temporary 1. Permanent		
108	monthly income including over time	----------ETB/month		
109	What is your working department?	0. mason 1. Carpenter & roofers 2. Plumbers & electrician /welder/ 3.worker carrying out finishing work /painter/ 4. plasterer 5. Daily laborer and other helpers 6.operater/driver		
110	Work experience	-------- in years		

Part II Availability and utilization of personal protective measure

Questionnaire Identification number----------

No	Question	Possible response	Code	skip
201	Do you use any PPE while you are on work?	1.Yes 0.No →		Skip to Q206
202	If yes to Q201 what type?(more than one answer is possible)	0. Glove 1.Yes 0.No 1. Ear plug 1.Yes 2.No 2. Respirators 1.Yes 2.No 3. Helmet 1.Yes 2.No 4. Overalls 1.Yes 2.No 5. Goggles 1.Yes 2.No 6. Face shield 1.Yes 2.No 7. Boots /shoes1.Yes 2.No 8. Others, specify_____		
203	If yes to Q201,do you use PPE all the time while on working	1.Yes → 0.No		Skip to Q 205
204	If No to Q203, what are the reasons not use safety equipments all the time? (more than one answer is possible)	0. Not to fill discomfort 1. To safe time 2. Not aware of risk 3.careless/negligence 4. No access		
205	From where do you get PPE? (more than one answer is possible)	0.It is supplied by institution 2. You buy it for your self 99. Others, specify		
206	Have you had training on any type of occupational safety issues when you were first engaged in this job?	1.Yes 0.No		
207	Have you ever had on job training on any type of occupational safety issues?	1.Yes 0.No		
208	If yes to Q207, from where did you get? (more than one answer is possible)	1. From institution 2.From NGOs		

Part III occupational (work related) injury characteristics

Questionnaire Identification number----------

No	Question	Possible response	Code	Remark
301	Have you had an incident at work that resulted injury to you in the last12 months	1. Yes 0. No		If no skip to Part IV
302	Have you had an incident at work that resulted injury to you in the last 2 weeks?	1. Yes 0. No		
303	If yes for Q301 or 302, how many times?	1.----------in12 months 2.---------- in 2 weeks		
304	Day of injury	0. Monday 1.tuesday 2.Wedensday 3.Thuresday 4.Firday 5.Saturday 6.Sunday 7.I don't remember		
305	Time of injury	0.Morning 1.Afternoon 2.Evening 3.Midnight 4.I don't remember		
306	Parts of the body affected	0. Eye 1.Yes 2.No 1. Tooth 1.Yes 2.No 2. Hand 1.Yes 2.No 3. Ear 1.Yes 2.No 4. Knee 1.Yes 2.No 5. Toe 1.Yes 2.No 6. Fingers 1.Yes 2.No 7. Head 1.Yes 2.No 8. Upper arm 1.Yes 2.No 9. Lower arm 1.Yes 2.No 10. Upper leg 1.Yes 2.No 11. Lower leg 1.Yes 2.No 12. Back 1.Yes 2.No 13.Chest1.Yes2.No 99. other ,specify		
307	Types of accident	0.Fallig to from height 1.struck by object 2.stuck against an object		

		3.Hit by falling object 4.Falling at ground level 99.other specify----------		
308	What was your reason(s) at, the time of injury?	0. I was new for the work process 1. Thinking about private affairs 2. Due to other medical problem 3. I think accident is beyond control 4. It is the working behavior 5. It is due to not using PPD/E 6. I don't remember 99. Others (specify)		
309	Working condition	0.At height 1.Ground 2.Both 3.underground		
310	Were you hospitalized due to injury?	1.yes 0.No		
311	If yes for Q310, how long it takes (hours)	----------hours		
312	If yes for Q310, how long it takes (day)?	----------days		

Part -IV-Working environment related variables

Questionnaire ID: _____

No	Question	Possible response	Code	skip
401	Hours worked per week	----------		
402	Regular health and safety supervision	1.Yes 0.No		
403	Have you had safety training in Connection with new employment, equipment, or Work Process?	1.Yes 0.No		
404	Does your work involve manual handling activity (pulling, pushing, carrying, and lifting)?	1.yes 0.No		
405	If yes for Q404 On average how much weight did you handled per day?	0.light (not greater than 5kg) 1. medium (6-25kg) 2. heavy (25-50)kg) 3.very heavy (greater than 50kg)		
406	On average how much time did you spend at this work per day	0. Not more than 2 hours. 1. 4.hours 2. 4 hours and above		
407	Did your work need visual concentration?	1.Yes 0.No		

408	Do you use vibrating tools at your work place?	1. Yes 0. No		
409	If your answer for Q408 is yes for how long per day	0.Not greater than 1 hour 1. 2-4 hours 2. greater than 4 hours		
410	Are machines you are working with always guarded or installed With safety devices?	1. Yes 0. No		
411	Are machines you are working withal ways maintained Immediately when old or unsafe?	1. Yes 0. No		

Part-V- Workers behavior and characteristic

No	Question	Possible response	Code	skip
501	Do you smoke?	1.Yes 0.No →		If no skip to Q503
502	If yes for Q501, how often?	0.Every day 1.1-3 days/ week 2.Ocassionally		
503	Do you drink alcohol?	1.Yes 0.No →		If no skip to Q35
504	If yes to Q503, how Often?	0. Every day 1. 1-3days/wk 2.Ocassionally		
505	Do you chew khat?	1.Yes 0.No →		If no skip To Q507
506	If yes to Q505, how Often	0. Every day 1.1-3 days/wk. 2.Ocassionally		
507	Do you have any sleeping disorders	1.Yes 0.No →		If no skip To Q509
508	If yes to Q507, what is the reason	0. Working greater than 8 hours without Shifting 1. Working in evening 2. Trying to work more than one task at a time 3. Excessive heat 99. Others, Specify___		
509	Are you satisfied with your job or task required to do at Present?	1.Yes 0.No		

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

Annex 2: Amharic version questionnaire

ስ አበባ ዩኒቨርስቲ የህብረተሰብ ጤና ትምህርት ቤት
በቦሌ ክ/ከተማ በስራ ላይ ያሉ ጠቅላላ ኮትራክተሮች በሚገነቧቸው ቤቶች ግንባታ ውስጥ የሚስሩ ሰራተኞች ላይ የሚደርሱትን ከሙያ ጋር የተያያዙ ጉዳቶችን ና መንስኤዎቻቸዉን ለይቶ ማወቅ ይረዳ ዘንድ የተዘጋጀ መጠይቅ,2009ዓ.ም፡፡

አባሪ 1፡ የአማሪኛ ትርጉም መጠይቅ
በጥናቱ ላይ ለሚሳተፉ የሚሰጥ መረጃ

ጤና ይስጥልኝ፡ እኔ _____እባላለሁ፡፡ እዚህ የመጣሁት ይህንን ጥናት ለማካሄድ የአዲስ አበባ ዩኒቨርሲቲይ የጥናት ቡድን ሆኘ ነዉ፡፡ ፡ ከሙያ ጋር በተያያዙ ጉዳቶች እና መንስኤ ሊሆኑ ስለሚችሉ ነገሮች ከ20-30 ደቂቃ ብቻ የሚፈጅ 50 ጥያቄ ልጠይቅዎት እፈልጋለሁ ፡፡ እርስዎ የሚሰጡን ትክክለኛ መልስ ለህግ አርቃቂዎች በቀላሉ ከሙያ ጋር በሚደርሱ ጉዳቶችን በመከላከል እና በመቆጣጠር ጤናማ የሰራተኛ ሀይል እንዲፈጠር ይረዳል፡፡ እርሰዎ የተመረጡት በባለፈዉ ቅድመ ጥናት ዳሰሳ በሰጡት መልስ ነዉ፡፡ በዚህ ጥናት ላይ የሚሳተፍ ማንኛዉም ሰዉ ከዚህ በታች ስለ ጥናቱ የተሰጠዉን መረጃ በትክክል ተረድቶ ፍቃደኝነቱን ሲያሳይ ብቻ ነዉ፡፡

የጥናቱ ርዕስ፡ በቦሌ ክ/ከተማ በስራ ላይ ያሉ ጠቅላላ ኮትራክተሮች በሚገነቧቸው ቤቶች ግንባታ ውስጥ የሚስሩ ሰራተኞች ላይ የሚደርሱትን ከሙያ ጋር የተያያዙ ጉዳቶችን ና መንስኤዎቻቸዉን ለይቶ ማወቅ ነው።

የጥናቱ ዋና አላማ፡ በቦሌ ክ/ከተማ ጠቅላላ ኮትራክተሮች በሚገነቧቸው ቤቶች ግንባታ ሰራተኞች ላይ የሚደርሱ ከስራ ጋር የተያያዙ ጉዳቶችን ብዛታቸው እና አጋላጭ መንስኤዎቻቸዉን ለይቶ ማወቅ፡፡

የተጠኝዎች መብት፡ በጥናቱ ላይ መሳተፍም ይሁን አለመሳተፍ ይችላሉ፡ ተሳታፊዎች ጥናቱን በፈለጉት ቦታ ማቋረጥ ይችላሉ፡ መመለስ ያልፈለጉትንም ጥያቄ መዝለልም ይችላሉ፡፡ተሳታፊዎች ማንኛዉንም ያልገባቸዉን ጥያቄ መጠየቅ ይችላሉ፡፡

የጥናቱ ሚስጢራዊነቱ፡ በመላሾች የሚሰጥ ማንኛዉም አይነት መልስ በሚሰጢር ይያዛል፡ ስማቸዉም አይገለፅም፡፡

የተሳታፊዎች የፈቃደኝነት መጠየቂያ ቅፅ

ይህ መጠይቅ በቦሌ ክ/ከተማ ጠቅላላ ኮትራክተሮች በሚገነቧቸው ቤቶች ግንባታ ሰራተኞች ላይ በሚደርስ ከስራ ጋር የተያያዙ ጉዳቶችን ለማጥናት የተዘጋጀ ነዉ፡፡

የመጠይቁ መለያ ቁጥር _____
ጠቅላላ ኮትራክተሮች ስም_____
የግንባታዉ ቦታ መለያ ቁጥር/ስም/ _____ አድራሻ_____

ከላይ ያለዉን ፎርም ብታነቡት ወይም ቢነበብልዎት እና ስለ ጥናቱ ፍሬ ሀሳብ ቢረዱ እርስዎ በዚህ ጥናት ላይ ይሳተፉ ነበር?
አዎ _____አልሳተፍም_____
የተሳታፊዎች ፊርማ_____
የመረጃ ስብሳቢው ስም_____ ፊርማ_____ቀን_____

ክፍል 1፡ ማህበራዊና ስነ-ህዝባዊ ገፅታዎችን የተመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
101	ፆታ	1. ወንድ 2.ሴት		
102	እድሜ	_____		
103	ሀይማኖት	1. ኦርቶዶክስ 2.ሙስሊም 3.ፕሮቴስታንት 4.ካቶሊክ 5.ሌላ፡ ይጠቀስ_____		
104	ብሄር	1.አማራ 2.ኦሮሞ 3. ትግሬ 4. ደቡብ		
105	የጋብቻ ሁኔታ	1. ያገባ/ች 2. ያላገባ/ች 3. የፈታ/ች 4. የሞተችበት/ባት 5. ተነጣጥለው የሚኖሩ		
106	የትምህርት ደረጃ	1.ማንበብና መፃፍ የማይችል/ትችል 2.ማንበብና መፃፍ 3.የመጀመሪያ ደረጃ ትምህርት(1-8) 4.የሁለተኛ ደረጃ ትምህርት(9-12) 5.ሙያና ቴክኒክ 6. የመጀመሪያ ድግሪና ከዚያ በላይ		
107	የቅጥር ሁኔታ	1. በጊዜያዊነት 2. በቋሚነት		
108	የወር ገቢ	----------ብር		
109	የስራ ክፍል ምንድን ነው	1. ግንበኛ 2. አናፂ እና ጣራ ሰራተኛ 3. የቱቦዎችን እና መብራት ገጣሚ 4. የመጨረሻ ስራዎችን የሚሰሩ /painter/ 5.ለሳኝ 6. የቀን ሰራተኞችእና ሌሎች የረዳት ስራ የሚሰሩ 7. ሹፌር/ኦፕሬተር/		
110	የስራ ልምድ	---------ዓመት		

ክፍል 2 የመከላከያ መሳርያዎች አቅርቦትና አጠቃቀም በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
201	ስራ በሚስሩበት ግዜ የአደጋ መከላከያ ይጠቀማሉ	1.አዎ 2.የለም →		ወደ ቁ.206 ዝለል
202	ለጥያቄ ቁ.201፡ መልስዎ አዎ ከሆነ ምን አይነት(ካንድ በላይ መልስ መስጠት ይቻላል)	a. ጓንት 1. አዎ 2. የለም b. የጆሮ መከላከያ 1. አዎ 2. የም c. የአፍና የአፍንጫ መከላከያ 1. አዎ 2. የለም d. የጭንቅላት መከላከያ 1. አዎ 2.የለም e. ሁለንም የሰውነት ክፍል 1. አዎ 2.የለም f. የአይን መከላከያ መነፅር 1. አዎ 2.የለም g.የፊት መሸፈኛ 1. አዎ 2. የለም h.ቦቲ/ቆዳ ጫማ 1. አዎ 2. የለም i.ሌላ ካለ ይገለፅ ----------		
203	ለጥያቄ ቁ.201 መልስዎ አዎ ከሆነ መከላከያዎቹን ሁል ግዜ ይጠቀማሉ	1.አዎ 2.የለም →		ወደ ቁ.205 ዝለል
204	ለጥያቄ ቁ.203 መልስዎ የለም ከሆነ ሁሌ መከላከያ እንዳይጠቀሙ የሚያደርጎት ነገር ምንድን ነው;(ካንድ በላይ መልስ መስጠት ይቻላል)	a.ስለማይመች 1. አዎ 2. የለም b.ስዓት ለመቆጠብ1. አዎ 2. የለም c.ጉዳት ያመጣል ብዬ ስለማላስብ1. አዎ 2. የለም d.ግዴለሽነት 1. አዎ 2. የለም e.ስለሌለኝ 1. አዎ 2. የለም		
205	መከላከያ መሳርያውን ከየት ነው የሚያገኙት(ካንድ በላይ መልስ መስጠት ይቻላል)	1.ከተቋሙ 2.እራሴ እገዛዋለሁ 3. ከሌላ/ይጠቀስ/ ----------		
206	በዚህ ስራ ስትስማሩ የጥንቃቄ ስልጠና ወስደው ነበር	1.አዎ 2.የለም		
207	በስራ ላይ እያሉ የጥንቃቄ ስልጠና ወስደው ያውቃሉ	1.አዎ 2.የለም		
208	ለጥያቄ 207 መልሶ አዎ ከሆነ ስልጠናውን ከየት ነው ያገኙት(ካንድ በላይ መልስ መስጠት ይቻላል)	1.ከተቋሙ 2. መንግስታዊ ካልሆነ ግብረስናይ ድርጅት 3.ሌላ ካለ ይጠቀስ----------		

ክፍል 3፡ የስራ ላይ ጉዳትን በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
301	ባለፉት አስራ ሁለት ወራት ውስጥከስራዎ ጋር በተያያዘ የደረሰበዎት አደጋ አለ?	1. አዎ 2. የለም →		ወደ ክፍል 4 ይሸጋገሩ
302	ባለፉት ሁለት ሳምንታት ውስጥከስራዎ ጋር በተያያዘ የደረሰበዎት አደጋ አለ?	1. አዎ 2. የለም		
303	ለጥያቄ ቁጥር 301 እና 302መልሰዎ አዎ ከሆነ ለስንት ጊዜ?	1.ባለፉት 12 ወራት ውስጥ----ጊዜ 2.ባለፊትሁለት ሳምንታት----ጊዜ		
304	አደጋው የደረሰብዎት ዕለት መቼ ነው?	1.ሰኞ 2.ማክሰኞ 3.ዕረቡ 4.ሐሙስ 5.ዓርብ 6.ቅዳሜ 7.እሁድ 8.አላስታውስም፤		
305	ምን ጊዜ ነው አደጋው የደረሰብዎት?	1.ጠዋት 2.ከስዓት 3.ማታ 4.ሌሊት 5.አላስታውስም		
306	ጉዳት የደረሰበት የሰውነትዎ ክፍል	a. አይን1.አዎ 2.የለም b. ጥርስ 1.አዎ 2.የለም c. እጅ 1.አዎ 2.የለም d. ጆሮ 1.አዎ 2.የለም e. ጉልበት 1.አዎ 2.የለም f. እግር 1.አዎ 2.የለም g. የእግር ጣት 1.አዎ 2.የለም h. ራስ 1.አዎ 2.የለም i. የላይኛው ክንድ 1.አዎ 2.የለም j.የታችኛው ክንድ 1.አዎ2.የለም k. ከጉልበት በላይ ያለው እግር1.አዎ 2.የለም l. ከጉልበት በታች ያለው እግር1.አዎ2.የለም m. ጀርባ 1.አዎ 2.የለም n. ደረት 1.አዎ 2.የለም o.ሌላ ካለ ይገለፅ----------		
307	የጉዳቱ አይነት	1. ከከፍታ ቦታ መውደቅ 2.በተቀመጡ እቃዎች መወጋት 3. ከተቀመጡ ነገሮች ጋር መጋጨት 4. የሚወድቁ ነገሮች 5.መሬት ላይ መውድቅ 6.ሌላ ካለ ይጠቀስ		

308	**አደጋው ለምንየደረሰበዎ ይመስለዎታል**?	a. **ለስራው ሂደት አዲስ ነበርኩ** 1. **አዎ** 2. **የለም** b. **ስለ ግል ህይወቴ እያሰብኩ ነበር** 1. **አዎ** 2. **የለም** c. **ሌላ የጤና ችግር ስለነበረብኝ** 1. **አዎ** 2. **የለም** d. **አደጋን መከላከል ስለማይቻል ነው ጉዳቱ የደረሰብኝ** 1. **አዎ** 2. **የለም** e. **የስራው ባህሪ ስለሆነ ነው** 1. **አዎ** 2. **የለም** f. **የአደጋ መከላከያ ባለማደረጌ ነው** 1. **አዎ** 2. **የለም** g. **አላስታውስም** 1. **አዎ** 2. **የለም** h. **ሌላ ካለ ይጠቀስ**----------		
309	**የሚስሩበት ቦታ የት ነው**	1.**ከፍታ ቦታ/ፎቅ ላይ/** 2.**መሬት/ምድር/** 3.**ሁለቱም ቦታ** 4.**ሌላ ካለ ይጠቀስ**…		
310	**በአደጋው ምክንያት በጤና ተቋም ወይም በቤትዎ አልጋ ይዘው ነበር**	1. **አዎ** 2. **የለም**		
311	**ለጥያቄ ቁ**.310 **መልሰዎ አዎ ከሆነ ለምን ያህል ጊዜ(በሰአት)**	----------**ሰአት**		
312	**በአደጋው ምክንያት ከስራ የቀሩበት ቀናት**	----------**ቀናት**		

ክፍል 4፡ የስራቦታን በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
401	በሳምንት በአማካይ ምን ያህል ሰአትይሰራሉ?	_____ሰዓት		
402	በመደበኛ የስራ ቦታዎ የሙያ ደህንነትናጤንነት ቁጥጥር ተደረጎ ያውቃሉ	1.አዎ 2. የለም		
403	የሙያ ደህንነትና ጤንነት ስልጠና ወስደው ያውቃለ?	1.አዎ 2. የለም		
404	በስራ ቦታዎ ከፍተኛ ዕቃ የማንሳት፣ የማጓጓዝ፣ መግፋትና የመሸከም የመሳሰሉትን ስራ ያከናውናለ?	1.አዎ 2. የለም →		ወደቁ.407 ዝለል
405	ለጥያቄ ቁ.404 መልሰዎ አዎ ከሆነ በቀን በአማካይ ምን ያህልክብደት ያነሳለ?	1.ቀላል (ከ5ኪግ የማይበልጥ) 2. መካከለኛ(ከ6-10ኪግ) 3. ከባድ (ከ11-20ኪግ) 4.በጣም ከባድ (ከ 20ኪየሚበልጥ)		
406	በአማካይ በዚህ ስራ ላይ ለምን ያህልጊዜ ይቆያሉ?	1. ከ2 ሰአት ያነሰ 2. ከ2-4ሰአታት 3. ከ 4 ሰአታት በላይ		
407	ስራዎ የማየት ትኩረትን የሚሻ ነውን?	1. አዎ(ጥቃቅን ነገሮችን በትኩረትአመለከታለሁ ≤50ሴ.ሜ) 2. አልመለከትም(ጥቃቅን ነገሮችን በትኩረትአልመለከትም>50ሴ.ሜ) →		
408	በስራ ቦታዎ እርግብግቢት ያለባቸውንመሳሪያዎች ይጠቀማሉ?	1.አዎ 2. የለም		ወደ ቁ.410 ዝለል
409	ለጥያቄ ቁ.408 መልሰዎ አዎ ከሆነ ለምንያህል ጊዜ?	1.ከ1 ሰአት አይበልጥም 2. ከ2-4 ሰአት 3. ከ 4 ሰአት በላይ		
410	ስራ በሚሰሩበት ጊዜ የሚሰሩበት ማሽን ከላል አለው?	1.አዎ 2. የለም		
411	ማሽኑ ሲበላሽ በወቅቱ ጥገና ይደረግለታል?	1.አዎ 2. የለም		

ክፍል 5፡ የሰራተኞችን ባህሪ በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
501	ያጨሳሉ?	1.አዎ 2. የለም →		መልሰዎ የለም ከሆነ ወደ ጥያቄቁ.503 ይሸጋገሩ
502	ለጥያቄ ቁ.501 መልሰዎ አዎ ከሆነ በስንት ጊዜ	1.በየቀኑ 2 ከ.1-3 ቀን በሳምንት 3. አልፎ አልፎ		
503	አልኮን ይጠጣሉ?	1.አዎ 2. የለም →		መልሰዎ የለም ከሆነ ወደ ጥያቄ ቁ.505 ይሸጋገሩ
504	ለጥያቄ ቁ.503 መልሰዎ አዎ ከሆነ	1. በየቀኑ		

	በስንት ጊዜ	2 ከ.1-3 ቀን በሳምንት 3. አልፎ አልፎ		
505	ጫት ይቅማለ?	1.አዎ 2. የለም →		መልሰዎ የለም ከሆነ ወደ ጥያቄ ቁ.507 ይሸጋገሩ
506	ለጥያቄ ቁ.505 መልሰዎ አዎ ከሆነ በስንት ጊዜ	1. በየቀኑ 2 ከ.1-3 ቀን በሳምንት 3. አልፎ አልፎ		
507	ስራ ላይ እያሉ የእንቅልፍ ችግር አለበዎት	1.አዎ 2.የለም		መልሰዎ የለም ከሆነ ወደ ጥያቄ ቁ.509ይሸጋገሩ
508	ለጥያቄ ቁ.507 መልሰዎ አዎ ከሆነ ምክንያቱ ምንድን ነው?	a. ያለ ዕረፍት/ቅያሬ ከ8 ሰአት በላይ መስራት 1. አዎ 2. የለም b. በምሽት መስራት 1. አዎ 2.የ ለም c. በእንድ ጊዜ ከእንድ በላይ ስራ መስራት 1. አዎ 2.የለም d. ከፍተኛ የሙቀት ጫና1.አዎ 2.የ ለም e. ሌላ ካለይጠቀስ ----------		
509	በአሁኑ ጊዜ በስራዎ ደስተኛ ነዎት?	1. አዎ 2.የለም		

ይህ የመጠይቃችን መጨረሻ ነው፡፡ አነዚህ ጥያቄዎች ጊዜ ወስደው በመመለስ ላደረጉልን ትብብር ከልብ እናመሰግናለን፡፡

Part VI Work environment observational cheek list

Name of constriction site_____

No	Safety factors	Possible answers	Remark
1	Equipment put in a correct place and orderly	1.Yes 2.No	Yes requires all materials and wood place in correct place.
2	Is there warning signs or safety rules in the work place?	1.Yes 2.No	Yes requires no lack of such signs or post while inspection around.
3	Do the employees use the necessary personal protective device?	1.Yes 2.No	Yes requires no lack of such equipment and used by each workers while inspection around.
4	Does the working section have first aid equipment?	1.Yes 2.No	Yes requires the presence of first- aid equipment during data collection.
5	Electrical panel knockouts are in place?	1.Yes 2.No	Yes requires the presence of electrical panel knockouts during data collection
6	Ladders are safe and inspected as appropriate?	1.Yes 2.No	Yes requires the two legs of ladder properly stand and there is no moisture on it during data collection.
7	Hammers kept free of splinters/mushrooms?	1.Yes 2.No	Yes requires hammer were not easily splinters area.
8	Unsafe handling tools are prohibited by the supervisors?	1.Yes 2.No	Yes requires supervisor prohibited those worker from unsafe hand tool
9	Employers operating lifts are trained on the equipment?	1.Yes 2.No	The employee operates lift without any faire during data collection
10	Wall openings floor holes are covered or guarded?	1.Yes 2.No	Yes requires opening and floor holes covered during data collection.
11	Portable circular saws equipped with protective guards?	1.Yes 2.No	Yes requires portable saw have caver during data collection.

Declaration

The understand declared this my original work and has not been presented in this and any other university and also all sources of materials used for this thesis have been duly acknowledged.

Name of the student: Getachew Miruri

Sign:_____

Date:_____

Place: Addis Ababa University

This thesis has been submitted for examination with my approval as university advisor

Approval of the primary Advisor

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School of Public Health

Addis Ababa University

Signature_____

Date_____

Place Addis Ababa University