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SCHOOL OF PUBLIC HEALTH

Determinants of Occupational Injury among the condominium house construction workers of Addis Ababa city, Ethiopia. Unmatched case control study

BY

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Table of content

Table of Contents Page

List of Tables page

List of figures page

Acronyms

AOR: Adjusted Odds Ratio

CI: Confidence Interval

CAS: Cases

CON: Controls

COR: Crude Odds Ratio

EPI Info: Epidemiological Information

ILO: International Labor Organization

OR: Odds Ratio

PI: Principal Investigator

PPE: Personal Protective Equipment

SPSS: Statistical Package for Social Sciences

WHO: World Health Organization

Abstract

Back ground of the study: Occupational injuries constitute global public health burden from which millions of workers die each year from unintentional work related accidents causing economic loss. The construction industry has been identified as one of the hazardous industries in Ethiopia; a significant number of people are working in the industry.

Objective of the study: To assess factors of Occupational Injury among the condominium house construction workers of Addis Ababa city, Ethiopia.

Methods: Institution based unmatched case control study design was done to assess the determinant of occupational injury among the condominium house construction workers in Addis Ababa city. Five large scale condominium house construction site was selected based on the number of worker (n>250) and number of condom unit (>=2500) constructed. Sample of 576 study participants were included in the study by one to two cases to control ratio (192 cases and 384 controls). Study subjects were selected using simple random sampling technique. Data collection was made by using pre-tested questionnaire. Work environment observation was held to strengthen the information with quantitative findings of environmental determinants. EPI INFO 3.5.1 version computer software package was used for editing, cleaning, coding, and check completeness and consistency of data. Variables with 95% confidence interval 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: Socio demographic and most environmental factors had no association on the occurrence occupational injury among the condominium house construction workers only health and safety information access had association; some behavioral factor such as use of personal protective equipment (AOR [95%Cl] = 2.24 [1.26, 3.93]), sleep disturbance (AOR [95%Cl] = 8.67 [5.30, 14.20]), workers who were unsatisfied by their work (AOR [95%Cl] = 2.14 [1.26, 3.93]), smoking cigarette (AOR [95%Cl] = 2.38 [1.45, 3.89]), and drank alcohol (AOR [95%Cl] = 2.15 [1.38, 3.34]) were significantly associated with the occurrence of occupational injury. Most environmental health and safety matters such as warning sign, ladders inspected, portable circular saws were equipped with protective guards, unsafe handling of material prohibited by supervisors were not fulfilled with in all construction site.

Conclusion and recommendation: Behavioral factors sleep disturbance, not satisfying by work, alcohol consumption, smoking cigarette, not using personal protective equipment increase the risk of occupational injury. Safety training of workers and continuous monitoring of working site can play an important role in reducing occupational injury.

Key word: *occupational injury; socio demographic, environmental, and behavioral factors; condominium house worker.*

Introduction

Background

International labor organization or World Health Organization joint Committee defined occupational health and safety as: "Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. The prevention of workers in their working section from risks adverse to their health and placement of workers in an occupational environment adapted to their physiological and psychological capabilities are also the objectives of occupational health (1).

The issue of occupational health and safety has been a central point for the ILO ever since it began operations in 1919 and continuous to be a fundamental requirement for achieving the objective of decent work agenda along with WHO which endorsed a global strategy on occupational health for all (1996), but the overall situation on conditions of work for majority of workers did not meet the minimum standards and guidelines set by the two organization (2, 3). Occupational health services are available only to 10-15% of the 3 billion workers of the world. In industrialized countries, the coverage varies between 15 and 90% and in developing countries between a few percent and 20% (2, 4, 5). The workplace has been considered an important arena and occupational health has been seen implicitly as key instrument for implementation of policies and strategies of "health for all" by 2000 and further development of health system in the global strategy on occupational health for all in the WHO global plan of action on worker's health which was approved by the world health assembly in 2007 (2, 6).The Occupational health service guideline which was designed jointly by WHO/ILO includes basic activities like, monitoring and assessing work environment and workers' health, initiatives, management and control of hazards, accidents and injuries to the branch and workplace in concern.

The role of occupational health services in most developing countries has been given less attention due to inadequate knowledge, shortage of information, lack of resources and lack of political will (7, 8) which can impose greater burdens for occupational injuries. The experience and practice of occupational health service in Ethiopia is very limited. Recently, the national Ministry of Labor and Social Affairs is giving emphasis and under plan to organize the service, but the baseline information on determinants of occupational injuries especially on construction work is scarce /absent for planning and implementing to prevent and control it (9).

Statement of problem

Occupational injuries pose a major public health and developmental problems which result in a serious health, social, and economic consequences on workers and their employers (10). The International Labour Organization (ILO) and World Health Organization (WHO) estimates that around 1.2 million work-related deaths, 250 million injuries and 160 million work-related diseases occur each year globally (11). It represents 12% of the global burden of disease and third most important cause of overall mortality globally (12). Every year more than 4.1 million workers suffer a serious job related injury and more than 350,000 workers die each year due to injury (13, 14). The impact is 10 to 20 times higher in developing counties, where the greatest concentration of the world's workforce is located (14).

The construction sector comprised an estimated 9 million public and private sector workers in 2011 according to the Current Population Survey of US. However, the construction industry has been identified as one of the most hazardous industries in many parts of the world. The industry accounts over one third of all fatal industrial accidents; 30% of accidents resulting injuries which leads absence from work for four or more days (15, 16).

The United States Secretary of Health and Human Services reported a total of 430 fatal injuries among the construction workers in 2008 (13). The results of 19 years of research in the United States of America also showed that about 11.5% of work related injuries among construction workers (12). In Egypt, about 13% of work-related deaths and 18% of occupational injuries were recorded among workers in the construction industry (17). In developing countries occupational health and safety hazards faced by construction workers are greater than those in industrial countries (18). Ethiopia is striving hard to improve housing accessibility of homeless people in Addis Ababa and other towns of the country by building condominium house by the government. There is no systematic recording of occupational injury among the workers in 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. Therefore this study intends to assess the determinants of occupational injury among the condominium house construction workers in Addis Ababa city.

Rational of the study

Occupational morbidity, disability and death in most developing countries including Ethiopia are becoming a serious public health problem. Construction industry has been identified as one of the most hazardous industries in many parts of the world. Especially developing country like Ethiopia in which, development of housing Construction on fast growing are more affected. Although, evidence based occupational health and safety services are indispensable, studies showing factors of occupational injury in most work places such as housing construction are scarce in Ethiopia. So, this study aims to contribute in filling information gaps on the existing occupational health and safety service practice that uses for design injury prevention strategy so that morbidity, disability and death among construction workers due to occupational injury are minimized and promote production opportunity. Besides, it can also serve as base line information to undertake studies on similar settings.

Literature review

An occupational injury is any physical injury sustained on a worker in connection with the performance of his or her work in the working area (19). Hundreds of millions of people through-out the world are working today under circumstances that foster ill health and/or are unsafe. The construction industry is considered to be an extremely dangerous working environment, and therefore the health status of construction workers needs to be considered prior, during and out of the industry. Occupational hazards relative to the construction worker are well researched internationally; however few countries undertake routine surveillance to identify the health status of the construction worker relative to these hazards (15). Most Researchers showed that several factors were related to the occurrence, severity, and types of injury. Socio-demographic factors, working environment variables, and workers' behaviors related variables are risk factors for workers to be injured in workplace.

Socio demographic determinants of occupational injury

Research has found that female construction workers have a higher overall rate of fatalities. But, study done in USA and China indicated that men had a higher risk of occupational injury than women. Studies in Ethiopia, Addis Ababa and Gondar showed that the prevalence of occupational injury is higher for males (20). However, another study conducted in Ethiopia among small-and medium-scale factory workers indicated that occupational injury has no significant statistical association with gender of the worker (21).

Although the occupational injuries affected all categories of workers French case-control study found that construction workers under the age of 30 had a greater risk of accidents than those 30 years and older (22). A case control study in textile industry of Amhara regional state Ethiopia is also younger workers (<=30) had greater risk of accidents than older workers (23). Done by Department of Environmental Health, Ministry of Health, majority of occupational injuries (24%) were in the age group of 26-30 (24). Ministry of Labour and Social Affairs of Ethiopia also reported that the majority (18 %) of work related injuries were observed in the age group of 25-29 (25). Most study emphasized that work-related injuries in young subjects were more common due to lack of experience and lack of job knowledge than in other subjects. Furthermore, many workers begin working at an early age and often without safety training (26). However, a cohort study done in Germany older workers are vulnerable group with respect to risk of occupational disability (27). Similarly a case control study done among coal mining industrial workers in India reported that older workers were at higher risk of occupational injury than young workers (28). A cross sectional study done in Addis Ababa Ethiopia on large scale industry showed that age is not significantly associated with occurrence of injury (20). Aging would result in a decrease in physical and mental abilities which may in turn alter the quality of

work performance and the ability to notice work environment hazards, particularly when the demanding level of the tasks is high (29).

Different investigations reported that low education status, low monthly salary, low working experience (5 years or less) on present job were common risk factor for work-related injuries (21, 23, 30). Most occupational health and safety studies conducted in developing countries also revealed that increased educational levels in factory have been associated with decreased work-related injuries (30, 31). However, a cross sectional study in Addis Ababa shows educational status of the workers has not significantly associated with magnitude of occupational injuries (21). Education is more likely to increase workers safety and health practice that can prevent them from occupational injuries (32). Education is more likely to increase workers safety and health practice that can prevent them from occupational injuries (33).

A cohort study done in German among construction workers shows that experienced construction workers seem to be at particular risk of occupational disability (34). But study done in Turkey shows that work experience is much more important in construction sector than the others in terms of injury prevention (35). Study done in Ethiopia Gondar among the workers of Small and Medium-Scale Industries showed that lack of experience influences the interaction between the person and other workers, knowledge of machines and tools in use and their defects, and awareness of surrounding hazards (30).

Workers salary per month was found to be significantly related to injury occurrence. Workers with low income could have more hazardous job in which may not use protective clothing. Workers with good salaries are usually highly educated have supervisory jobs and have less exposure to job hazards (36).

Study done in chemical company of India Comparison between the permanent and temporary workers has shown that the temporary workers have been more responsible for high incidence of accidents in the company (32).

Working environment determinants of occupational injury

Many study concluded hours worked per week, health and safety information, work place supervision, health and safety training showed a significant association with work and work-related injuries (23, 26, 37, 38). An increasing number of studies have considered job satisfaction and regular supervision of workplace as pervasive and influential factors in the occurrence of work related injuries in the work environment. Study done in France among the construction workers poor perception regarding working conditions and safety environment had significant influence on the injury occurrence (39).

A study done in Ethiopia North Gondar Zone among small-and medium-scale factory workers revealed that risk of work-related injury decreased with job satisfaction and workplace supervision (30). Literatures indicated that there is a strong relationship between training on health and safety and reduced work accident rates among industrial workers (40). Study done in Ismailia strengthens these idea workers who had no training for their work is at high risk of injury than those who were trained for their work (41). 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 occupational injury than workers who trained but health and safety information access didn't show significant association to the occupational injury (23). Another study done in Addis Ababa health training did not show significant association with the occurrence of injury (21). Health and safety training could motivate workers to be safer and instruct them in correct safety behaviors.

Behavioral determinants of occupational injury

Many study concluded that the occurrence of work-related injury was significantly related to job satisfaction, sleep disorder, khat chewing, job stress, smoking characteristics of workers, workers with excess alcohol use, and use of personal protective device. Injury is one of many adverse consequences of substance use and misuse, and substance use and misuse are therefore often suspected to contribute to occupational injuries (20). A study in France indicated that work accidents have been associated with alcohol consumption (42). Study done in our country afar regional state workers who were used to drink alcohol were more likely to be injured than those who do not consume alcohol but no significant association between khat chewing and cigarette smoking with occurrence of occupational injuries (38).

Poor perception regarding to working conditions and safety environment had a significant influence on injury occurrence (35). Most researchers emphasize that workplace injuries are caused by poor person environment which leads to increased job stress and occupational injury (43). A case control study done among Iranian car manufacturing workers reported that the risk of occupational injury among

those with high job stress was significantly higher than those with low job stress (44). Another study done Amhara regional state Ethiopia on textile factory workers shows that workers who were stressed highly due to their job were more likely to report more than 2.5 times occupational injury compared with their counterparts (23).

Most studies in deferent countries revealed that sleeping disorder, job stress and job dissatisfaction are the major risk factors for the occurrence of occupational injuries among industrial workers. In adequate sleep has been associated with numerous major work-related accidents. A case control study done among construction workers in France indicated that workers with sleeping disorder problem sustained more occupational injury compared with their counterparts (42). Different scholars reported that sleep disturbances such as difficulty in initiating sleep, sleeping poorly at night, sleep insufficiency, and insomnia symptoms are significantly associated with the occurrence of occupational injuries (45). Sleeping disturbance problems affect the ability to maintain wakefulness and concentration as well as the ability to assess or watch the work environment and working conditions and perform duties safely. A case control study among coal mining factory workers in India reported that workers who were highly satisfied with the existing jobs have lower risk of occupational injury (28). This can be explained that workers who did not injured have positive thinking about the physical environment and always take necessary safety precautions. This indicated that work injuries were caused by a poor person environment which leads to increased job stress. Such stresses increased occupational injury risks, and stressed individuals were more likely to have involved in occupational injuries (32).

A study conducted in Gondar University among the construction workers concluded that awareness among workers regarding dangers and risks at work place, use of personal protective equipments, and good personal hygiene practice to minimize unnecessary exposure to worksite contaminants was found to be important to decrease the occupational injury problems and improve the health status of workers (46).

The whole literatures reviews are summarized by the following figure 1. Socio demographic factors such as Sex of workers, Age of workers, Level of education , Salary of workers, Employment condition, Work experience, environmental factors like Health and safety information, Health and safety training, Workplace supervision and behavioral factors such as Alcohol consumption, Chat chewing, Sleep disturbance, Job satisfaction, Job stress, Use of personal protective equipment of are interlinked each other and the whole may leads for the occurrence of occupational injury.

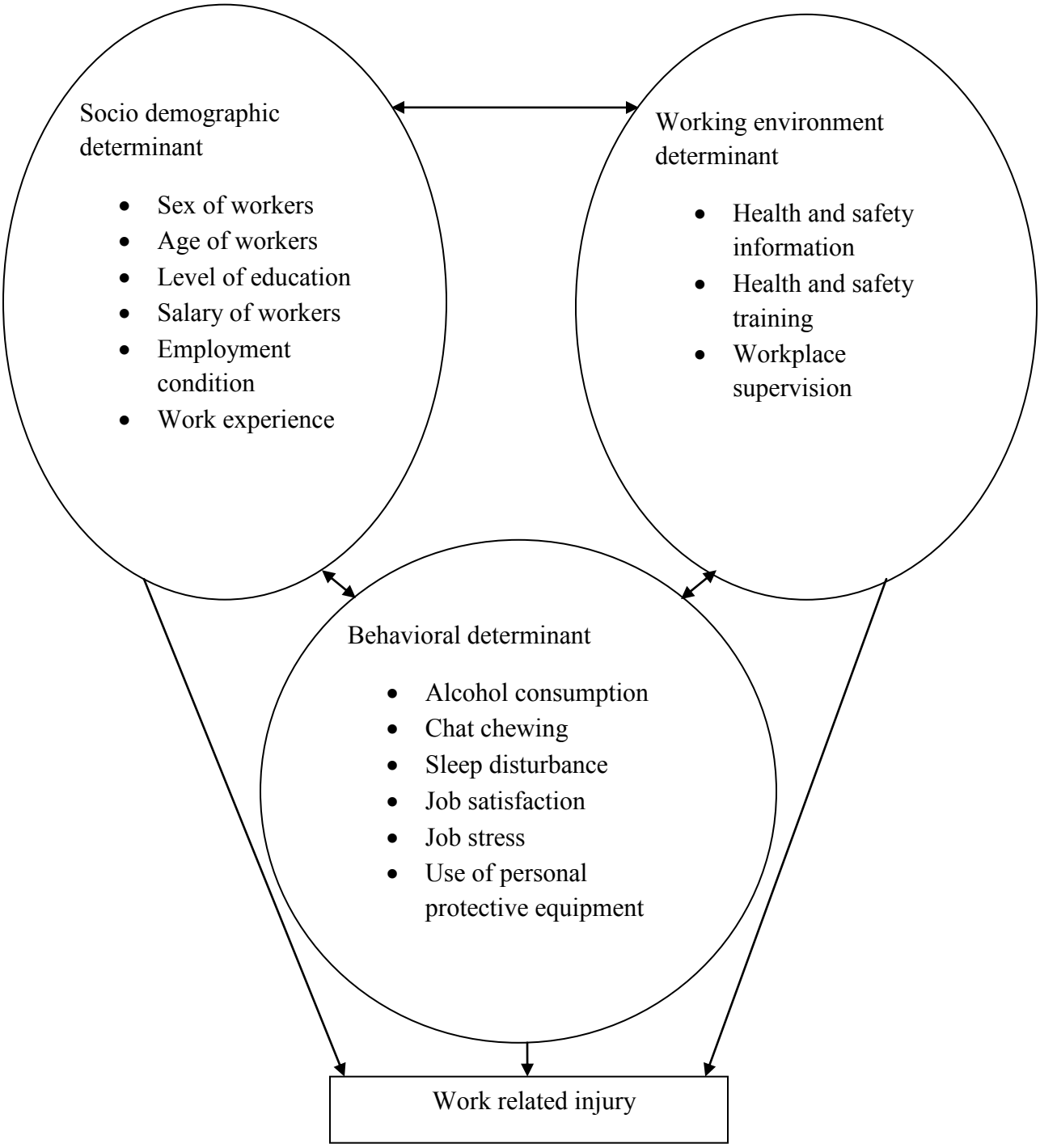

Figure1. Conceptual framework adapted from the literatures review.

Objective

General objective

- To assess the determinants of Occupational Injury among the condominium house construction workers of Addis Ababa city, Ethiopia, 2013.

Specific objectives

- To assess socio-demographic factors of workers for occupational injuries.
- To assess environmental factors of workers for occupational injuries.
- To assess the behavioral factors of workers for occupational injuries.

Methods

Study design

Institution based unmatched case control study design was conducted to assess the factors of occupational injuries among condominium house construction workers in Addis Ababa city, Ethiopia, 2013.

Study area and period

The study was conducted in Addis Ababa from February 1st – 20th, 2013 G.C. Total population of the city administrative was 2,738,240 with 1,433,730 females and 1,303,518 males (47) The city is subdivided into ten sub city. In Addis Ababa city more than 70% of the population lives in slums and the houses are made predominantly from mud and straw (13). To solve these problems since 2005 Ethiopia has been implementing government-led low- and middle-income housing program: the initial goal of the program was to construct 400,000 condominium units, and create 200,000 jobs for the jobless (13).

Source population

All workers who are engaged in the government condominium house construction in Addis Ababa city were the source population.

Study population

All employees who are involved in 44,709 condominium house construction workers working as the masons, Carpenters and roofers, Plumbers and electricians, Workers carrying out finishing work, Helpers and daily labourer were included in the study with the following case and control definition; Cases were workers who experienced occupational injury within the last three months, and the control groups were workers who never experienced occupational injury within the working site; where as those construction sites that involve small number of workers(<=250) and construct small number of condom unit (<=2500) were excluded from the study because of injury prevalence is high in large scale construction industry (48). And workers working as supervisors, trackers, and other managerial working area were excluded from the study assuming that they were less exposed for occupational injury.

Sample size determination

Sample size (n) was calculated by using two population proportion formula by considering 16.1% exposed for sleep disturbance among the cases and 7.5% exposed for sleep disturbance among the controls of construction workers from the previous study done in France (49). With an assumption of one-to-two cases-to-controls ratio; 95% confidence interval, and 80% power of the study.

$$n_1 = \frac{\left[Z_{\frac{\alpha}{2}}\sqrt{\left(1+\frac{1}{r}\right)p(1-p)} + Z_{\beta}\sqrt{p_1(1-p_1)+\frac{p_2(1-p_2)}{r}}\right]^2}{(p_1-p_2)^2}$$

n_1 = Number of sample of cases within the last three consecutive months.

r = Ratio of control to cases

$\boldsymbol{p = \frac{p_1 + rp_2}{1+r}}$

P_1= Percent of cases exposed for sleep disturbance = 16.1%

P_2= Percent of control with exposed for sleep disturbance = 7.5%

$Z_{\frac{\alpha}{2}}$= 95% degree of confidence interval; α = 0.05

Z_{β}= 80% power of the study; β = 0.84

Case: control ratio = 1: 2

Therefore by considering the above assumption the sample size was calculated by using EPI-INFO version 7 statistical software's statCalc program for unmatched case control study design. 175 cases and 349 controls were calculated and 10% none response rate were added both for cases and controls; finally a total of 576 study participants (192 cases and 384 controls) were included in the study.

Sampling procedure

From all condominium house construction sites in Addis Ababa Large Scale condominium house construction sites were selected based on the operational definition. Bole Bulbula, Project 11, project 12, project 13 and project 14 were included; working departments which included in the study were Carpenters and Roofers, Masons, Plumper and Electrician, Workers carrying out finishing work and Helpers and daily labourer. Prior to the actual data collection a base line survey was conducted for one week to identify source of cases and the controls from each site. Then by simple random selection methods select those cases and controls. The study subjects were recruited by deriving an assumption that factors of occupational injury was homogeneous in each construction site.

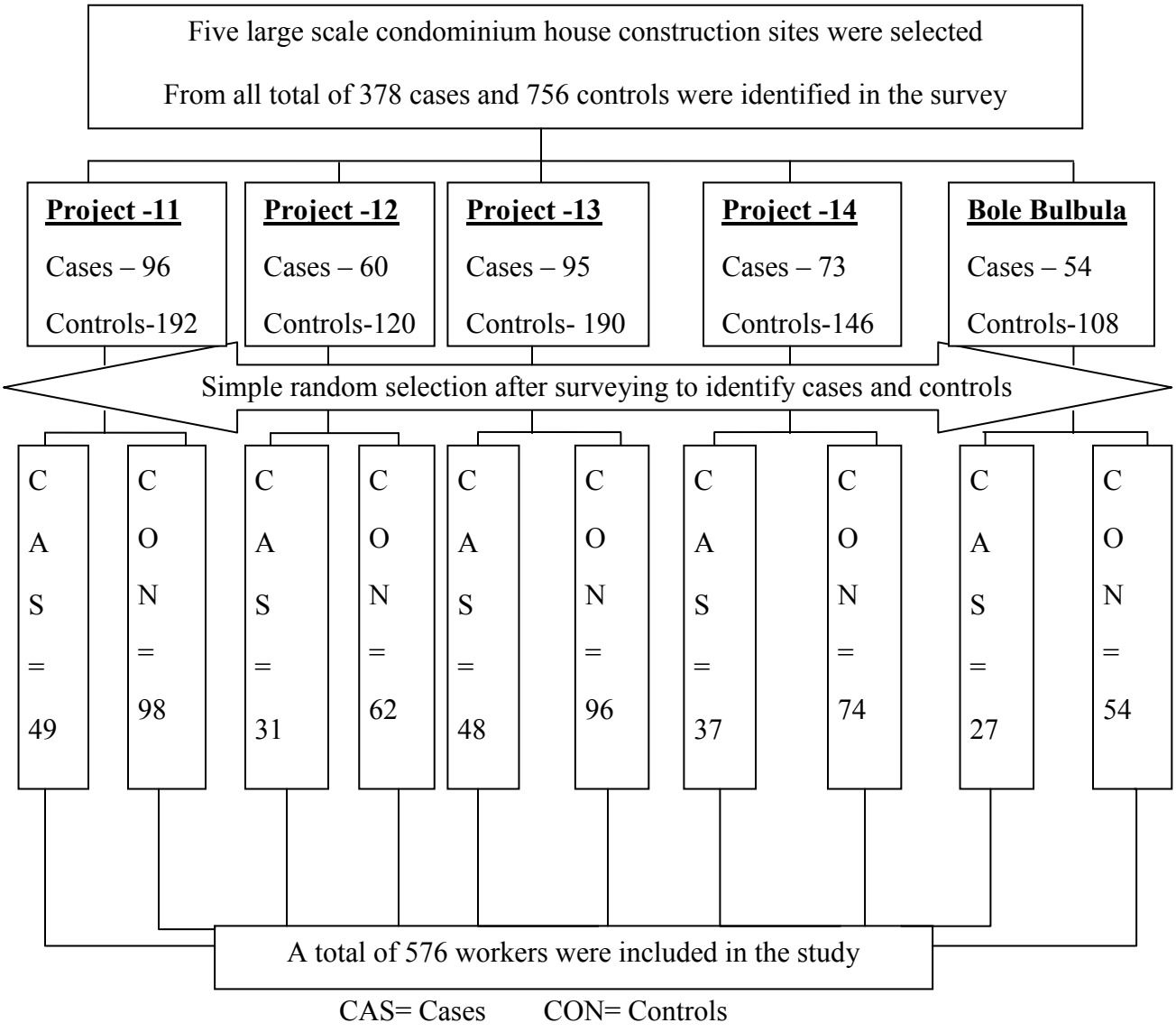

Figure 2: Schematic representation of sampling procedure.

Data collection

Data was 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. Data was collected by ten grade 12 completed students, and three supervisors who have Bsc. in environmental health after three days of training. Job stress assessed by 14 job stress related questionnaires and job satisfaction of workers was assessed by using 15 job satisfaction related questionnaires (28, 40). Sleep disturbance was assessed with the four-item Jenkins Sleep Problems Scale (Jenkins.*et.al*, 1988).

Operational definition

Cases: Workers who have experienced occupational injury within the last three months in the construction site.

Controls: Workers who never experienced occupational injury within the construction working site.

Health and Safety Information: A worker who have got any kind of information in one year period through any kind of media about health and safety of construction workers.

Health and Safety Training: Trainings given to a worker about health and safety.

Job Satisfaction: A worker who have scored above or equal to the 90^{th} percentile from 15 job satisfaction related questionnaire was considered to have job satisfaction and below the 90^{th} percentile was considered to be dissatisfied by his/her job (42).

Job Stress: A worker who have scored above or equal to 90^{th} percentile from 14 job stress related questionnaire was considered to have a problem of job stress and below the 90^{th} percentile was considered to have no job stress (42).

Large scale condominium house construction site: construction site that involves greater than 250 workers and greater or equal to 2500 condom unit construction.

Occupational injury: Any physical injury sustained on worker in connection with the performance of his or her work and absent from work four or more days from work identified during the survey.

Sleeping disturbance problem: The participants have sleep disturbances if they reported any problems with sleep from four-item of Jenkins Sleep Problems Scales within the construction site.

Variable of the study

Dependent variable: Occupational injury

Independent variables:

Socio demographic factors: sex, age, religion, ethnicity, marital status, level of education, monthly salary, Employment condition, and work experience.

Work environment determinants: health and safety information, health and safety training, workplace supervision, working department.

Behavioral determinants: Alcohol consumption, khat chewing, cigarette smoking, sleeping disorder, job satisfaction, job stress, and personal protective equipment use.

Data processing and analysis

Data was entered by using EPI INFO 3.5.1 version computer software package for editing, cleaning, coding, and check completeness and consistency. Finally, data was exported to SPSS for windows version 16 for data management and analysis. Descriptive statistics, Bivariate logistic and multivariate logistic regression analysis were done to see association between determinant factors and occupational injury. Crude odds ratio with 95% confidence intervals and significance level at $P< 0.05$ were used to see the association between determinant factors and occupational injury. Variables with 95% confidence interval and P value at <0.2 during the bivariate analysis were included in the multivariate logistic regression analysis to see the relative effect of confounding variables and interaction of variables (23). Adjusted odd ratios with 95% confidence interval were calculated. The data were displayed by tables and statements.

Data quality management

The questionnaire was prepared originally in English and translated to Amharic and back to English to keep the consistency of the questionnaires. Training of data collectors & supervisors on all aspect of data collection tools, questioning techniques, ethical issues, role played on how to fill the questionnaire and pre testing of questionnaire were made to ensure the quality of data. Principal investigator and supervisors were made spot-checking and reviewing the completed questionnaires by the data collectors ensures completeness and consistency of the information collected. Before the actual data possessing re entry of 5% of the data to EPI INFO software package was made to maintain the data quality.

Ethical consideration

This study was carried out after getting ethical clearance from Addis Ababa University, IRB of College of Health Sciences. Permission to conduct this study was secured from Addis Ababa house construction bureau and from each construction site official's. Verbal consent from each study subjects were obtained after clear explanation on the purpose of the study. To this end, the right of each respondent to refuse, answer for few or all questions were respected. Omitting names of the study subjects from the questionnaire help to assure confidentiality of the information and respondents faraway from co-workers were made to maintain privacy of the respondent during the interview. If there was an incident that results injury to the worker while interviewing, an immediate referral to the surrounding clinic was arranged prior to the data collection. However, injury Study participants were informed on common causes there was no incident that results and methods of preventing occupational injuries by the interviewer after completing interview.

Dissemination of findings

A detailed report of this study which consists of the main findings will be disseminated to Addis Ababa house 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 on local/ international journal.

Results

Socio demographic characteristics

One hundred ninety two cases and three hundred eighty four controls were interviewed for this study with the response rate of 100%, of the total participants 165 (85.9%) of cases and 327 (85.2%) controls were male workers; 137 (71.4%) of cases and 287 (74.7%) controls were under the age of 30 years; majority of the workers were single, 118 (63.5%) and 248 (64.6%) among cases and controls respectively; 129 (67.2%) of cases and 280 (72.9%) among the controls were an educational status of up to grade eight; by religion, 99 (51.6%) orthodox among the cases and 185 (48.2%) Orthodox among the controls; by ethnicity 73 (38%) among the cases and 148 (38.5%) controls were Oromo; 134 (69.8) cases and 272 (70.8) controls are temporary workers: by work experience 123 (64.1) cases and 275 (71.6) controls were work below five years; the mean monthly salary of the workers were 2504 ($\pm$ 845.9) (Table 1)

Table 1:- Distribution of socio demographic characteristic of respondent in condominium house construction workers in Addis Ababa, Ethiopia, February 2013.

Socio demographic variable	Case (n=192) (%)	Control(n=384) (%)	Total	P-value
Sex				
Male	165 (85.9)	327 (85.2)	492 (85.4)	0.802
Female	27 (14.1)	57 (14.8)	84 (14.6)	
Age				
<30years	137 (71.4)	287 (74.7)	424 (73.6)	0.385
≥30years	55 (28.6)	97 (25.3)	152 (26.4)	
Marital status				
Married	66 (34.4)	130 (33.9)	196 (34.0)	0.205
Single	118 (61.5)	248 (64.6)	366 (63.5)	
Widowed	3 (1.6)	1(0.3)	4 (0.7)	
Divorced	5 (2.6)	5(1.3)	10 (1.7)	
Religion				
Orthodox	99 (51.6)	185 (48.2)	284 (49.3)	0.438
Muslim	67 (34.9)	143 (37.2)	210 (36.5)	
Protestant	25 (13)	56 (14.6)	81 (14.1)	
Ethnic group				
Amhara	61 (31.8)	133 (34.6)	194 (33.7)	0.834
Tigre	36 (18.8)	65 (16.9)	101 (17.5)	
Oromo	73 (38)	148 (38.5)	221 (38.4)	
SNNP	22 (11.5)	38 (9.9)	60 (10.4)	
Educational level				
Can't read and write	23 (12.0)	29 (7.6)	52 (9.0)	
≤ grade 8	129 (67.2)	280 (72.9)	409 (71.0)	0.323
Grade 9-12	28 (14.6)	52 (13.5)	80 (13.9)	
Certificate and above	12 (6.2)	23 (6.0)	35 (6.1)	
Employment condition				
Permanent workers	58 (30.2)	112 (29.2)	170 (29.5)	0.796
Temporary	134 (69.8)	272 (70.8)	406 (70.5)	
Monthly salary in birr				
≤2504 birrper month	100 (52.1)	213 (55.5)	313 (54.3)	0.442
>2504 birr per month	92 (47.9)	171 (44.5)	263 (45.7)	
Work experience in years				
Below five years	123 (64.1)	275 (71.6)	398 (69.1)	0.064
5 years and above	69 (35.9)	109 (28.4)	138 (30.1)	

Working environment characteristics

From the total workers 145 (75.5%) cases and 242 (63) controls had no any health and safety information access before; and there were no supervision of work area by health or safety professionals as well as training of workers before or after starting work. Majority of the workers were helper and daily laborer, 80 (41.7%) among the cases and 172 (44.8%) controls (Table 2).

The results of observational checklist to assess environmental factors that were not addressed by quantitative data showed that in most sites, general working place equipment was not put in correct place and orderly, only Bole Bulbula site had special type of placing equipment correctly and orderly. There were no any forms of warning sign in all site of work place and workers were not wear personal protective equipment; working site had no electrical panel knockout in a place; ladders were not safe and inspected as appropriate; hammers were not kept in free of splinters; unsafe hand tools were not prohibited by supervisors; employees were not trained on operating lifts; wall opening and floor holes were not covered or guarded; portable circular saws were not equipped with protective guards during the data collection period.

Table 2:- Shows the distribution of environmental factors among the condominium house construction workers of Addis Ababa, Ethiopia, February 2013.

Socio demographic variable	Case (n=192) (%)	Control(n=384) (%)	Total	p-value
Health and safety				
Information access				
Yes	47 (24.5)	142 (37)	189(32.8)	0.003
No	145 (75.5)	242 (63)	387(67.2)	
Working department				
Masons	18 (9.3)	39 (10.2)	57 (9.9)	0.782
Carpenter & roofers	58 (30.2)	99 (25.8)	157(27.3)	
Plumbers & electrician	14 (7.3)	24 (6.2)	38 (6.6)	
Worker carrying out finishing work	22 (11.5)	50 (13.0)	72 (12.5)	
Helpers and other daily labourer	80 (41.7)	172 (44.8)	253(43.8)	

Behavioral characteristics

Among the total workers 168 (87.5%) cases and 311 (81.0%) controls were not used any form of personal protective equipment; majority of the workers were satisfied by their work, 152 (79.2%) cases and 359 (93.5%) controls; 172 (89.6%) cases and 370 (96.4%) the controls had no job stress. Majority of the cases were affected by sleep disturbance 166 (86.5%); From the total cases 95 (49.3%) were cigarette smokers, 85 (89.5%) smoke everyday and from the controls 85 (22.1%) were smoker, 60 (70.6%) smoke everyday; 80 (41.7%) cases were chew khat, 94 (92.5%) were every other days and 137 (35.7%) control were chew khat, 134 (97.8) were chew every other days. 125 (65.1%) cases were consume alcohol, 119 (95.2%) consume every other days: 140 (36.5%) controls were consume alcohol, 139 (99.3%) consume every other days (Table 3).

Table 3:- Distribution of behavioral factors among the condominium house workers of Addis Ababa, Ethiopia, February, 2013.

Socio demographic variable	Case (n=192) (%)	Control(n=384) (%)	Total	P-value
PPE use				
Yes	24 (12.5)	73 (19.0)	97 (16.8)	0.049
No	168 (87.5)	311 (81.0)	479 (83.2)	
Job satisfaction				
Yes	152 (79.2)	359 (93.5)	511 (88.3)	0.001
No	40 (20.8)	25 (6.5)	65 (11.7)	
Job stress				
Yes	20 (10.4)	14 (3.6)	34 (5.9)	0.001
No	172 (89.6)	370 (96.4)	542 (94.1)	
Sleeping disturbance				
Yes	166 (86.5)	165 (43.0)	331 (57.5)	0.001
No	26 (13.5)	219 (57.0)	245 (42.5)	
Cigarette smoking				
Yes	95 (49.3)	85 (22.1)	180 (31.2)	0.001
No	97 (50.7)	299 (77.9)	396 (68.8)	
How often?				
Everyday	85 (89.5)	60 (70.6)	145 (80.6)	0.001
Smoking every other days	10 (10.5)	25 (29.4)	35 (19.4)	
Khat chewing				
Yes	80 (41.7)	137 (35.7)	217 (37.7)	0.162
No	112 (58.3)	247 (64.3)	359 (62.3)	
How often?				
Everyday	6 (7.5)	3 (2.2)	9 (4.1)	0.058
Chewing every other days	94 (92.5)	134 (97.8)	208 (95.9)	
Alcohol consumption				
Yes	125 (65.1)	140 (36.5)	265 (46.0)	0.001
No	67 (34.9)	244 (63.5)	311 (54.0)	
How often?				
Everyday	6 (4.8)	1 (0.7)	7 (2.6)	0.001
Drank every other day	119 (95.2)	139 (99.3)	258(97.4)	

Factors association with occupational injury: Bivariate analysis

Table 4 presents the selected socio demographic variables and their relation to the occupational injury. Sex, age, educational level, employment condition, monthly salary and work experience didn't show significant association with occupational injury.

Table 5 indicates the bivariate analysis of environmental condition with respect to occupational injury. Health and safety information access showed significant association to the occupational injury.

The crude analysis of behavioral factors for occupational injury is shown in Table 6: workers who couldn't use personal protective equipment (COR [95%Cl] =1.64 [1.00, 2.70]) were more likely to have injury than worker who uses personal protective equipment. The odds of having occupational injury were significantly higher for those who have sleep disturbance (COR [95%Cl] = 8.46 [5.35, 13.43]). Workers who were unsatisfied by the work (COR [95%Cl] = 3.78 [2.21, 6.45]) and workers who had job stress (COR [95%Cl] = 3.07 [1.52, 6.23]) significantly associated with occupational injury. Smokers (COR [95%Cl] = 3.45 [2.38, 5.00]), workers who drank alcohol (COR [95%Cl] = 2.31 [1.34, 3.99]) also significant association with accordance of occupational injury. Smoking every day (COR [95%CL] = 3.54 [1.58, 7.92]) showed significant association for the occurrences of occupational injury than smoking every other days. But chewing khat (COR [95%Cl] = 1.29 [0.90, 1.84]) didn't show significant association to the occupational injury.

Table 4:- Association of occupational injury with socio - demographic determinants among condominium house construction workers in Addis Ababa Ethiopia, February 2013.

Socio demographic Variables	Cases (n=192) No. (%)	Control(n=384) No. (%)	COR (95%cl)	P-value
Sex				
Male	165 (85.9)	327 (85.2)	1.06 (0.65,1.75)	0.802
Female	27 (14.1)	57 (14.8)	1.00	
Age group				
<30years	137 (71.4)	287 (74.7)	0.84 (0.57,1.24)	0.385
≥30years	55 (28.6)	93 (25.3)	1.00	
Educational level				
Can't read and write	23 (12.0)	29 (7.6)	1.52 (0.63,3.69)	0.355
≤ grade8	129 (67.2)	280 (72.9)	0.88 (0.43,1.83)	0.738
Grade9-12	28 (14.6)	52 (13.5)	1.03 (0.45,2.38)	0.941
Certificate and above	12 (6.2)	23 (6.0)	1.00	
Employment condition				
Permanent workers	58 (30.2)	112 (29.2)	1.00	
Temporary	134 (69.8)	272 (70.8)	0.95 (0.65,1.39)	0.796
Monthly salary in birr				
≤2504 birr per month	100 (52.1)	213 (55.5)	0.87 (0.62,1.24)	0.442
>2504 birr per month	92 (47.9)	171 (44.5)	1.00	
Work experience in years				
Below five years	123 (64.1)	275 (71.6)	0.71 (0.49,1.02)	0.065
5 years and above	69 (35.9)	109 (28.4)	1.00	

Table 5:- Association of occupational injury with environmental determinants among condominium house construction workers in Addis Ababa, Ethiopia, February 2013.

Work environment Variables	Case (n=192) No. (%)	Control (n=384) No. (%)	COR (95% Cl)	P-value
Health and safety				
Information access				
Yes	47 (24.5)	142 (37)	1.00	
No	145 (75.5)	242 (63)	1.81 (1.23,2.67)	0.003
Working department				
Masons	18 (9.4)	39 (10.2)	1.00	
Carpenter & roofers	58 (30.2)	99 (25.8)	1.27 (0.67-2.42)	0.469
Plumbers & electrician	14 (7.3)	24 (6.2)	1.26 (0.53-2.99)	0.595
Worker carrying out finishing work	22 (11.5)	50 (13.0)	0.95 (0.45-2.02)	0.901
Helpers and other daily labourer	80 (41.7)	172 (44.8)	1.01 (0.54-1.87)	0.980

Table 6: Association of occupational injury with behavioral determinants among condominium house construction workers of Addis Ababa, Ethiopia, February, 2013.

Behavioral variables	Case (n=192) No. (%)	Control (n=384) No. (%)	COR (95%CI)	P-value
PPE use				
Yes	24 (12.5)	73 (19.0)	1.00	
No	168 (87.5)	311 (81.0)	1.64 (1.00,2.70)	0.051
Job satisfaction				
Yes	152 (79.2)	359 (93.5)	1.00	
No	40 (20.8)	25 (6.5)	3.78(2.21,6.45)	0.001
Job stress				
Yes	20 (10.4)	14 (3.6)	3.07 (1.52,6.23)	0.002
No	172 (89.6)	370 (96.4)	1.00	
Sleeping disturbance				
Yes	166 (86.5)	165 (43.0)	8.46 (5.35,13.43)	0.001
No	26 (13.5)	219 (57.0)	1.00	
Cigarette smoking				
Yes	95 (49.3)	85 (22.1)	3.45 (2.38,5.00)	0.001
No	97 (50.7)	299 (77.9)	1.00	
How often?				
Everyday	85 (89.5)	60 (70.6)	3.54 (1.58,7.92)	0.002
Smoking every other days	10 (10.5)	25 (29.4)	1.00	
Khat chewing				
Yes	80 (41.7)	137 (35.7)	1.29 (0.90,1.84)	0.162
No	112 (58.3)	247 (64.3)	1.00	
How often?				
Everyday	6 (7.5)	3 (2.2)	0.28 (0.07,1.14)	0.075
Chewing every other days	94 (92.5)	134 (97.8)	1.00	
Alcohol consumption				
Yes	125 (65.1)	140 (36.5)	3.25 (2.26,4.67)	0.001
No	67 (34.9)	244 (63.5)	1.00	
How often?				
Everyday	6 (4.8)	1 (0.7)	0.14 (0.12,1.20)	0.070
Drank every other day	119 (95.2)	139 (99.3)	1.00	

Determinants of occupational injury, Multivariate analysis

To avoid excessive number of variables that reached 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. The multivariate logistic analysis identified having health and safety information access (AOR [95%CI] = 1.62 [1.02, 2.59), use of personal protective equipment (AOR [95%CI] = 2.14 [1.26, 3.93]), job satisfaction (AOR [95%CI] = 2.46 [1.21, 4.97]); sleep disturbance (AOR [95%CI] = 8.67 [5.30, 14.20]), cigarette smoking (AOR [95%CI] = 2.38 [1.45, 3.89]), and drinking alcohol (AOR [95%CI] = 2.15 [1.38, 3.34]) showed significant association with the occupational injury. But work experience (AOR [95%CI] = 0.71 [0.44, 1.12]), job stress (AOR [95%CI] = 1.37 [0.55, 3.40]), and chewing khat (AOR [95%CI] = 0.94 [0.59, 1.48]), didn't show significant association on the occupational injury (Table 7).

The analysis showed workers who didn't use personal protective equipment had more than 2.24 time higher the odds of having occupational injury than workers who uses personal protective equipment (AOR [95%Cl] = 2.14 [1.26, 3.39]). The odds of having occupational injury in workers who had sleep disturbance were 8.67 times higher than who didn't have sleep disturbance (AOR [95%Cl] = 8.67 [5.30, 14.21]). Workers who were unsatisfied by their work, workers who had health and safety information access, smoking cigarette, drank alcohols also showed significantly associated with occupational injury.

Table 7: Summary of logistic regression analysis of Socio- demographic, Environmental and Behavioral factors on occupational injury among condominium house construction workers in Addis Ababa, Ethiopia, February 2013.

Variables	Cases (n=192) (%)	Control (n=384) (%)	COR (95%CI)	AOR (95%Cl)
Work experience in years				
Below five years	123 (64.1)	275 (71.6)	0.71 (0.49,1.02)	0.71 (0.44,1.12)
5 years and above	69 (35.9)	109 (28.4)	1.00	1.00
Health and safety Information access				
Yes	47 (24.5)	142 (37)	1.00	1.00
No	145 (75.5)	242 (63)	1.81 (1.23,2.67)	1.62 (1.02,2.59)*
PPE use				
Yes	24 (12.5)	73 (19.0)	1.00	1.00
No	168 (87.5)	311 (81.0)	1.64 (1.00,2.70)	2.14 (1.26,3.93)*
Job satisfaction				
Yes	152 (79.2)	359 (93.5)	1.0	1.00
No	40 (20.8)	25 (6.5)	3.78 (2.21,6.45)	2.46 (1.21,4.97)*
Job stress				
Yes	20 (10.4)	14 (3.6)	3.07(1.52,6.23)	1.37 (0.55,3.40)
No	172 (89.6)	370 (96.4)	1.00	1.00
Sleeping disturbance				
Yes	166 (86.5)	165 (43.0)	8.46 (5.3,13.43)	8.67 (5.30,14.20)**
No	26 (13.5)	219 (57.0)	1.00	1.00
Cigarette smoking				
Yes	95 (49.3)	85 (22.1)	3.45 (2.38,5.00)	2.38 (1.45,3.89)**
No	97 (50.7)	299 (77.9)	1.00	1.00
Khat chewing				
Yes	80 (41.7)	137 (35.7)	1.29 (0.90,1.84)	0.94 (0.59,1.48)
No	112 (58.3)	247 (64.3)	1.00	1.00
Alcohol consumption				
Yes	125(65.1)	140(36.5)	3.25(2.26,4.67)	2.15 (1.38,3.34)**
No	67(34.9)	244(63.5)	1.00	1.00

* Significant at $p<0.05$ ** Significant at $p\leq0.001$

Discussion

This institution-based unmatched case control study attempted to assess the determinants of work-related injuries in the last three months among the condominium house construction workers in Addis Ababa city. In this study efforts were made to eliminate selection bias in sampling.

Studies done in developed and developing countries reported that men had a higher risk of occupational injury than women in working industries (16, 20, 23, 26). But this study didn't show significant association on genders of workers this may be due to that male worker may have repeated exposure for construction environment that may gave an experience for safe practice.

Study done in France and Ethiopia (22, 23) and the reports of Ministry of Labour and Social Affairs of Ethiopia and Ministry health of Ethiopia (24, 25) shown majority of occupational injury occur at the age of below 30 years; but this study, age didn't show significant association with occupational injury this could be explained by most younger workers were participating as daily labourer that may not require special experience.

Most occupational health and safety studies conducted in developing countries revealed that increased educational level has been associated with decreased work-related injuries (30, 33). This is due to the fact that education is more likely to increase workers safety and healthy practice that can prevent them from occupational injuries (32). But this study and across-sectional study done in Ethiopia among small-and medium-scale factory workers revealed that educational level did not show any statistical significant association with occurrence of occupational injury (30). This difference may be due to the fact that only education by itself alone cannot reduce occupational injury when the level of hazards is high and the use of reliable techniques and safe work environment are limited (30).

The other socio demographic factors monthly salary, working condition, and work experience also had no significant association to the occupational injury this can be explained by most workers were temporary workers take the work by contract and spent short duration on one site they always shift to the new environment during this time those variables may not be an important pre requisite for the occurrences of occupational injury. These may also due to the misclassification bias as cases and controls on the survey because of only uses participant report in the absence of recorded injury report.

Study conducted in our country (23) showed health and safety information access no association to the occurrence of occupational injury but this study showed significantly associated this can be explained by the difference in study setting. Health and safety information access can increase the workers

awareness about the working environment to be safer and instruct them in correct safety behaviors in construction site.

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.

Many study concluded that the occurrence of work-related injury was significantly related to job satisfaction, sleep disorder, khat chewing, job stress, smoking characteristics of workers, workers with excess alcohol use, and use of personal protective device. Injury is one of many adverse consequences of substance use and misuse, and substance use and misuse are therefore often suspected to contribute to occupational injuries (21, 22, 39, 42). This study also indicate that workers who drink alcohol were 3.25 times more likely to be injured than those who do not consume alcohol before adjusting (COR [95%Cl] = 3.25 [2.26, 4.67]) and 2.15 times more likely to be injured after adjusting for other behavioral and environmental factors (AOR [95%CI] = 2.15 [1.38, 3.34]), it is consistent with study in France (42) and in our country (39).

Different scholars reported that sleep disturbances such as difficulty in initiating sleep, sleeping poorly at night, sleep insufficiency, and insomnia symptoms are significantly associated with the occurrence of occupational injuries (45). This study also revealed that workers who complained from sleeping disturbance during work had about 8.46 times more likely to report occupational injury than workers who did not report a problem of sleeping disturbance (AOR [95% CI.] = 8.67 [5.30, 14.20]). Most occupational health and safety studies conducted in developing and developed countries strongly agreed with this finding (23, 30, 42). This is due to the fact that workers who participated in this study had bus service at one o'clock in order to use these bus service they need wake up from sleep early at the morning and most construction worker drank alcohol at the evening it also take their sleeping time these leads to the problem of staying a sleep at morning and problem of waking up several times per night which may disturb the sleep pattern of workers; these sleep disturbance problems affect the ability to maintain wakefulness and concentration as well as the ability to assess or watch the work environment and working conditions and perform duties safely.

Those who were not satisfied with their job were more likely to be injured before adjusting other factors (COR [95%Cl] = 3.78 [2.21, 6.45]) and 2.46 times more likely to injured after adjusting other behavioral factors (AOR [95%Cl] = 2.38 [1.21, 4.97]). This was similar with case control study among coal mining factory workers in India (28), study done in Ethiopia (23, 30). This can be explained that workers who satisfied by their work may have positive thinking about the physical environment and always take necessary safety precautions.

Most researchers concluded that job stresses increased occupational injury risks, and stressed individuals were more likely to have involved in occupational injuries (23, 28, 32, 44). But this study didn't show significant association between job stress and occupational injury, this can be explained by most workers were temporary workers, and most work taken by contract therefore each worker feel freedom and they taken each work by voluntarily and according to their performance.

Use of personal protective equipments was found to be important to decrease the occupational injury problems and improve the health status of workers. It is consistent with the study done in Gondar (46).

Strengths and limitations of the study

Strengths of the study

- ✓ Since there were no study done on determinant of occupational injury in 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.
- ✓ 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.
- ✓ Uses of case control study design to easily identify multiple exposure for single occupational injury by comparing those exposures for who experienced occupational injury and who didn't.
- ✓ The use of observational checklists for the whole working environment will give strength for the quantitative findings of environmental determinants of occupational injury.

Limitations of the study

- ✓ Three month case control study design could lead to recall bias (under or over report of determinant of injury).
- ✓ Most workers were temporary workers they took any activity by contract that may leads to decrease the association of determinant of occupational injury.
- ✓ The use of participant reported information for identifying cases and controls during survey may leads to misclassification bias as cases and controls.
- ✓ Lack of similar studies particularly in Ethiopia made difficult in comparing results.

Conclusions and recommendations

Conclusions

- ✓ Socio demographic factors didn't show significant associations on the occurrences of occupational injury.
- ✓ The presences of health and safety information access and Use of personal protective equipments by the workers were found to be important to decrease occupational injury.
- ✓ Behavioral factors such as alcohol use, job satisfaction, sleep disturbance and cigarette smoking had significant association on the occurrences of occupational injury.
- ✓ Most environmental health and safety factors in construction area such as equipment put in correct place, sign of warning and safety rule, first aid equipment, electrical panel knockout 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 that may play an important role in reducing occupational injury.

Recommendations

The following recommendations are forwarded from findings of the study.

- ✓ Ministry of Health, Addis Ababa health bureau, Labor and Social Affairs bureau, Addis Ababa house construction bureau and contractors should have an integrated emphasis to reduce occupational injury by giving training on health and safety before and after starting work for the employees in order to have healthy workforce.
- ✓ The Ministry of Labor and social affairs should assign occupational health and safety professionals for monitor working site that will important for reinforce and remind the basic health and safety matters fulfillment.
- ✓ Contractors who select employees during recruitment consider important behavioral factors such as smoking status, alcoholic, sleep disturbance etc…
- ✓ The supervisors/boss of the construction area tries to identify the needs of workers in order to make them satisfied by their work.
- ✓ Further cohort study should be conducted especially on the sleeping disturbance of workers and occupational injuries.

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Annexes

Annex 1: English version questionnaire

Questionnaire on the assessment of the determine factors of occupational injuries among condominium house construction workers in Addis Ababa city, 2013.

Questionnaire ID:_____

Name of construction site by code _____Address by code_____

1. Information sheet

Hello, I am _____ from Addis Ababa university research team. I would like to ask few questions which take 30 minutes about determinant factors in work related injuries to you in the previous three consecutive months. Your genuine information that you are going to provide will help policy makers to design strategy/give priority for prevention and control of occupational injuries to have healthy workforce. You are selected based on the previous information that you give in the survey, participant of this study if you give me consent after you have understood the following information sheet:

Title of the study: Determinants of occupational injury among the condominium house construction workers in Addis Ababa city, Ethiopia 2013g.c. Unmatched case control study

Objective of the study: To assess the determinant factors of Occupational Injury among the condominium house construction workers of Addis Ababa city, Ethiopia, 2013g.c

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

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

Informed consent

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

Yes ☐ No ☐

Signature of participant _____

Name of PI: Sisay Shine Address: Tell (E-mail) 0921646475 /sisayask@gmail.com Signature _____ IRB: AAU, IRB Tell: 011553873

Name of witness' _____

Signature_____

Date of interview _____starting time _____Ending time_____

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

If the respondent is not voluntary, please skip to the next participant.

Status of study participant; 0. Control ☐ 1. Cases ☐

Part-I – Socio demographic information

No	Question	Possible response	Skipping	Code
101	Sex	0. Female 1. Male		
102	Age	_____		
103	Religion	0. Orthodox 1. Muslim 2. Protestant		
104	Ethnic group	0. Amhara 1. Tigre 2. Oromo 3. SNNP		
105	Marital status	0. Married 1. Single 2. Divorced 3. Widowed		
106	Educational level	0. Can't read and write		

		1. ≤ grade8 2. Grade9-12 3. Certificate and above		
107	Employment condition	0. Temporary 1. Permanent		
108	Work experience	0. <= 5 years 1. >= 5 years		
109	Salary	_____		

Part II: Environmental factors

No	Question	Possible response	Skipping	Code
201	Do you have health and safety information regarding occupational injury?	0. No 1. Yes		
202	Do you have health and safety training before or after starting the work?	0. No 1. Yes		
203	Do you have workplace supervision by occupational health and safety professionals?	0. No 1. Yes		
204	What is your working department?	0. Masons 1. Carpenter & roofers 2. Plumbers & electrician 3.worker carrying out finishing work 4. Helpers and other daily labourer		

Part III: Behavioral factors

No.	Question	Possible answer	Skipping	Code
301	Do you use Personal protective material?	0. No 1. Yes		
302	Do you smoke Cigarette?	0. No 1. Yes	If Q302 is no skip to Q304	
303	If Q302 is yes how often?	0. Everyday 1. Every other days		
304	Do you chew khat?	0. No 1. Yes	If Q304 is no skip to Q306	
305	If Q304 is yes how often?	0. Everyday 1. Every other day		
306	Do you drink alcohol?	0. No 1. Yes	If Q306 is no skip to Q308	
307	If Q306 is yes how often?	0. Everyday 1. Every other days		
	Sleep disturbance assessment tool			
308	Do you have problem in falling asleep (if it takes more than 30 minutes)	0. No 1. Yes		
309	Do you have problem of waking up several times per night (3 times and above)	0. No 1. Yes		
310	Do you have problem of staying a sleep at morning.	0. No 1. Yes		
311	Do you have problem of feeling tired and worn out after wakeup of usual amount of sleep.	0. No 1. Yes		
	Job stress assessment tool			
312	Do you work hard in your work?	0. No 1. Yes		

313	Do you think your job is difficult?	0. No 2. Yes		
314	Do you think you are working in hurry due to excess work load?	0. No 1. Yes		
315	Do other members of your family depend on you?	0. No 1. Yes		
316	Is the construction work boring and monotonous?	0. No 1. Yes		
317	You do not have the idea of your work and its result?	0. No 1. Yes		
318	Your supervisors/boss does not take care of your dignity?	0. No 1. Yes		
319	Your salary is not adequate for your work?	0. No 1. Yes		
320	Is your work full of danger?	1. No 2. Yes		
321	Does a co worker is not try to defame you?	0. No 1. Yes		
322	Do you feel you have responsibility for the development of the construction?	0. No 1. Yes		
323	Your co workers not spontaneously help you to solve any problem in the construction site?	0. No 1. Yes		
324	Do you feel your service is a burden to you?	0. No 1. Yes		
325	Are you unhappy with the working situation of the construction site?	0. No 1. Yes		
	Job satisfaction assessment tool			
326	You are not satisfied with the condition of your work place?	0. No 1. Yes		

327	Are your co-workers are not co- operative and helpful?	0. No 1. Yes		
328	Do you think your job is not respected by other persons?	0. No 1. Yes		
329	There is no any respect in your job?	0. No 1. Yes		
330	Are the promotions of workers given without justice and honesty?	0. No 1. Yes		
331	You do not think you got the right job for yourself?	0. No 1. Yes		
332	Your supervisor/ officer do not appreciate your competency and quality?	0. No 1. Yes		
333	Do you think your work is difficult and arduous?	0. No. 1. Yes		
334	Do most workers work by compulsion and fear?	0. No. 1. Yes		
335	Do you think the workers didn't get right behavior which they expect from their officers?	0. No 1. Yes		
336	If you get an opportunity would you like to live this company and join another?	0. No 1. Yes		
337	Are you doing this job as you are getting sufficient salary in spite of your dislike this job?	0. No 1. Yes		
338	Do you think this work is not source of respect for a man like you?	0. No 1. Yes		
339	You are not allowed to make decision independently regarding your job?	0. No 1. Yes		
340	You are not happy with your family?	0. No 1. Yes		

Annex 2: Amharic version questionnaire

አባሪ 1፡ <u>የአማሪኛ ትርጉም መጠይቅ</u>

<u>በጥናቱ ላይ ለሚሳተፉ የሚሰጥ መረጃ</u>

ጤና ይስጥልኝ፡ እኔ _____እባላለሁ፡፡ እዚህ የመጣሁት ይህንን ጥናት ለማካሄድ የአዲስ አበባ ዩኒቨርሲቲይ የጥናት ቡድን ሆኘ ነዉ፡፡ ፡ ከሙያ ጋር በተያያዙ ጉዳቶች መንስኤ ሊሆኑ ስለሚችሉ ነገሮች ለሰላሳ ደቂቃ ብቻ የሚፈጅ ትንሽ ጥያቄ ልጠይቅዎት እፈልጋለሁ ፡፡ እርስዎ የሚሰጡን ትክክለኛ መልስ ለህግ አርቃቂዎች በቀላሉ ከሙያ ጋር በሚደርሱ ጉዳቶችን በመከላከል እና በመቆጣጠር ጤናማ የሰራተኛ ሀይል እንዲፈጠር ይረዳል፡፡ እርስዎ 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፡ በአዲስ አበባ በጋራ መኖሪያ ቤቶች ግንባታ ሰራተኞች ላይ የሚደርሱትን ከስራ ጋር የተያያዙ ጉዳቶችን መንስኤዎቻቸዉን ለይቶ ማወቅ።

የጥናቱ ዋና አላማ፡ በአዲስ አበባ ከተማ የጋራ መኖሪያ ቤቶች ግንባታ ሰራተኞች ላይ የሚደርሱ ከስራ ጋር የተያያዙ ጉዳቶችን ዋና ዋና 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፡፡

<u>የተሳታፊዎች የፈቃደኝነት መጠየቂያ ቅፅ</u>

ይህ መጠይቅ በአዲስ አበባ ከተማ የጋራ መኖሪያ ቤቶች ግንባታ ሰራተኞች ላይ በሚደርስ ከስራ ጋር የተያያዙ ጉዳቶችን ለማጥናት የተዘጋጀ ነዉ፡፡

የመጠይቁ መለያ ቁጥር _____

የግንባታዉ ቦታ መለያ ቁጥር _____

በጥናቱ ላይ የተሳታፊዎች ሁኔታ 1 ጉዳት ካሁን በፊት ያጋጠመዉ ☐

2 ጉዳት ካሁን በፊት ያላጋጠመዉ ☐

ከላይ ያለዉን ፎርም ብታነቡት ወይም ቢነበብልዎት እና ስለ ጥናቱ ፍሬ ሀሳብ ቢረዱ እርስዎ በዚህ ጥናት ላይ ይሳተፉ ነበር?

አዎ ☐ አልሳተፍም ☐

የተሳታፊዎች ፊርማ_____

ጥናቱን የሚያካሂደዉ ሰዉ ስም ሲሳይ ሽኔ፡ አድራሻ ስልክ *0921646475 Email- sisayask@gmail.com*

ፊርማ _____አዲስ አበባ ዩኒቨርሲቲይ ስልክ *011553873*

ቃለ ምልልሱ የተካሄደበት ቀን_____የተጀመረበት ሰዓ

ት_____ያለቀበት ሰዓት_____

የቃለ ምልልሱ ዉጤት 1፡ የተጠናቀቀ 2፡ ተሳታፊዉ መልስ አልሰጠም 3፡ ለመሳተፍ ፍቃደኛ አይደለም 4፡ በግማሽ ተመልሷል

<u>ማሳሰቢያ</u> ፡ ተሳታፊዉ ፈቃደኛ ካልሆነ ወደሚቀጥለዉ ጥያቄ ይታለፍ፡፡

ክፍል 1፡ <u>ማህበራዊና ስነ-ህዝባዊ ገፅታዎችን የተመለከቱ ጥያቄዎች</u>

ተ.ቁ	ጥያቄ	የመልስ አማራጮዎች	ዝለል	መለያ
101	ፆታ	0. ሴት 1. ወንድ		
102	እድሜ	_____		
103	ሀይማኖት	0. ኦርቶዶክስ 1. ሙስሊም 2. ፕሮቴስታንት		
104	ብሄር	0. አማራ 1. ትግሬ 2. ኦሮሞ 3. ደቡብ		
105	የጋብቻ ሁኔታ	0. ያገባ/ች 1. ያላገባ/ች 2. የሞተችበት/ባት 3. የፈታ/ች		
106	የትምህርት ደረጃ	0. መፃፍና ማንበብ የማይችል 1. 1-8ኛ 2. 9-12ኛ 3. ማንኛዉም የስራፍቃድ እና ከዚያ በላይ ያለዉ/ት		
107	የቅጥር ሁኔታ	0. በቋሚነት 1. በግዚያዊነት		
108	የስራ ልምድ	0. ከአምስት አመት በታች 1. አምስትና ከአምስት አመት በላይ		
109	ደመወዝ	_____		

<u>ክፍል 2፡ አካባቢያዊ መንስኤዎችን በተመለከተ</u>

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	ዝለል	መለያ
201	ከሙያ ጋር በሚደርሱ ጉዳቶች ጋር በተመለከተ የጤና እና ቅድመ ጥንቃቄ የምታዉቁት ነገር አለ?	0. የለም 1. አዎ		
202	ስራ ከመጀመርዎ በፊት እና ከጀመሩ በሓላ በጤና እና ቅድመ ጥንቃቄን የተመለከተ ስልጠና አግኝተዉ ያዉቃሉ?	0. አላዉቅም 1. አዎ		
203	በጤና ባለሙያዎች ወይም የስራ ደህንነቶች የስራ ቦታችሁ ተጎብኝቶ ያዉቃል?	0. አያዉቅም 1. አዎ		

204	የስራ ክፍልዎ ምንድን ነዉ?	0. ግንበኛ 1. አናፂ እና ጣራ ሰራተኛ 2. የቱቦዎችን እና መብራት ገጣሚ 3. የመጨረሻ ስራዎችን የሚሰሩ 4. የረዳት ስራ የሚሰሩ እና ሌሎች የቀን ሰራተኞች		

<u>ክፍል 3፡ የሰራተኞች ባህሪን በተመለከተ</u>

ተ.ቁ	ጥያቄ	የመልስ አማራጮዎች	ዝለል	መለያ
301	በስራዎ ላይ የጉዳት መከላከያ ይጠቀማሉ?	0. አልጠቀምም 1. አዎ		
302	ሲጋራ ያጨሳሉ?	0. አላጨስም 1. አዎ	አላጨስም ካሉ ወደ ጥያቄ 304 ይለፉ	
303	የጥያቄ 302 መልስ አዎ ከሆነ መቼ?	0. በየቀኑ 1. አልፎ አልፎ		
304	ጫት ይቅማሉ?	0. አልቅምም 1. አዎ	አልቅምም ካሉ ወደ ጥያቄ 306 ይለፉ	
305	የጥያቄ 304 መልስ አዎ ከሆነ መቼ?	0. በየቀኑ 1. አልፎ አልፎ		
306	አልኮል ይጠጣሉ?	0. አልጠጣም 1. አዎ	አልጠጣም ካሉ ወደ ጥያቄ 308 ይለፉ	
307	የጥያቄ 306 መልስ አዎ ከሆነ መቼ?	0. በየቀኑ 1. አልፎ አልፎ		
	የቅልፍ መዛባት ችግርን መመዘኛ ጥያቄዎች			
308	አልጋ ላይ ከተኙ በኋላ እቅልፍ ለመዉሰድ ከ 30 ደቂቃ በላይ ይፈጅብዎታል?	0. አይፈጅብኝም 1. አዎ		

309	በአንድ ለሊት ዉስጥ ሶስት ግዜ እና ከ 3 ግዜ በላይ ከቅልፊዎ የመንቃት ችግር አለብዎት?	0. የለብኝም 1. አዎ		
310	ጠዋት ጠዋት እቅልፊዎን ሳይጨርሱ የመነሳት ችግረ አለብዎት?	0. የለብኝም 1. አዎ		
311	መደበኛዉን እቅልፊዎን ተኝተዉ ሲነሱ የድካም እና የድብርት ስሜት አለብዎት?	0. የለብኝም 1. አዎ		
	የስራዎ ላይ ዉጥረት መኖሩን የምንለካበት ጥያቄዎች			
312	ስራዎን በአግባቡ ይሰራሉ?	0. አልሰራም 1. አዎ		
313	ስራዎ አስቸጋሪ ነዉ ብለዉ ያምናሉ?	0. አላስብም 1. አዎ		
314	በስራ ጫና ምክንያት ስራዬን የምሰራዉ ሳልረጋጋ ነዉ ብለዉ ያስባሉ?	0. አላስብም 1. አዎ		
315	የርስዎ ቤተሰብዎች በርስዎ የስራ ገቢ ላይ የተወሰነ ነዉ?	0. አይደለም 1. አዎ		
316	የግንባታ ስራ አሰልች እና አድካሚ ነዉ?	0. አይደለም 1. አዎ		
317	የስራዎን ጭብጥ ሀሳብ እና ዉጤት አያዉቁም?	0. አላዉቅም 1. አዎ		
318	የርስዎ አሰሪ የርስዎን ሰበአዊ መብት አይጠብቁም?	0. አይጠብቁም 1. አዎ		
319	ለምሰራዉ ስራ ደመወዜ በቂ ነዉ ብለዉ አያስቡም?	0. አላስብም 1. አዎ		
320	የርስዎ ስራ በአደጋ የተሞላ ነዉ?	0. አይደለም 1. አዎ		
321	የርስዎ የስራ አጋር እርስዎን ለማጣጣል ይሞክራሉ?	0. አይሞክሩም 1. አዎ		
322	የግንባታዉን ስራ የማሳደግ ግዴታ አለብኝ ብለዉ ያስባሉ?	1. አላስብም 2. አዎ		
323	በስራ ቦታ ማንኛዉንም ችግር ቢደርስ፡ ለመፍታት በርስዎ የስራ አጋር የማያቋርጥ እርዳታ አይደረግልዎትም?	0. አየረዱኝም 1. አዎ		

324	የርስዎ አገልግሎት ለርስዎ ሸክም ነዉ ብለዉ ያስባሉ?	0. አላስብም 1. አዎ		
325	በግንባታ አካባቢ ባለዉ የስራ ሁኔታ ደስተኛ አይደሉም?	0. አይደለሁም 1. አዎ		
	በስራዎ መርካትዎን የምንለካበት ጥያቄ			
326	በስራዎ አካባቢ ባለዉ ሁኔታ አልረኩም?	0. አረካሁም 1. አዎ		
327	አብረዎት የሚሰሩት ሰራተኞች ተባባሪዎች አይደሉም?	0. አይደሉም 1. አዎ		
328	የርስዎ ስራ በሌላ ሰዉ ተከባሪ ነዉ ብለዉ አያስቡም?	0. አላስብም 1. አዎ		
329	በስራዎ ላይ መከባበር የለም?	0. የለም 1. አዎ		
330	የስራ እድግት በግልፀኝነት እና በፍትሀዊነት አይካሄድም?	0. አይካሄድም 1. አዎ		
331	እርስዎ ለኔ የሚገባኝን ስራ አግኝቻለሁ ብለዉ አያስቡም?	0. አላስብም 1. አዎ		
332	የርስዎ አሰሪ የርስዎን የስራ ተወዳዳሪነት እና ጥራት አያበረታቱም?	0. አያበረታቱም 1. አዎ		
333	የርስዎ ስራ አስቸጋሪ እና ከባድ ነዉ ብለዉ ያስባሉ?	0. አላስብም 1. አዎ		
334	አብዛኛዉ የርስዎ ስራ በጉልበት እና በፍርሀት የሚሰራ ነዉ?	0. አይደለም 1. አዎ		
335	ሰራተኞች ካሰሪያቸዉ የሚጠብቁትን ትክክለኛ ጸባይ እያገኙ አይደለም ብለዉ ያስባሉ?	0. አላስብም 1. አዎ		
336	እርስዎ ሌላ አማራጭ ቢያገኙ ስራዎን ለቀዉ ይሄዳሉ?	0. አልሄድም 1. አዎ		
337	ይህን ስራ የሚሰሩት ስራዉን ባይዎዱት እንኳን በቂ ደመወዝ ስለሚያገኙበት ብቻ አይደለም?	0. አይደለም 1. አዎ		
338	እንደርስዎ ላለ ሰዉ ይህ ስራ አስከባሪ ነዉ ብለዉ አያስቡም?	0. አላስብም 1. አዎ		
339	ስራዎን በተመለከተ ካለምንም ጣልካ ገብነት ዉሳኔ እንዲያስተላልፉ አይፈቀድልዎትም?	0. አይፈቀድልኝም 1. አዎ		
340	በቤተሰብዎ ሁኔታ ደስተኛ አይደሉም?	0. አይደለሁም 1. አዎ		

Annex 3: Work Environment observation checklist

Checklist to assess environmental factors of working site modified from construction site inspection tools

Name of the construction site_____

No.	Safety factors	Possible answer	Remark
1.	Equipments 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 workplace?	1. Yes 2. No	Yes requires no lack of such signs or posts while inspection around.
3.	Do the employees use the necessary personal protective devices?	1. Yes 2. No	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 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 hammers were not easily splinters area
8.	Unsafe hand tools are prohibited by the supervisors?	1. Yes 2. No	Yes requires supervisor prohibited those worker from unsafe hand tool
9.	Employees 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