ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE-

SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF OCCUPATIONAL INJURY AND ITS ASSOCIATED FACTORS AMONG CEMENT FACTORY WORKERS IN OROMIA REGIONAL STATES, ETHIOPIA

BY

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ABBREVIATIONS AND ACRONYMS

AAU Addis Ababa University

ETB Ethiopian Birr

GDP Gross Domestic Product

ILO International Labour Organization

MOLSA Ministry of Labour and Social Affairs

MOLS Ministry of Labor and Skills

OHS Occupational Health and Safety

PPE Personal Protective Equipment

SPSS Statistical Package for Social Science

COR Crude Odds Ratio

AOR Adjusted Odds Ratio

Contents

Abstract

Background: The cement industry is a cause of many types of injuries. The rate of occupational injuries is high in developing countries including Ethiopia. This study aims to assess occupational injury and its associated factors among cement factory workers in Oromia regional states.

Methods: - An institutional-based cross-sectional study was conducted from April to June 2023 among Cement factory workers in the Oromia Regional States. The study subjects were selected using a simple random sampling technique. Data were collected using face-to-face interviews with 422 workers. The collected data were entered into Epi Info version 7 Software and transported to SPSS version 21 software packages for analysis. Variables with a 95% p-value at < 0.2 during the bivariate analysis were included in the multivariate logistic regression analysis to see the effect of confounding variables.

Results: - The Prevalence of occupational injury in the last 12 months was 129 (30.6%) 95%CI. Of the total of 129 injured respondents, 45(35%) were hospitalized; of these, 31 (68.9%) spent more than 24 hours in the hospital and 415 work days were lost due to this occupational injury. Workers engaged in the engineering department had 4.19 times higher odds of injury compared to workers placed in the raw material department [AOR=4.19, 95%CI :(1.71-10.29)]. Workers who do not use PPE had 1.79 times higher odds of injury compared to those who used it [AOR=1.79, 95%CI: (1.08- 2.97)]. Workers whose work involves hand-arm vibration had 3.14 times higher odds of injury relative to those whose work does not involve it [AOR= 3.14, 95%CI :(1.29-7.66)].

Conclusions and Recommendations

A high prevalence (30.6%) of occupational injuries was reported, affecting various body parts. Identified factors include high-risk job categories, lower education, insufficient PPE use, and manual handling activities. Recommendations include enhancing inspections, implementing comprehensive training programs, and measures to reduce manual handling risks.

Keywords: Occupational injury, factory workers, Cement Factory, Ethiopia

1. Introduction

1.1. Background

Injury refers to any physical harm or damage sustained by body tissues resulting from an accident(1).Unfortunately, millions of individuals in the working age group worldwide operate in hazardous conditions, leading to occupational diseases and injuries as the primary causes of work-related fatalities (2). According to an ILO report, annually occupational accidents and work-related diseases cause over 2.3 million fatalities, out of which over 350,000 are caused by occupational accidents(3). The ILO estimates that annually lost working time, workers' compensation, interruption of production, and medical expenses cost four 4% of the global GDP(4,5). The hazards that contribute to health problems are thought to be 10 to 20 times higher in developing countries than in industrialized ones(6). In sub-Saharan Africa, each year 54,000 workers die and 42 million work-related accidents take place that cause at least three days of absence from work(7). Different investigation reports in Africa, that the cement industry is a cause of many types of injuries(8). The study, conducted in Cairo, Egypt, identified specific causes of injury such as exposure to fracture, falling from height, exposure to fall from heavy objects, and moving mechanical machines (8). In Ethiopia, it has been reported that a mere 5 to 10% of workers have the opportunity to avail themselves of occupational health services within their designated workplaces (9).

In Ethiopia, the study conducted in the Mugher cement factory showed that the prevalence of occupational injury in a year was 10.4% and in another study conducted in the Habesha and Dangote cement factories the magnitude of occupational injury among workers was 48.9%(10,11).

The issue of governing safety and health at work on a legal basis in Ethiopia dates back to the 1940s when the first legal instrument Proclamation No. 58/1945 was promulgated(12). The origin of this legislation was the result of the advent of industrialization that took place in the country.so far, Ethiopia has ratified about 23 ILO conventions, in particular the Occupational Safety and Health Convention 1981 (No. 155). In Ethiopia, labor inspection is handled by the MOLSA, which was formerly known as the Ministry of Labor and Skills. There are nearly 380 labor inspectors in the country but due to a lack of resources, labor inspectors may not enforce standards effectively(9).

1.2. Statement of the problem

The underreporting of workplace risks, hazards, and fatalities poses a significant challenge, particularly in Ethiopia where many industries lack comprehensive records of work-related injuries among factory workers(6,7). Globally, the absence of statistics for occupational diseases and injuries is prevalent, with over half of all countries failing to provide critical data. Only a few countries collect sex-disaggregated data. This makes it difficult not only to identify specific types of occupational injuries and diseases that affect men and women but also hinders the development of effective preventive measures for all (14).

The cement industry is one of the rapidly growing industries in Ethiopia(13). As the industry increases and the safety-related requirements are not met the risk from the production labor will increase because of the labor-intensive nature of the process. Cement is produced through a series of processes including quarrying, crushing, milling, blending, and kiln burning, to form clinker cement. During all these processes accidents cannot be avoided, due to the ever-increasing pace of production activities(8).

In the context of Ethiopia, prior research conducted at the Mugher cement factory revealed an annual prevalence of occupational injuries at 10.4% (10). Conversely, another study conducted at the Habesha and Dangote cement factories indicated a notably higher magnitude of occupational injuries among workers, reaching 48.9% (11). There is a large variety and inconsistent results, per the findings of these earlier investigations. Additionally, the previous studies left out certain work-related and ergonomic characteristics commonly found in cement factories. Therefore, this study addresses this gap by providing data-supported findings on these crucial aspects.

1.3 Rationale and Significance of the Study

The rationale of the study

Accidents at work are a worldwide problem. These occupational injuries are particularly affecting developing countries like Ethiopia more than industrialized countries. As the cement industry in Ethiopia experiences rapid growth, there is an urgent need to address safety-related requirements to minimize the increasing risks faced by production labor. Addressing the significant challenge of underreporting workplace risks, hazards, and fatalities emphasizes the need for accurate and comprehensive data on occupational injuries. The existing studies on

occupational injury in cement factories, while informative, have revealed variations in prevalence rates, indicating potential gaps in understanding and addressing the associated factors. Furthermore, the prior investigations overlooked certain crucial work-related and ergonomics variables However; it is one of the primary risk factors in the cement manufacturing industry (16). This observed variation and the omission of key factors underscore the need for a comprehensive and updated study to provide a more detailed understanding of occupational injuries in the context of cement factories.

Significance of the study

This study plays a crucial role in enhancing understanding of the various injuries that individuals may encounter in cement factories by figuring out these differences, we can give workers the knowledge they need to protect themselves from getting hurt on the job again. It also calls on employers to take a leading role in creating workplaces that keep their employees safe.

For those who observe in workplaces, like inspectors, this study showing them exactly where they need to focus to make sure rules are followed. Plus, source of knowledge for future decision-makers and researchers.

2. Literature Review

2.1. Magnitude of Occupational Injury

The study conducted on workers at a cement industry in Obajana, Kogi State, Nigeria about their knowledge of occupational hazards and safety procedures The Prevalence of Work-Related Injuries in one year was 19.5%, Prevented injury 90.6%, reporting injury by injury staff 79.2% and absence from work in that year was 17.0% (14).

Another study done in central Ethiopia cement factories showed that the magnitude of occupational injury for 12 months was 48.9%. Among these 35.6% sustained occupational injury once(11). According to a comparable study conducted in Ethiopia among workers of the Mugher cement industry, the rate of occupational injury over 12 months was 10.4%. Among the injured workers, 18 (34.6%) were absent from work for 15-30 days. (10).

2.2. Part of the body affected

A study done in a Cairo Egypt cement factory shows that two-thirds of the studied workers were exposed to skin disorders 65.7% and sinusitis 62.8%. More than half of the studied workers were exposed to hearing disorder 50.5%, more than two-fifths were complaining of chronic cough 42.8%, and nearly two-thirds of the studied workers had poor knowledge about different types of personal protective equipment and occupational disease in cement factory, almost two third of the studied workers 67.1% complained from musculoskeletal disorders; 56, 1% from hypertension(15). Similarly, a study conducted in cement companies in Bangladesh revealed that common injuries affected body parts such as the arm, leg, hand, finger, eye, and head (16). In central Ethiopia, another study identified specific body parts commonly injured: the hand (20.6%), finger (13.4%), eye (9.6%), and toe (6.4%)(11).

2.3. Determinants of Occupational Injury

Different studies in Ethiopia indicated that socio-demographic, socio-economic, personal work and the working environment are found to contribute to injuries(10,17,18).

2.3.1. Socio-demographic determinants of occupational injury

A study conducted in Bangladesh cement factories showed that age groups of 21-25 and 51-55 have the maximum injury frequency and 79.1% of total injury is temporarily disabled type injury(16). Age group at interview, sex, and work experience showed statistically significant association with occupational injury. The rest socio-demographic variables like religion, ethnicity, marital status, and educational level do not show with statistically significant association with occupational injury (19). The Ministry of Labor and Social Affairs of Ethiopia has reported that the majority of 18 % of work-related injuries were observed in the age group of 25-29 (20). These studies emphasized that work-related injuries in the young subject were more common due to lack of experience, lack of job knowledge, and know-how than in other subjects. Furthermore, many workers begin working at an early age and often without safety training(21).

2.3.2. Working Environment determinants of occupational injury

A study conducted on cement industry workers in Obajana, Kogi State, Nigeria about their knowledge of occupational hazards and safety procedures. Types of hazard Falls from height 19.5%, Injuries from machines 18.8%, Electrocution 16.9%, Falling or moving object 14.7%, Fire 7.8%, Explosives 7.1, Others 20.7(14). The most common agent stated as the cause was machinery (30%), electricity 14%, falling of objects 9%, collision with objects 6%, followed by hot substances 5%(11)

The study on the prevalence of occupational injuries among small and medium-sized industrial workers in north Gondar, Ethiopia, demonstrates a substantial relationship between information access to health and safety, routine workplace monitoring, and training on health and safety(11). Another set of studies revealed that there was a statistically significant correlation between occupational injury and workplace supervision (11,18), working hours(18,22,23), safety training(22,24), work shift(24), and work department(24). However, no significant correlation

was found between safety training (32, 36, 37), working hours per week (14, 38, 39), workplace supervision (14, 32, 40, 41), or work department(18,24).

2.3.3. Behavioral determinants of occupational injury

According to a quasi-experimental research design conducted in Cairo Only 34.3% of workers used PPE, Another study in Egypt's Tourah Cement factory, whereas 65% of those surveyed were not wearing PPE. 34.3% of the workers studied using aprons as one of the PPE followed by goggles 28%. There were highly statistically significant differences between pre and post-health promotion programs related to wearing PPE, its types, and availability(15).

Another cross-sectional study conducted in cement factories in central Ethiopia shows that Cigarette smoking, the educational status of the workers, and the use of PPE of workers were significantly associated with work-related injury(11).

The study on the prevalence of work-related injuries among small and medium-scale industrial workers in north Gondar Ethiopia shows that personal equipment, alcohol drink consumption, sleeping disturbance, job dissatisfaction, and job stress had shown significant association with occupational injury. However, chat chewing and cigarette smoking did not show a significant association with occupational injury(18). Different investigators report that not using PPE(10,22,23), chat chewing(22), Alcohol use, Job satisfaction, and cigarette smoking were significant associations with occupational injury(25).

In some studies Sleeping disorders (26,29), not using PPE(24,26), chat chewing(10,23,24), Alcohol use(10,22,24), Job satisfaction(10,24), cigarette smoking(10,24) did not show a significant association with occupational injury.

2.3.4. Work-related and Ergonomics factors determinants of occupational injury

According to research conducted on occupational injury in standard and shift workers of textile and garment factories in Adama, Ethiopia. Pressure point showed a significant association with occupational injury, In contrast to pulling, .pushing, heavy lifting, and carrying, which did not show a significant association with occupational injury (1).

Another similar study carried out in the kombucha textile industry in northeast Ethiopia revealed that maintenance of the machine and manual handling of very big objects (>20 kg) were significantly associated with work-related injury(24).

3. Conceptual framework

This conceptual framework is derived from a comprehensive literature review on injuries and their associated factors. It establishes a complex understanding of the elaborate relationships between occupational injuries and various socio-demographic, working environments, behavioral, and ergonomic factors, either directly or indirectly.

It's vital to ensure that the workplace is suitable for employees by following the rules in labor laws, including factors like the age when someone can start working. This ensures that the workplace is in line with legal standards and is fair to all employees Moreover; the framework recognizes that workers acquire and apply knowledge and skills relevant to their professions. The time spent by employees at work, their actions and behaviors within the workplace, and their ability to report for duty in a healthy physical and mental condition collectively contribute to the occurrence or prevention of occupational accidents at different levels. This framework aims to capture the multifaceted interplay of these factors, shedding light on the dynamic and complex nature of occupational injuries in diverse work settings.

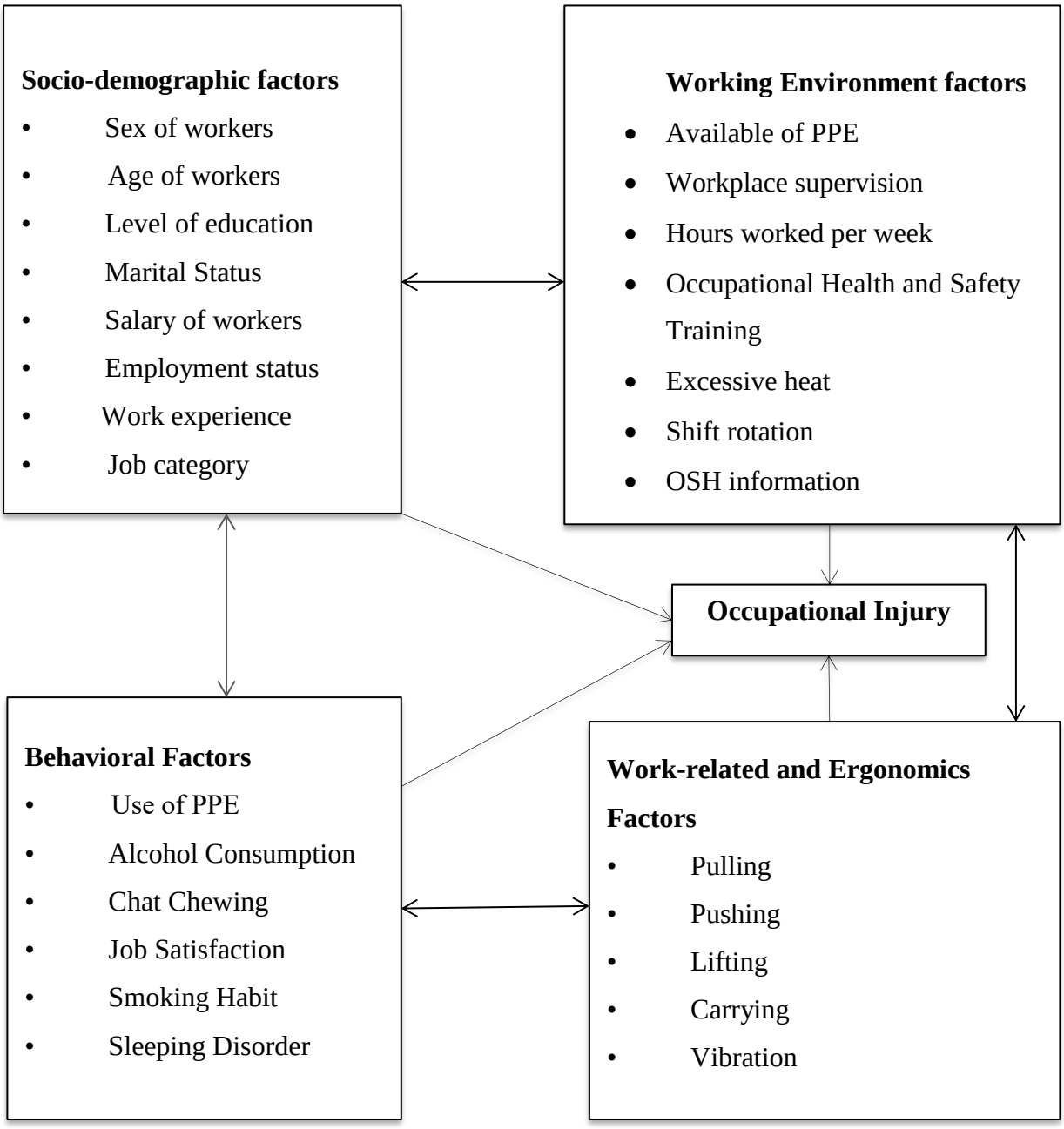

Figure 1:Conceptual framework adapted from the literature review(10,27,28).

4. Objectives

4.1. General Objective

- ✔ To assess the prevalence and factors associated with occupational injury among cement factory workers in Oromia regional states, Ethiopia

4.2. Specific Objectives

- ✔ To determine the prevalence of occupational injury among cement factory workers.
- ✔ To identify factors associated with occupational injury among cement factory workers.

5. Methods

5.1 Study setting

There are thirteen Cement factories in Oromia Regional States: Dangote Cement Factory, Habesha Cement factory, Mugher Cement Factory, Abyssinia Cement Factory, Ethio Cement Factory, Derba Midroc Cement Factory, Kuyu Cement Factory, East Cement Factory, Jama Cement Factory, Zhongshu Cement Factory, Capital Cement Factory, Red Fox Cement Factory and Africa Cement Factory. The data from the Office of Labor and Social Affairs indicated. In total, more than 5,772 workers are employed in these factories.

This study was conducted in four selected cement factories. These four industries were selected based on security problems and the time allocated for this study. Derba Midroc, Ethio, Kuyu, and East Cement factories were selected for this study.

Derba Midroc Cement Plant is situated 70 km from Addis Ababa in the Sululta district of the North Shewa Zone, Oromia Region. Ethio Cement Plant is located in Chancho town, North Shewa Zone, Oromia Region. Additionally, both Kuyu and East Cement Factories are also situated in the North Shewa Zone of the Oromia Region. The Kuyu Cement Plant is found in Gerba Gurch town 157 km from Addis Ababa, while the East Cement Plant is located in Degam Woreda Hambiso town, about 98 km from Addis Ababa.

5.2 Cement manufacturing process

Cement is the fundamental component in construction, and undergoes a six-phase manufacturing process: quarry extraction of raw materials, grinding, proportioning and blending, pre-heater phase, kiln phase, cooling and final grinding, packing & shipping. Sand, clay, and limestone are the raw materials that are taken out of the quarry, examined in the plant laboratory, and then proportioned in preparation for grinding. After being pre-homogenized, the final raw mix which is mainly made up of 80% limestone and 20% clay is finely powdered. The material first undergoes grinding before entering the pre-heating chamber in the kiln, where it is preheated to an energy-efficient 1450 °C to start the decarbonization process. Forced air is used to cool the resulting clinkers, and the final grinding stage yields the fine powder known as cement. To manage the cement setting, gypsum is added during grinding. while most are carried in bulk by trucks, trains, or ships, a tiny amount is packaged for particular customer needs(29).

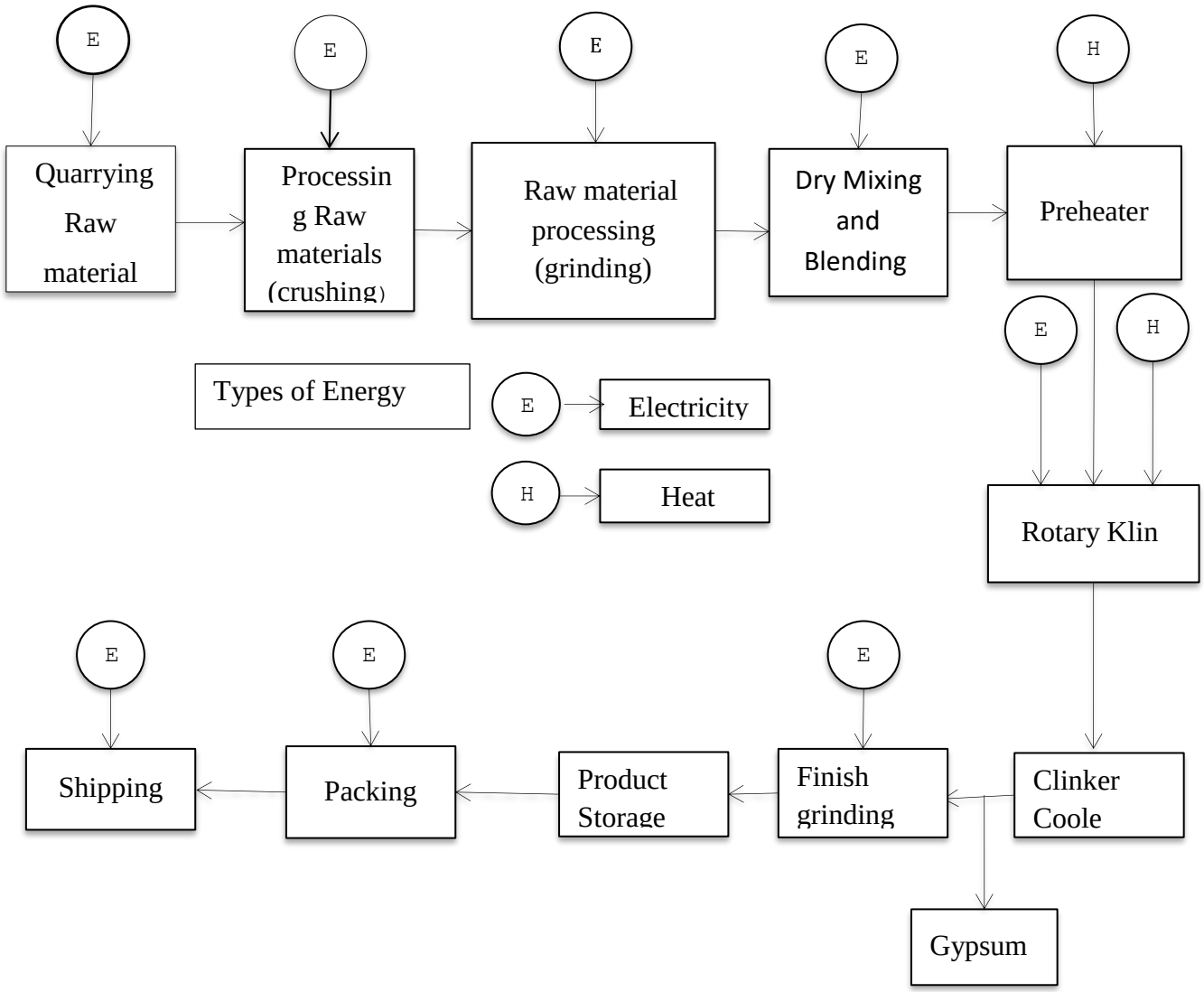

Figure 2:Process flow diagram for the cement manufacturing process, showing electricity and heat consumption inputs(30,31)

5.3. Study Design and Period

An institutional-based cross-sectional study was conducted from April to June 30, 2023

5.4. Source of Population

Including all production workers in the cement industries in the Oromia Regional State

5.5. Study Population

Selected workers directly involved in cement production were considered as the study population.

Inclusion criteria: - All workers who have been working at least for one year in the selected factory irrespective of sex were included in the study.

Exclusion criteria: -Workers who were absent from work for any reason during data collection, including illness and leave, were excluded from the study.

5.6. Sample size determination

The sample size for the first specific objective: -

The sample size was determined by a single population proportion formula. that's calculated using a 48.9% prevalence of occupational injury among cement factory workers in central Ethiopia(11).

Confidence interval = 95%

Critical value =1.96

d=degree of precision (margin of error) = 0.05

$$n= (Z_{\alpha/2})^2 \frac{[p\ (1-p)]}{d^2}$$

Where n=sample size

$\alpha = 0.05$

$Z_{\alpha/2=}1.96$

P=48.9

$$n= \frac{(1.96)^2\ 0.489(1-0.489)}{(0.05)^2}$$

n = 384

Non-response rate was considered 10% of the sample size, which gives that approximately 384 +38

So final sample size is **422**

The sample size for the second specific objective: - The sample size for the second objective was calculated by using the double population proportion formula
Assuming, cement workers, those who utilized PPE were 3.7 times less likely to be harmed than those who did not(11).

P1= proportion of occupational injury among PPE users = 19.8%

P2= proportion of occupational injury among PPE non-users = 29.2%

P=pooled proportion = p= (0.198+29.1)/2=0.245

Z α/2=0.05 the probability of committing error = 1.96

Z_β = standard normal distribution value corresponding to 80% power to detect the assumed difference =0.84

n=Sample size

$$n = \frac{z\frac{\propto}{2}\sqrt{1+\frac{1}{r}p(1-p)} + Z\beta\sqrt{p1(1-p1)+\frac{p2(1-p2)}{r}}}{(P\ 1-\ P\ 2)^2}$$

$$n = \frac{1.96\sqrt{1+\frac{1}{3.7}0.24(1-0.24)} + 0.84\sqrt{0.198(1-0.198)+\frac{0.291(1-0.291)}{3.7}}}{(0.198-0.291)^2}$$

n=204

And 10% non-response rate 204+25=**225**

The first objective is the largest sample size which is **422**; it was representative of both objectives. Considering time and resource constraints, it was chosen for both objectives, ensuring a meaningful and feasible study.

5.7. Sampling Method

The study population was taken from Derba Midroc Cement, Ethio Cement, East Cement, and Kuyu Cement Factories of the human resource management office. The study participants were selected using a simple random sampling technique from each study population.

Therefore, a sample of 189, 72, 77, and 84 individuals was selected by simple random sampling using a random number generator. The selection was made from Derba Midroc, Ethio, East, and Kuyu cement factories, respectively, with proportions aligned to their respective sample sizes.

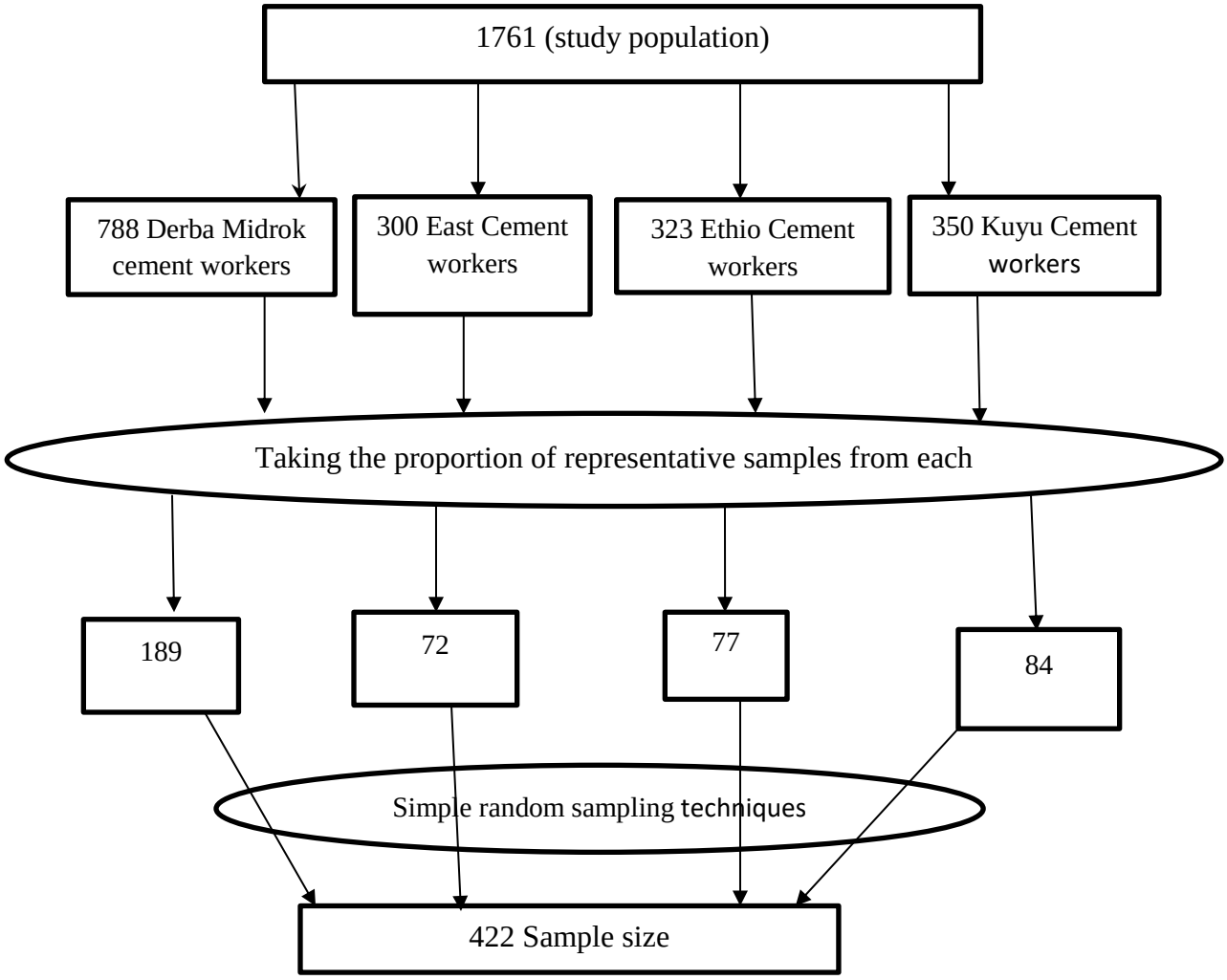

Figure 3: Schematic presentation of the participant sampling procedure

5.8. Data Collection

The data was collected through face-to-face interviews with structured questionnaires from randomly selected study participants by trained interviewers and observational checklists by visiting the departments and principal investigators closely followed the process. These structural questionnaires adapted from different relevant literature on occupational injury were used after some modifications (10,27). The structured questionnaire was prepared in English first and then later translated into Amharic and Afan Oromo to agree effortlesely; interviews were done in both Afan Oromo and Amharic. This data was collected by five data collectors and one supervisor their educational backgrounds included one BSc in environmental health, one in nursing, three in chemistry, and one supervisor who has a BA degree in management. The questionnaire was focused on socio-demographic factors, behavioral factors, and environmental factors, work-related and ergonomic factors that can affect an occupational injury in the production area of selected cement factories.

5.9. Study variables

Dependent variables: - Occupational injury

Independent Variables

1. Socio-demographic factors: - Sex of workers, Age of workers, Level of education, Marital Status, Salary of workers, Employment status, and Work experience

2. Work environmental factors:- Available of PPE, Workplace supervision, Hours worked per week, Working Section, Occupational Health and Safety Training, Excessive heat, Shift rotation and OSH information

3. Behavioral factors: - Use of PPE, Alcohol Use, Chat Chewing, Job Satisfaction, Smoking Habit and Sleeping Disorder

4. Ergonomics and work-related factors: - Pulling, Pushing, Heavy lifting, Carrying and vibration

5.10. Operational definition

Occupational injury: Any unintentional physical harm to workers in a cement factory within one year, reported by workers defined as:

Non-disabling injury: Harm without significant impact on regular job duties.

Temporary disability: Injuries causing a temporary inability to perform regular job duties.

Permanent disability: Lasting impairment affecting the ability to perform certain job tasks.

Death: Fatalities occurring within one year due to work-related accidents.

Personal protective equipment (PPE):- Workers wear specialized clothing or equipment to safeguard against health and safety hazards, designed to protect various body parts(19, 24).

Excessive heat: - heat is recorded as excessive if a worker is found sweating when naked or with light clothing; if the investigator feels a sudden heatwave when entering the work(32,33).

The severity of injury: -characterized hospitalization and absence from work at least for one days in the last year(21).

Hand-arm Vibration: The presence of involuntary hand and arm movements from vibration devices if described by participants and confirmed by an observational checklist.

Whole body vibration: Presence of mechanical tremor affecting the whole body if described by participants and confirmed by observational checklist

Carrying- Manually transporting loads, as reported by participants and confirmed by an observational checklist.

Heavy lifting: Manually handling loads reported by participants and confirmed through an observational checklist.

Pulling and pushing: Applying force to move objects horizontally, as reported by participants and confirmed by the observation checklist.

5.11. Data Management

Before the beginning of data collection, critical data that needed to be collected were identified. While data was being collected, daily monitoring was conducted. After data collection, raw data were checked for questionnaire completeness and rearranged to prepare for data entry.

Data entry was conducted in Epi Info version 7 cleaned data was transferred to the SPSS version 21 software package. Data were saved in different folders on the computer and removable flash disks. The completeness of the data was reviewed once again after it had been entered into the SPSS 21 software program, and it was then coded and ready for analysis.

5.12. Data Analysis Procedure

Specific Objectives one

The collected data were entered into Epi Info version 7 and the data were transferred to the SPSS version 21 software package for further analysis. For all study variables, descriptive statistics were performed using the conventional statistical parameters of percentages, means, and standard deviations such as frequency, percentages, means, medians, variances, and standard deviations, This analysis helped to determine the last one-year prevalence of occupational injury among cement factory workers under study. Tables, charts, and were used to allow readers to visually understand the study results easily.

Specific Objectives two

Bivariate logistic regression analysis was utilized to ascertain the relationship between occupational injury and associated factors for the second objective.

The impact of individual predictor variables was evaluated using the crude odds ratio along with 95% confidence intervals. In bivariate analysis, independent variables with a P-value less than 0.2 were considered. This step was taken to identify candidate variables for multivariate analysis, aiming to prevent an excessive number of variables and maintain stable estimates in the final analysis. Additionally, an adjusted odd ratio with 95% confidence intervals was taken into account to analyze the impact of all the study variables in the study. The variables that showed significant association in the bivariate and continue in the multivariate were the determinants of occupational injury. These were variables with a 95% confidence interval p-value of less than 0.2 in bivariate analysis and less than 0.05 in multivariate analysis. This approach involved a step-

by-step analysis of the effects of socio-demographic factors, working environment factors, behavioral factors, work-related and ergonomic factors on occupational injury.

5.13. Data Quality Assurance

Data quality was assured by giving training for data collectors for two days before going into the data collection for this study, a pretest was conducted at Gold Lion Plc. Factory in Fiche town north shewa zone of Oromia. This was implemented by taking 5 % of the sample size from this study. Following a brief training on the method and procedure of data gathering given to the data collectors, it was put into practice. All questionnaire items were translated into Amharic and Afan Oromo to make for clarity and then transitioned to the English language for the composition of the thesis report. Filled questions were checked for completeness, accuracy, and consistency daily.

The data collectors, supervisor, and principal investigators exchanged information and discussed the previous day's data collection process, and anything that raised issues and was confusing was cleared up before the following daily work day.

5.14. Ethical Consideration

After receiving ethical approval from the research ethics committees of Addis Ababa University's School of Public Health, this research project was started. The factory managers were adequately informed of the study's aims and their approval was obtained for the research activities before the start of the investigation and the gathering of important data. The goal and expected results of the study were openly explained to the participants. They were encouraged to express their opinions freely, with the guarantee that the information gathered would be coded and handled with the highest confidentiality. Participants were explicitly informed of their right to withdraw from the study at any point, and they were encouraged to seek clarification on any aspects they found unclear. In line with ethical considerations, the collected data was handled discreetly. Furthermore, based on the findings of this study, comprehensive training sessions will be organized for the surveyed factories. These sessions will focus on describing the causes of occupational injuries and giving preventive measures for the future. The overarching goal is to contribute to a safer working environment by disseminating knowledge and fostering awareness among factory personnel.

5.15. Dissemination of finding

A detailed report of this study which consisted of the main findings will be disseminated to Derba Midroc, Ethio, East, and Kuyu Cement factories, Addis Ababa University School of Public Health, Oromia Labour and Social Affairs Bureau, Ministry of Labor and Skill, Oromia Health Bureau, Ministry of Health. To enhance knowledge transfer and foster a culture of safety, workshops and seminars will be organized. By engaging with factory managers, workers, and relevant authorities, these workshops aim to translate research findings into actionable insights, contributing to a safer working environment. Therefore, the intention is to increase the study's impact by publication and monitoring in reputable scientific journals. This process will ensure that a greater number of individuals, both nationally and internationally, are aware of these findings.

6. Results

6.1. Socio-demographic characteristics of the respondents

A total of 422 participants were chosen for the survey, and all responded, achieving a 100% response rate. Among the respondents 407(96.4%) were males. Of the total study, 260(61.6%) participants were less than 29 years of age. The majority of respondents were Orthodox religious followers 373(88.4). Marital status showed 271(64.2%) respondents were married followed by single151 (35.8%). One hundred seventy-eight (42.2%) respondents were in primary school and ninety-seven (23%) were in secondary school. Most workers' employment status was permanent 320 (75.8 %). One hundred twenty (28.4%) of the respondents were from (mill) production. Two hundred thirty-seven (56.2%) of the respondents had less than 4000 ETB monthly salaries. Two hundred thirty-one (54.7%) of the respondents had working experience of 2-10 years (Table 1).

Table 1: The Socio- demographic characteristics of the respondents Derba Midrok, East, Ethio, and Kuyu Cement factories workers in Oromia regional states, 2023 (n=422).

Variables	Frequency	Percentage
Sex		
Male	407	96.4
Female	15	3.6
Age		
≤ 29	260	61.6
> 29	162	38.4
Religion		
Orthodox	373	88.4
Other	49	11.6
Educational level		
Primary school(1-8) and below	178	42.2
Secondary school(9-12)	97	23.0
Technical and Vocational school	44	10.4
Diploma	60	14.2
First degree	43	10.2
Marital status		
Married	271	64.2
Single	151	35.8
Employment status		
Permanent	320	75.8
Temporary	102	24.2
Job category		
Engineering	90	21.3
Clinker	52	12.3
Milli (Production)	120	28.4
Packing	91	21.6
Raw Material and Other	69	16.4
Service years		
< 2	141	33.4
2-10	231	54.7
>10	50	11.8
Monthly salary in birr		
< 4000 ETB	237	56.2
≥ 4000 ETB	185	43.8

6.2. Occupational injury characteristics

The total prevalence of occupational injury in the last 12 months was 129 (30.6%).fifty-three (41.1%) respondents reported having had an occupational injury in the last two weeks. Regarding the frequency of injuries over the last 12 months, 116 (89.9) injuries occurred once, 13(10.1%) injuries occurred more than once, and in the past two weeks, 48 (90.6%) injuries occurred once and 5(9.4%) more than once (Table2).

Table 2: Prevalence of occupational injury Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia Regional States,2023(n=422).

Variables	Frequency	Percentage
Occupational injury in the last 12 months	129	30.6
Number of occurrences		
Once	116	89.9
More	13	10.1
Occupational Injury in the last 2 weeks	53	41.1
Number of occurrences		
Once	48	90.6
More than once	5	9.4

The body part with the highest frequency of occupational injuries is the eye 42(24.1%), followed by the finger 33(19%), the hand 15(8.6%), the lower leg 14(8%), the head and toe 12(6.9%). Burn 31(16.6%), Puncture 25(13.4%), Cut and Fracture 21(11.2%), Suffocation 14(7.5%) , Poisoning 9(4.8%) and abrasion 8(4.3%) were the most common injury types recorded (Table 3).

Table 3: Type and Parts of body affected among 129 injured respondents in Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia regional states, 2023 (n=422).

Variables	Frequency	Percentage
Part of the body affected		
Eyes	42	24.1%
Tooth	11	6.3%
Hand	15	8.6%
Toe	12	6.9%
Finger	33	19.0%
Head	12	6.9%
Lower Leg	14	8.0%
Others*	32	20.2%
Type of injury		
Abrasion	8	4.3%
Cut	21	11.2%
Burn	31	16.6%
Puncture	25	13.4%
Fracture	21	11.2%
Suffocation	14	7.5%
Electrocutions	7	3.7%
Poisoning	9	4.8%
Others**	46	30.3%

Others* = Ear, Knee, Upper Arm, Lower Arm, Hip, Upper leg, Back, Chest, Multi location …

Others** = Amputation, Dislocation, Chemical exposure, Respiratory injuries …

Regarding causes of injury machines were responsible for 39 (21.9%), Hits 21(11.8%), Hot substances 18(10.1%), Electricity 10 (5.6%), Hand tools 10(5.6%), Splintering objects 8(4.5%) and Hit by falling objects 7(3.9%) (Table4).

Reason for the causes of injury, 36(21.3%) think it was a working behavior, 23(13.6%) due to not using PPE, 18(10.7%) improper hand working instrument, 16(9.5%) Being new to the working process, 15(8.9%) thinking about private affairs, 13(7.7%) those who think the accidents beyond the control, 9(5.3%) absence of safety Education and 6(3.6%) absence in adequate machine safeguard (Table 4).

Table 4: Causes and Reasons of Injury among injured respondents in Derba Midroc, East, Ethio, and Kuyu Cement Factories Workers in Oromia Regional States, 2023 (n=422).

Variables	Frequency	Percentage
Causes of injury		
Machinery	39	21.9%
Hit by Falling objects	7	3.9%
Hit	21	11.8%
Electricity	10	5.6%
Splintering objects	8	4.5%
Hand tools	10	5.6%
Fire	11	6.2%
Hot substances	18	10.1%
Falls	5	2.8%
Others*	49	27.6%
Reason of injury		
Being new to the working process	16	9.5%
Thinking about private affairs	15	8.9%
Those who think the accidents are beyond their control	13	7.7%
Those who think it was a working behavior	36	21.3%
Improper hand-working instrument	18	10.7%
Absence of adequate machine safeguard	6	3.6%
Absence of Safety Education	9	5.3%
Due to not using PPE	23	13.6%
Others**	33	19.4%

Others*= Collision with objects, Lifting heavy objects …

Others**=Chat online at work, other environmental factors …

Regarding the date of the injury, 91 respondents (58.3%) could not recall the exact days of the injuries, 18(11.5%) occurred on Wednesday, 13(8.3%) on Monday, 10(6.4%) on Friday, 9(5.8%) on Tuesday, 8(5.1%) on Thursday, 4(2.6%) on Saturday and 3(1.9%) on Sunday (Table 5).

The study also showed that 47(29.2%) of participants did not recall the exact time of their injuries, while 44 (27.3%) were injured in the afternoon, 29 (18%) were injured at midnight, 23 (14.3%) were injured in the evening, and 18(11.2%) were injured in the morning (Table 5).

Table 5: Days and Time of injury among injured respondents Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia Regional States, 2023 (n=422).

Variables	**Frequency**	**Percentage**
Days of injury		
Monday	13	8.3%
Tuesday	9	5.8%
Wednesday	18	11.5%
Thursday	8	5.1%
Friday	10	6.4%
Saturday	4	2.6%
Sunday	3	1.9%
I don't remember	91	58.3%
Time of injury		
In the morning	18	11.2%
In the Afternoon	44	27.3%
In the evening	23	14.3%
In the mid-night	29	18.0%
I don’t remember	47	29.2%

6.3. Severity of Occupational Injuries

Of the total of 129 injured respondents, 45(34.9%) were hospitalized; of these, 14 (31.1%) spent less than 24 hours in the hospital 31 (68.9%) spent more than 24 hours, and 415 work days were lost due to this occupational injury(Table 6).

Table 6: The severity of occupational injuries as reported by respondents Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia regional states, 2023 (n=422).

Variables	Frequency	Percentage
Hospitalization	45	34.9%
less than 24 hours	14	31.1%
more than 24 hours	31	68.9%
Working day lost		
<2	11	22%
2-7	27	54%
>7	12	24%

6.4. Working environmental factors of occupational injury

In this study, 347 (82.2%) of the respondents work both day and night shifts. Only 122 (28.9%) of the employees have gone through occupational safety training. It was regularly supervised for health and safety, according to 91 (21.6%) of the respondents. Three hundred six (72.5%) of respondents reported having information about workplace health and safety. Thirty-nine (9.2%) of workers reported working in environments with high temperatures, and the Clinker department accounts for the majority of these cases.Three hundred fifty-nine (85.1%) of employees work in environments with enough light. That is 14.9 percent of the workers work in poorly light areas (Table 7).

Table 7: Working environment characteristics of respondents in Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia Regional States, 2023 (n=422).

Variables	Frequency	Percentage
Regular health and safety supervision		
Yes	91	21.6%
No	331	78.4%
Shift rotation		
Yes	347	82.2%
No	75	17.8%
Occupational safety and health training		
Yes	122	28.9%
No	300	71.1%
Excessive heat		
Yes	39	9.2%
No	383	90.8%
Health and Safety information		
Yes	306	72.5%
No	116	27.5%
Is there enough light in your workplace		
Yes	359	85.1%
No	63	14.9%
working hours per week		
≤ 48	187	44.3%
> 48	235	55.7%
Reason for sleeping disorder		
Working greater than 8 h	36	8.5%
Working at night	51	12.1%
Don't use PPE	4	0.9%
Other	25	5.9%

6.5. Behavioral factors of occupational injury

According to the data among the respondents, 111 (26.3%) used alcohol, 47 (11.1%) chewed chat, and 31 (7.3%) smoked cigarettes. The majority of respondents do so occasionally. Job satisfaction was only reported by 190 respondents (45%). Reasons not to use personal protective equipment were most frequently stated as the absence of personal protective equipment, accounting for 300 (71.1%) (Table8).

Table 8: Working behavioral characteristics of respondents in Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia Regional States, 2023 (n=422).

Variables	Frequency	Percentage
Alcohol Use		
Yes	111	26.3%
No	311	73.7%
How often		
1-3 days/week	28	6.6%
Occasionally	83	19.2%
Chat chewing		
Yes	47	11.1%
No	375	88.9%
How often		
1-3 days/week	8	1.9%
Occasionally	39	9.2%
Cigarette Smoking		
Yes	31	7.3
No	391	92.7
How often		
Non-daily smokers	31	7.3%
Sleeping disorders		
Yes	127	30.1%
No	295	69.9%
Job satisfation		
Yes	190	45.0%
No	232	55.0%
Reasons for not using personal protection		
Create safety and health hazards	11	2.6%
Decrease work performance	45	10.7%
Lack of personal protective equipment	300	71.1%
Lack of safety and health education.	5	1.2%
Not comfortable to use	38	9.0%
Other	23	5.5%

Regarding the utilization of personal protective equipment, 313 respondents (74.2%) reported using personal protective equipment while at work. Gloves 341(80.8), respirators 318(75.4%), and safety shoes 273(64.7%) were used most frequently, according to respondents who were interviewed (Table 9).

Table 9: Utilization of Personal Protective Equipment of respondents in Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia Regional States, 2023 (n=422).

Variables	Frequency	Percentage
Use of PPE		
Yes	313	74.2
No	109	25.8
Gloves		
Yes	341	80.8%
No	81	19.2%
Earplug		
Yes	61	14.5%
No	361	85.5%
Respirators		
Yes	318	75.4%
No	104	24.6%
Helmet		
Yes	141	33.4%
No	281	66.6%
Overalls		
Yes	47	11.1%
No	375	88.9%

Goggles		
Yes	161	38.2%
No	261	61.8%
Face shield		
Yes	37	8.8
No	385	91.2
Safety shoes		
Yes	273	64.7
No	149	35.3

6.6. Work-related and ergonomics Factors of occupational injury

Only 34(8.1%) respondent's involved pulling activities. Forty-five respondents (10.7%) are involved in pushing activities. Seventy-two respondents (17.1%) reported that involvement in heavy lifting.

Thirty-five respondents (8.3%) were involved in carrying activities. Twenty-five respondents (5.9%) reported experiencing hand-arm vibration. Only 21 respondents (5%) reported being involved in whole-body vibration activities (Table 10).

Table 10: Work-related and ergonomics characteristics of respondents in Derba Midrok, East, Ethio, and Kuyu cement factories workers in Oromia Regional States, 2023 (n=422).

Variables	Frequency	Percent
Pulling		
Yes	34	8.1
No	388	91.9
Pushing		
Yes	45	10.7
No	377	89.3
Heavy Lifting		
Yes	72	17.1
No	350	82.9
Carrying		
Yes	35	8.3
No	387	91.7
Hand-arm vibration		
Yes	25	5.9
No	397	94.1
Whole body vibration		
Yes	21	5.0
No	401	95.0

6.7. Observational finding

Department of Engineering/mechanics/ at the Ethio Cement Factory there are locations where neither natural nor bulb light can adequately illuminate the space. There is excessive heat in the clinker area of all cement factories taken into consideration

Workers identify a critical issue as the lack of sufficient sleeping space for night shift a worker, which is also confirmed by this working environment observation. This has caused the workers to fall asleep while doing their jobs.

There are insufficient ventilation systems and warning signs in all of the production areas of the cement facilities under study. These cement factories have access to first aid, but they are lacking in essential items.

Less than half workers utilize personal protective equipment appropriately, and many do not use it, usually due to a lack of supply. Some workers are also unwilling to use the personal protective equipment. Additionally, some workers purchased their personal protection equipment and used it. If the cement grinding machine in the production area catches a pebble, workers enter and remove it. The machine gets hot when operating and takes a while to cool down. There is a risk of burning if workers enter before the cooling hours, and some workers have reported experiencing this risk.

`In the Derba Midroc cement factory, a comfortable and hazard-free dining area, separate from the production area, contributes to a safer work environment and potentially reduces the risk of occupational injuries. Conversely, in Kuyu Cement Factory, while there is a designated dining area separate from the workspaces, concerns arise due to the reported lack of cleanliness in the staff dining and food storage areas, potentially posing occupational health risks. In East and Ethio cement factories, the absence of a separate and adequate dining place, along with the practice of keeping food near the production area and potential allergens, may contribute to an increased risk of occupational injuries among workers.

6.8. Bivariate Analysis for Socio-demographic, Environmental, Behavioral, Work-related and Ergonomics Factors

6.8.1. Socio-demographic factors

Job category, Educational level, and service year were found to be the most important socio-demographic factors influencing occupational injury. The educational level of the workers was significantly associated with occupational injuries. Workers with an elementary school and below education had 2.34 times higher odds of injury compared to those with a degree [COR=2.34, 95%CI :(1.06-5.17)]. Job category was also significantly associated with occupational injuries. Workers who worked in Engineering, Clinker, Production, and Packing had respectively 2.64, 3.29, 2.54, and 2.72 times higher odds of injury compared to those in the raw material department. Work experience of the workers was significantly associated with occupational injuries. workers with less than two years of service 0.42 times lower odds of injury compared to those with more than 10 years of service[COR=0.42, 95%CI :(0.21-0.82)] (Table11).

Table 11: Bivariate analysis of socio-demographic factors of occupational injuries in Derba Midroc, East, Ethio, and Kuyu cement factories workers in Oromia regional states, 2023 (n=422).

Variables	Injury		COR (95%CI)
	Yes	No	
Sex			
Male	127	280	1.25 (0.3 - 3.20)
Female	4	11	1.00
Age			
≤ 29	83	177	1.11 (0.73-1.71)
> 29	48	114	1.00
Religion			
Orthodox	119	254	1.45 (0.73-2.87)
Other	12	37	1.00
Educational status			
Primary school(1-8) and below	68	110	**2.34 (1.06-5.17)***
Secondary school(9-12)	27	70	1.46 (0.62-3.44)
Technical and Vocational school	13	31	1.58 (0.60-4.22)
Diploma	14	46	1.15 (0.45)-2.97)
First degree	9	34	1.00
Marital Status			
Married	85	186	1.00
Single	46	105	0.96 (0.62-1.48)
Employment Status			

Permanent	99	221	1.00
Temporary	32	70	0.02 (0.63-1.65)
Job category			
Engineering	30	60	**2.64 (1.21-5.75)***
Clinker	20	32	**3.29 (1.40-7.73)****
Milli (Production)	39	81	**2.54 (1.20-5.37)***
Packing	31	60	**2.72 (1.25-5.92)***
Raw Material	11	58	1.00
Service year			
<2	37	104	**0.42 (0.21-0.82)***
2-10	71	160	0.52 (0.28 – 0.97)
>10	23	27	1.00
Monthly salary			
< 4000 ETB	78	159	1.22 (0.80 – 1.86)
≥ 4000 ETB	53	132	1.00

Note: Significant at,*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

6.8.2. Work Environment Factors

Among the workplace environmental variables, excessive heat showed a significant association with occupational injury. Workers who operate in excessive heat workplaces had 2.29 times higher odds of injury compared to those who did not [COR=2.29, 95%CI :(1.18-4.47)]. On the contrary, Working hours a week, Regular health and safety supervision, Shift rotation, Occupational safety training, and Occupational health and safety information did not show statistically significant associations with occupational injuries (Table 12).

Table 12: Bivariate analysis of work environment factors of occupational injuries in Derba Midrok, East, Ethio, and East Cement factories workers in Oromia regional states, 2023(n=422)

Variables	Injury		COR (95%CI)
	Yes	No	
Working hours in a week			
≤ 48	51	136	1.00
> 48	80	155	1.38 (0.90-2.10)
Regular health and safety supervision			
Yes	28	63	1.00
No	103	228	1.02 (0.62-1.68)
Shift rotation			
Yes	112	235	1.41 (0.80-2.48)
No	19	56	1.00
Occupational safety training			
Yes	35	87	1.00
No	94	206	1.13(0.71-1.80)
Excessive heat			
Yes	19	20	**2.29 (1.18-4.47)***
No	112	271	1.00
Occupational health and safety information			
Yes	91	215	0.80 (0.51-1.27)
No	40	76	1.00
Is there enough light in your workplace			
Yes	107	252	1.00
No	24	39	1.45 (0.83-2.53)

Note: Significant at,*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

6.8.3. Behavioral factors

Use of personal protective equipment among behavioral component variables significantly associated with occupational injury. Workers who did not use personal protection equipment had 1.67 times higher odds of injury compared to those who did use it [COR= 1.67, 95%CI :(1.06-2.63)]. However, in this study, there was no evidence of a significant association between occupational injury and alcohol use, smoking cigarettes, chewing chat, sleeping disorders, or job satisfaction (Table 13)**.**

Table 13: Bivariate analysis of behavioral factors of occupational injuries in Derba Midrok, East, Ethio, and East Cement factories workers in Oromia regional states, 2023 (n=422).

Variables	**Injury**		**COR (95%CL)**
	Yes	**No**	
Alcohol use			
Yes	42	69	1.52 (0.96-2.40)
No	89	222	1.00
Smoking cigarette			
Yes	13	18	1.67 (0.79-3.52)
No	118	273	1.00
Chat chewing			
Yes	19	28	1.59 (0.86-2.97)
No	112	263	1.00
Sleeping disorder			
Yes	46	81	1.03 (0.90-2.18)
No	85	210	1.00
Job satisfaction			
Yes	53	137	1.31 (0.86-1.99)
No	78	156	1.00
Use of PPE			
Yes	88	225	1.00
No	43	66	**1.67 (1.06 – 2.63)***

Note: Significant at,*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

6.8.4. Work-related and Ergonomics factors

From work-related and ergonomics factors variables, occupational injuries were significantly associated with heavy lifting, whole-body vibration, and hand vibration. Workers whose work involves hand-arm vibration had 3.63 times higher odds of injury compared to those not engaging in it [COR= 3.63, 95%CI :(1.59-8.32)].workers whose work involves whole body vibration had 2.58 times higher odds of injury compared to those not engaging in it[COR=2.58,95CI:(1.07-6.23), Similar workers engaging in heavy lifting had 2.03 times higher odds of injury compared to those not engaged in it [AOR=2.03, 95%CI :(1.21 - 3.41)] (Table 14).

Table 14: Bivariate analysis of work related and ergonomics factors of occupational injuries in Derba Midrok, East, Ethio, and Kuyu Cement factories workers in Oromia regional states, 2023 (n=422).

Variables	Injury		COR (95%Ci)
	Yes	No	
pulling			
Yes	11	23	0.94 (0.44-1.98)
No	120	268	1.00
Pushing			
Yes	11	34	0.69 (0.34-1.41)
No	120	257	1.00
Heavy lifting			
Yes	32	40	**2.03 (1.21-3.41)****
No	99	251	1.00
Carrying			
Yes	10	25	0.88 (0.41-1.89)
No	121	266	1.00
Whole body vibration			
Yes	11	10	**2.58(1.07 – 6.23)***
No	120	281	1.00
Hand-arm vibration			
Yes	15	10	**3.63 (1.59 - 8.32)****
No	116	281	1.00

Note: Significant at,*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

6.9. Multivariate logistic regression analysis

Educational level, Job Category, Excessive heat, PPE Use, Heavy Lifting, and Hand Vibration were significantly associated with occupational injury among variables chosen as associated factors from bivariate analysis with p-value < 0.2 to limit the number of variables (Table 15). When compared to educational levels workers with only an elementary school and below education were 2.67 times higher odds of injury compared to those with a degree [AOR=2.67,95%CI:(1.09-6.53)]. Workers in the engineering department had 4.19 times higher odds of injury compared to those in raw material [AOR=4.19, 95%CI :(1.71-10.29)]. Workers in the Clinker department had 3.11 times higher odds of injury compared to workers in the raw material departments [AOR=3.11, 95%CI :(1.21-8.02)]. Workers in the production department had 2.67 times higher odds of injury compared to those in raw material departments [AOR=2.67%CI :(1.20-5.94)]. Similar to this, workers in the packing department had 2.43 times higher odds of injury compared to those in raw material and others [AOR=2.43, 95%CI: (1.05-5.61)] (Table 15).

Workers who operate in environments with excessive heat have 2.36 times higher odds of injury compared to those who work in environments without such heat [AOR=2.36, 95%CI :(1.11-5.02)].

Participants in the study who did not use personal protective equipment had 1.79 times higher odds of injury compared to those who used it [AOR= 1.79, 95%CI: (1.08-2.97)]. Workers whose work involves hand-arm vibration had 3.14 times higher odds of injury compared to those whose work does not involve it [AOR= 3.14, 95%CI: (1.29-7.66)]. Similar to these workers whose work involves heavy lifting had 1.88 times higher odds of injury compared to those whose work does not involve it [AOR=1.88,95%CI:(1.07-3.33)] (Table 15).

Table 15: Multivariate logistic regression analysis of the relative effect of socio-demographic, work environment, behavioral factors, Work-related and Ergonomics factors on the prevalence of occupational injuries among Derba Midrok, East, Ethio, and Kuyu Cement factories workers in Oromia regional states, 2023(n=422).

Variables	Injury		COR (95%CI)	AOR (95%CI)
	Yes	No		
Educational status				
Primary school(1-8) and below	68	110	2.34 (1.06-5.17)	**2.67 (1.09-6.53)***
Secondary school(9-12)	27	70	1.46 (0.62-3.44)	1.72 (0.66-4.50)
Technical and Vocational School	13	31	1.58 (0.60-4.22)	1.36 (0.48-3.83)
Diploma	14	46	1.15 (0.45)-2.97)	0.89 (0.32-2.51)
First degree	9	34	1.00	1.00
Job Category				
Engineering	30	60	2.64 (1.21-5.75)	**4.19 (1.71-10.29)****
Clinker	20	32	3.29 (1.40-7.73)	**3.11 (1.21-8.02)***
Milli (Production)	39	81	2.54 (1.20-5.37)	**2.67 (1.20-5.94)***
Packing	31	60	2.72 (1.25-5.92)	**2.43 (1.05-5.61)***
Raw Material and Other	11	58	1.00	1.00
Service year				
<2	37	104	0.42 (0.21-0.82)	0.51 (0.24-1.09)
2-10	71	160	0.52 (0.28 – 0.97)	0.55 (0.28-1.11)
>10	23	27	1.00	1.00
Hours worked per week				
≤ 48	51	136	1.00	1.00
>48	80	155	1.38 (0.90-2.10)	1.35 (0.84-2.16)
Excessive heat				
Yes	19	20	2.29 (1.18-4.47)	**2.36 (1.11-5.02)***
No	112	271	1.00	1.00

Alcohol use				
Yes	42	69	1.52 (0.96-2.40)	1.09 (0.59-2.04)
No	89	222	1.00	1.00
Smoke a cigarette				
Yes	13	18	1.71 (0.81-3.61)	1.52 (0.43-5.40)
No	116	275	1.00	1.00
Chat chewing				
Yes	19	28	1.59 (0.86-2.97)	1.22 (0.40-3.73)
No	112	263	1.00	1.00
Sleeping disorder				
Yes	46	81	1.03(0.90-2.18)	1.33 (0.80-2.19)
No	85	210	1.00	1.00
PPE Use				
Yes	88	225	1.00	1.00
No	43	66	1.67 (1.06 - 2.63)	**1.79 (1.08-2.97)***
Heavy lifting				
Yes	32	40	2.03 (1.21-3.41)	**1.88 (1.07-3.33)***
No	99	251	1.00	1.00
Hand-arm vibration				
Yes	15	10	3.63 (1.59- 8.32)	**3.14 (1.29-7.66)***
No	116	281	1.00	1.00
Whole body vibration				
Yes	11	10	2.58 (1.07-6.23)	2.13 (0.78-5.76)
No	120	281	1.00	1.00

Note: Significant at,*$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$

7. Discussion

The study result showed that the prevalence of occupational injury in the last 12 months was 129 (30.6%).Among these only 45 (35%) were hospitalized. The prevalence of this study is relatively high compared with the study done in Ethiopia's mugher cement industry the rate of occupational injury over 12 months was 10.4% of the total 52 injured respondents 37 (71.2%) were hospitalized, the reason for the study done in mugher cement lower prevalence was the inclusion of only injured workers who had their injuries verified by a hospital or clinic(10).

Another study conducted in cement factories in central Ethiopia showed that the prevalence of occupational injuries over 12 months was 48.9% of the total 183 injured respondents 84 (46%) was hospitalized. In comparison to our study, its prevalence is high. The higher prevalence cement factories in central Ethiopia was attributed to factors such as behavioral choices (alcohol, smoking) and inadequate use of personal protective equipment(11).

The reason why fewer workers in these industries are receiving treatment for occupational injuries in our study was due to private clinics being absent from those factories and a deliberate absence of arrangements to get workers' transportation to the hospital as soon as they are injured at work.

The overall prevalence was relatively low compared with other studies in the manufacturing and construction industries(27,28,32,34).

This study revealed that the most commonly injured body parts were the eye, finger and hand. The possible causes of work-related eye injuries include cement chips, dust from cement, coal stone fragments, chemicals, and metal particles. Other injured parts of bodies are more probability to be directly exposure to machines.

The other is that workers rarely use personal protective equipment (PPE) when they are at work. The other reasons contribute to the occurrence of this injuries some workers not use personal protective equipment (PPE) when they are at work.

A related study done in Bangladesh cement factories showed that the arm, leg, hand, finger, Eye, and head covered 82.81% of the total injury frequency(16). Similar studies conducted at cement factories in central Ethiopia have shown that the most commonly affected body parts are the finger, eye, and toe.

Another study conducted in Ethiopia in Mugher Cement Factories found that the most impacted

body parts were the hand, lower leg, finger, and eye(10). Another study done in Cairo Egypt Tourah cement factory showed ear problems, fracture accidents followed by falling, and eye disorders were the most physical hazards workers were exposed(15).

As our study showed machines, hit, and hot substances objects were the common causes of injuries. This was consistent with studies conducted in Addis Ababa, among iron and steel industries workers, Mugher cement factory, and others(10,11,21,34,35).

In this study, the main types of injury reported were burn 31(16.6%), Puncture 25(13.4%) and cut 21(11.2%). According to a study conducted in Addis Ababa's large-scale metal manufacturing industry, the most common injury types were dislocation, puncture, abrasion, and eye injuries(36). Another study conducted at the Arba Minch textile factory in southern Ethiopia revealed that the most frequent injury types to which workers were exposed were cuts, lacerations, dislocations, eye injuries, and fractures(26).

This study showed injuries most frequently happened in the afternoon (44.3%) and at midnight (29.0%). The primary reason for injury at this time was tiredness in the afternoon and falling asleep at work at midnight.

The data of this study suggests workers in the engineering, clinker, packing, and production departments are more prone to occupational injuries than those in the raw material departments. Engineers engaged in the maintenance, repair, or operation of heavy machinery and electrical systems may face an increased risk of injury due to the inherent characteristics of the equipment and the potential for accidents if safety procedures are not strictly followed.

In the clinker department, there is excessive heat, which can occasionally be dangerous for burns and force night shift workers to sleep at work. Dust from the production and packing area is everywhere, increasing the risk of suffocation and eye injuries.

A study among workers at cement factories in central Ethiopia found that workers in the engineering department had a higher risk of injury compared to those in the clinker department, Comparable research carried out in the Mugher cement factory revealed that workers in the clinker sector suffered greater injury than those in the packing and production departments.

The study found that the rate of occupational injury increases with lower educational levels. This finding is consistent with earlier research done in Ethiopia (10,11,37). However, there was no significant association found between injuries and demographic factors such as sex, age, religion, marital status, monthly wage, and employment status.

As our study showed workers who operate in environments with excessive heat had 2.36 higher odds of injury compared to those who work in environments without such heat [COR=2.36, 95%CI :(1.11-5.02).

This finding supported with research done on work related injuries and associated risk factors among iron and steel industries workers in Addis Ababa, Ethiopia(38).

Excessive heat may impact a worker's ability to focus on tasks and respond quickly to potential hazards, thereby increasing the risk of accidents.

The findings of this investigation imply workers who do not use personal protection equipment had 1.79 times higher odds of injury compared to those who used it [COR=1.79, 95%CI :(1.08-2.97)]. Consistent with this, several studies have shown that workers who do not use personal protective equipment (PPE) are more likely to have an occupational injury than workers who do (1,28,34,35).

Regarding the work-related and ergonomics factors manual handling activities such as heavy object lifting and hand vibration were significantly associated with occupational injury. Workers whose work involves hand-arm vibration had 3.14 times higher odds of injury compared to those whose work does not involve it [AOR= 3.14, 95%CI :(1.29-7.66)]. Similar to these workers whose work involves heavy lifting had 1.88 times higher odds of injury compared to those whose work does not involve it [AOR=1.88,95%CI:(1.07-3.33)]. A study on occupational injuries among textile and garment workers in Adama, Ethiopia, reported that heavy lifting was not associated with occupational injuries (29).

The observed differences may be attributed to varying job roles, work environments, and the nature of manual handling tasks across different study populations.

The observations in the cement industry raised serious safety concerns, such as poor lighting in specific workspaces, ongoing high temperatures in clinker areas, and a lack of proper rest spaces for night shift workers, presenting potential dangers. Production zones lacked proper ventilation and warning signs, affecting air quality and workers' awareness of hazards. Although first aid was accessible, its effectiveness was compromised due to a shortage of essential items. The use of personal protective equipment (PPE) was inconsistent, with less than half of the workers using it, often because of problems with the supply or workers being hesitant. Different conditions in dining areas across factories also pointed to potential health risks. It's crucial to address these issues to improve safety in the cement industry.

8. Strengths and Limitations of the Study

Strengths of the study

1. Integrating an observational checklist with interviews broadens coverage, capturing factors not verbally reported and providing additional understanding of occupational injury and associated factors

2. The study identifies specific departments (engineering, clinker, packing, and production) where workers are more prone to occupational injuries. This information can be valuable for targeted interventions and preventive measures.

3. The study encompassed multiple cement factories, offering a comprehensive understanding of occupational injury factors.

Limitations of the study

1. The study relies on historical data, which may be subject to recall bias. Workers may not accurately remember or report past injuries or exposure to risk factors.

2. The study not used direct measurements factors like vibration, heavy lifting, carrying, and heats their impact on occupational injuries.

9. Conclusions and Recommendations

Conclusions

Prevalence of Occupational Injury:

- In the last 12 months, a relatively high prevalence of 30.6% (95%CI) was reported among workers who experienced injuries.
- The commonly affected body parts include the eye, finger, hand, lower leg, head, and toe.
- To reduce risks and improve the general well-being of the workforce, thorough safety measures and urgent actions are needed.

Factors Associated with Occupational Injury:

- Engineering, clinker, packing, and production were identified as the where workers are more prone to occupational injuries.
- Lower education is significantly associated with increased injury risk.
- Insufficient use of PPE contributes to higher injury rates.
- Manual handling activities, such as heavy lifting and hand vibration, significantly contribute to an increased occurrence of occupational injuries.
- Highlights the complexity of factors association with occupational injury.

Recommendations

To MOLS (Ministry of Labor and Skills):

1. Develop and implement stringent workplace safety standards and guidelines, ensuring comprehensive training and resources for labor inspectors to effectively address the high prevalence of occupational injuries and associated contributing factors in cement factories.

To Labor inspectors

1. Labor inspectors should closely follow factory workers to detect occupational injuries and associated complexities, offering professional health and safety advice.
2. Labor inspectors should train factory managers to change attitudes, foster a healthy perception of workplace safety, and enforce laws where necessary to ensure workplace safety and health.

To the Factory Management

1. Develop comprehensive training programs: Focus on the correct use of personal protective equipment (PPE) and emphasize adherence to safety protocols.
2. On-site medical care: Encourage providing on-site medical facilities for quick care of injured workers.
3. Transportation arrangements: Ensure dedicated and efficient transportation for injured workers to reach hospitals promptly.
4. Ventilation systems in the clinker department: -Implement effective solutions to enhance working conditions, reduce health risks, and lower temperatures through the use of natural air and suitable ventilation.
5. Provide appropriate PPE: Provide workers in the production and packaging departments with personal protective equipment that is appropriate in dusty environments.
6. Replace manual lifting: Utilize machinery to replace manual lifting of heavy equipment, promoting safer practices.
7. Reduce hand-armvibration: Introduce anti-vibration gloves and implement task rotation to limit workers' exposure time to vibrating activities.

To the Researchers

- Researchers, consider adopting a forward-looking methodology to mitigate recall bias. Follow participants over time for more robust data collection and improved research outcomes.

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Annex 11

11.1 Annex: 1 Participant's Information sheet

Title of the research project: - Assessment of occupational injury and its associated factors among cement factory workers in Oromia regional states, Ethiopia, 2023.

Name of principal investigator: - Dereje Gizaw

Name of organization: - Addis Ababa University School of Public Health

Introduction: - Good morning/afternoon I am _____ here on behalf of the School of Public Health at Addis Ababa University. I have a few questionnaires that will generally assess socio-demographics, working Environment, work behavior, and Ergonomics. As a chance, you are one of the possible participants that we come across by chance.

Purpose of the research project: - The objective of this research is to assess occupational injury and its associated factors among cement factory workers in the Oromia region. This research undertaking is a postgraduate master of Public Health partial fulfillment research thesis.

Procedure: - The method of the research is an institutional-based cross-sectional study. The expected duration of the participant's contact with the interviewer will be not more than thirty minutes. You are asked to participate in this research because the trustful information that will be provided is important for the understanding of the proposed subject matter. Moreover, your particular participation is affirmed by the sampling frame through the procedure of probability sampling technique which provides an equal chance of selection. You will be asked about your Socio-demographic, working Environment, work behavior, and ergonomics risk factors.

Risk /discomfort: - The proposed research does not have any inhuman treatment of research participants or any physical harm, social discrimination, psychological trauma, or economic loss.

Benefit: - The research does not have a short-term financial, health care, and capacity-building benefit to the participant as an individual or a group but in the long run, it will help the concerned organization and policymakers to have a policy consideration and direction, and formulation of strategy and design of occupational health programs based on the recommendation and findings. Moreover, the research work will help as baseline data in the field.

Incentive/payment for participation: -This study will not give any incentive /payment to participants

Confidentiality: - To establish a secure safeguard of the confidentiality of research data the principal investigator will use codes during the data collection period instead of using the name. The original data will be locked in cabinets until the data analysis carryout and no person shall access it except the principal investigator and the advisor for data checking and cleaning purposes. The use of information for any purpose other than that to which participants consented is unethical to the participants. The information you provide is not disclosed in the way it identifies your characteristics and privacy. After the Research defense and final work are approved by the Institute of Public Health and Academic Commission and the university senate, the original data questionnaire will be incinerated securely.

Right to refuse or withdraw: - Any participant will participate in this study voluntarily. At any time he/she can quit by answering the questionnaire that he/she is not willing to answer or he/she has the right to leave.

Person to contact: - Principal investigator

Dereje Gizaw Tel. 0960270201

E-mail: derejegizaw6@gmail.com

Advisors:-

1) Prof. Abera Kume Tel. 0911882912

E-mail:aberakumie2@yahoo.com

2) Dr. Teferi Abegaz Tel. 0911361607

E-mail:teferiabegaz@gmail.com

11.2 Annex: 2 English Informed consent form

I have read this form, or it has been read to me in the language I can understand the condition stated above, therefore, I am willing and confirm my participation by signing the consent.

Name of the participant _____ Agreed to participate in the study:

Yes _____No_____ (mark one of them for verbal consent)

Signature _____ (if written consent)

Signature of data collector _____ Date_____

11.3 Annex 3: English version questionnaire

Addis Ababa University, College of Health Science, School of Public Health

Title- Assessment of occupational injuries and associated factors among cement factory workers in Oromia region, Ethiopia.

Name of the factory _____

Questionnaire identification number_____

Name of the working section_____

Section one: Socio-demographic information.

No	Question	Possible response	code	Skip to
101	sex	1. Male 2. Female		
102	Age	----------in years		
103	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others		
104	Educational level	1. Cannot read and write 2. Adult Education 3. Primary school (1-8) 4. Secondary school (9-12) 5. Graduated from Technical and Vocational school 6. Diploma 7. First degree 8. Second-degree and above		
105	Marital status:	1. Married 2. Single 3. Divorced 4. Widowed 5. Separated		
106	Employment status	1. Permanent 2. Temporary		
107	Job category	clinker Cement production		

		Raw material Engineering Laboratory Other_____		
108	Service years	_____		
109	Monthly salary in birr			

Section Two: Occupational Injury Characteristics

No	Question	Possible response	code	Skip to
201	Have you had an incident at your job that resulted in an injury to you in the last two weeks?	1. Yes 2.No		
202	If yes to Q201 how many times?	1. Once 2. More than once		
203	Have you had an incident at your job that resulted in an injury to you in the last 12 months?	1. Yes 2.No		If no, Skip to Q 301
204	If yes to Q203, how many times?	1. Once 2. More than once		
205	Part of the body affected			
	1. Eye	1. Yes 2.No		
	2. Tooth	1. Yes 2.No		
	3. Hand	1. Yes 2.No		
	4. Ear	1. Yes 2.No		
	5. Knee	1. Yes 2.No		
	6. Toe	1. Yes 2.No		
	7. Finger	1. Yes 2.No		
	8. Head	1. Yes 2.No		
	9. Upper Arm	1. Yes 2.No		
	10. Lower Arm	1. Yes 2.No		
	11. Hip	1. Yes 2.No		
	12. Upper Leg	1. Yes 2.No		
	13. Lower Leg	1. Yes 2.No		
	14. Back	1. Yes 2.No		
	15. Chest	1. Yes 2.No		
	16. Multi-Location	1. Yes 2.No		
	17. Other Specify	_____		
206	Type of injury			
	1. Abrasion	1. Yes 2.No		
	2. Cut	1. Yes 2.No		
	3. Burn	1. Yes 2.No		
	4. Puncture	1. Yes 2.No		
	5. Fracture	1. Yes 2.No		

	6. Dislocation	1. Yes 2.No		
	7. Suffocation	1. Yes 2.No		
	8. Electrocutions	1. Yes 2.No		
	9. Amputation	1. Yes 2.No		
	10. Poisoning	1. Yes 2.No		
	11. Other, specify	_____		
207	What were you doing at the time of injury?			
	Causes of injury			
	1. Machinery	1. Yes 2.No		
	2. Hit by Falling objects	1. Yes 2.No		
	3. Hit	1. Yes 2.No		
	4. Electricity	1. Yes 2.No		
	5. Splintering objects	1. Yes 2.No		
	6. Hand tools	1. Yes 2.No		
	7. Fire	1. Yes 2.No		
	8. Hot substances	1. Yes 2.No		
	9. Falls	1. Yes 2.No		
	10. Collision with objects	1. Yes 2.No		
	11. Lifting heavy objects	1. Yes 2.No		
	12. Other, specify	_____		
209	Reason for Injury	Being new to the working process Thinking about private affairs Those who think the accident is beyond their control This thinking was a working behavior Improper hand-working instrument Absence/inadequate machine safeguard Absence of Safety Education Due to not using PPE Chat online at work		
210	Day of injury:-			

	1. Monday	1. Yes 2.No		
	2. Tuesday	1. Yes 2.No		
	3. Wednesday	1. Yes 2.No		
	4. Thursday	1. Yes 2 No		
	5. Friday	1. Yes 2.No		
	6. Saturday	1. Yes 2.No		
	7. Sunday	1. Yes 2.No		
211	Time of injury			
	1. In the morning	1. Yes 2.No		
	2. In the Afternoon	1. Yes 2.No		
	3. In the evening	1. Yes 2.No		
	4. At the midnight	1. Yes 2.No		
212	Were you hospitalized as a result of injury in the last 12month	_____		
213	If Yes Q. 212, for how long	1. less than 24hrs 2. more than 24hrs		
214	If Yes Q. 212 where was the place			
215	cost			
216	Number of days lost due to injury at work the last one year(in days)	_____		

Section three: Work Environmental Information

No	Question	Possible response	Code	Remark
301	Hours worked per week	1. Less than 8 hours 2.8 hours 3. Greater than 8 hours		
302	Is there regular health and safety supervision	1. Yes 0. No		
303	Have you had any shift rotations in your work	1. Yes 0. No		
304	Have you had occupational safety training/ education?	1. Yes 0. No		
305	Is there Excessive heat	1. Yes		

		0. No		
306	Do you have any information regarding occupational health and safety from any source	1. Yes 0. No		
307	Is there enough light in your workplace	1. Yes 0. No		

Section four: Information on workers' behavior

No	Question	Possible response	code	Skip to
401	Do you drink alcohol?	1. Yes 2. No		
402	If yes to 401, how often?	1. Every day 2. 1-3 days/week 3. Occasionally		
403	Do you smoke a cigarette	1. Yes 2. No		
404	If yes to 403, how often?	1. Every day 2. 1-3 days/week 3. Occasionally		
405	Do you chew chat?	1. Yes 0.No		
406	If yes to Q405, how often?	1. Every day 2. 1-3 days/week 3. Occasionally		
407	Do you have any sleeping disorders	1. Yes 2. No		
408	If yes for Q 407 what reason for the sleeping disorder	Working greater than 8 h Working at night Working in greater than one area Don't use PPE		
409	Are you satisfied with the job or task required to do	1. Yes 2.No		
410	Do you use any personal protective Equipment?	1. Yes 2.No		If no skip to Q 409
411	If yes to Q410, what type?			
	1. Gloves	1. Yes 2.No		
	2. Earplug	1. Yes 2.No		
	3. Respirators	1. Yes 2.No		
	4. Helmet	1. Yes 2.No		
	5. Overalls	1. Yes 2.No		

	6. Goggles	1. Yes 2.No		
	7. Face shield	1. Yes 2.No		
	8. Boots/safety shoes	1. Yes 2.No		
	9. Others, specify	_____		
412	What are your reasons for not using personal protective	1. Lack of protective equipment 2. Lack of safety and health education. 3. Not comfortable use 4. Decrease work performance 5. Create safety and health hazards 6. Other, specify_____		

Section five: worker's health information

No	**Question**	**Possible response**	**code**	**Skip to**
501	Have you had any of these symptoms during the last two weeks?			
	a. Eye irritation			
	b. Skin allergies or rashes			
	c. General weakness or fatigue			
	d. Cough that produces thick sputum or blood			
	e. Cough lasting longer than 3 weeks			
	f. Others /specify			
502	Did you visit a health facility?			
503	If Q502 is yes where was the place?			

Section Six: Ergonomics Information and Work-related Factors

No	Question		possible	code	Skip to
601	pulling		1. Yes 2.No		
602	pushing		1. Yes 2.No		
607	Heavy lifting		1. Yes 2.No		
608	Vibration	Hand-arm vibration	1. Yes 2.No		
		Whole-body vibration	1. Yes 2.No		
609	carrying		1. Yes 2.No		
			1. Yes 2.No		

11.4 Annex: 4 English Observation Checklists

1. Are all workers' areas adequately illuminated?

1. Yes 2.No

A yes is required if there is no difficulty in reading a paper with a pencil.

2. Is the work area's ventilation system appropriate for the work being performed?

1. Yes 2.No

A yes is required if there is good ventilation.

3. Are there warning signs or safety rules?

1. Yes 2.No

A yes requires no lack of such arrangement at inspection around

4. Do the employees use the necessary personal protective equipment?

1. Yes 2.No

A yes requires no lack in the use of safety devices seen at inspection.

5. Does the industry have health and safety personnel?

1. Yes 2.No

Health and safety personnel are actively engaged in control and monitoring activities, substantiated by oral or written evidence.

6. Is there adequate supervision to ensure that employees are following safe machine operating procedures?

1. Yes 2.No

7. Are training needs considered in connection with new employment, equipment, or other changes?

1. Yes 2.No

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

8. Does the industry have first aid equipment?

1. Yes 2.No

A yes requires that first-aid equipment be available in the production area and that content be as prescribed.

9. When lunches are eaten on the premises, are they eaten in areas where there is no exposure to toxic material or other health hazards?

1. Yes 2. No

10. Are hazardous substances identified which may cause harm by inhalation, ingestion, skin absorption, or contact?

1. Yes 2. No

11.5 Annex: 5 Amharic participant's information sheet

አባሪ፡- የፈቃድ ቅጽ

የፕሮጀክቱ ጥናት ርዕስ፡-በኦሮሚያ ክልል በ 2015 ዓ.ም በሲሚንቶ ፋብሪካ ሠራተኞች መካከል ያለው የሥራ ጉዳት እና ተያያዥ ምክንያቶች ለማጥናት የተዘጋጀ ነው።

ጥናቱን የሚያካሂደው ተማሪ፡፡-ደረጀ ግዛው

የድርጅት ስም፡ -አዲስ አበባ ዩኒቨርሲቲ የህዝብ ጤና ትምህርት ቤት

መግቢያ፡-እንደምን አደሩ/አረፈዱ_____ነኝ።በአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና ት/ቤ የህብረተሰብ ጤና ቡዴን አባል ሆኜ ነው፡፡በአጠቃላይ፣ማህበራዊ ስነ-ሕዝብራ አካባቢ የስራባህሪን እና ኢርጎኖሚክስ ጥቂት መጠይቆች አሉኝ።እንደ እድል ሆኖ እርስዎ በአጋጣሚ ከምናገኛቸው ተሳታፊዎች መካከል አንዱ ነዎት።

የጥናቱ ዓላማ፡-የዚህ ጥናት ዓላማ በኦሮሚያ ክልል ውስጥ በሲሚንቶ ፋብሪካ ሠራተኞች መካከል ያለውን የሥራ ጉዳት እና ተያያዥ ጉዳዮችን ማጥናት ነው።ይህ ጥናት ስራ ለድህረ-ምረቃ ትምህርት ማሚያነት ለመጠቀም ነው።

የአሰራር ሂደት፡- የጥናቱ ዘዴ ተቋማዊ መሰረት ያደረገ ጥናት ነው። ተሳታፊው ከጠያቂው ጋር ያለው ግንኙነት የሚጠበቀው ጊዜ ከሰላሳ ደቂቃ ያልበለጠ ይሆናል።በዚህ ጥናት ውስጥ እንዲሳተፉ ተጠይቀዋል ምክንያቱ ጥናቱ ውጤታማ ሊሆን የሚችለው እርስዎ በሚሰጡት ትክክለኛ መልስ በመሆኑ ጥያቄዎቹን በጥንቃቄ እንዲመልሱልኝ ፍቃደኛነትዎን በትህትና እጠይቃለሁ፡፡

ሚስጥራዊነት፡ ከእርስዎ የምናገኛቸውን ማንኛውንም መልሶች በሚስጥር እንጠብቃለን። ከዚህ ጥናት ጋር በተያያዘ በማናቸውም ቦታና ጊዜ ስምዎ እንዳይፃፍና እንደማይጠቀስ ልንገልጽለዎ እነወዳለን።

ጥቅም፡ ይህ ጥናት የአጭር ጊዜ የገንዘብ፣ የጤና እንክብካቤ እና የአቅም ግንባታ ጥቅማ ጥቅሞች ለተሳታፊዎች የሉትም። ነገር ግን በሂደት የጥናቱ ውጤት ለሚመለከተው አካልና ፖሊሲ አውጪዎች ለፖሊሲ ግብአትነት፣ አቅጣጫ እና ስትራቴጂ ቀረፃ ይረዳል።

ጉዳት፡ ሊካሄድ የታሰበው ጥናት በተሳታፊዎች ላይ ኢሰብአዊ የሆነ አቀራረብ፣ አካላዊ ጉዳት፣ ማህበራዊ አድሎ፣ ስነልቦናዊ ጉዳትና የኢኮኖሚ ድቀትን አያስከትልም።

ጉቦ፣ ማበረታቻ እና ካሣ፡ ይህ ጥናት ምንም አይነት ማበረታቻና ካሣ የለውም። በተጨማሪም ምንም አይነት ካሣ የሚያስከፍል ጉዳት አያመጣም።

የውጤት ስርጭት፡ አጥኚው የጥናቱን ውጤት ሙሉ በሙሉ ለሲሚንቶ ፋብሪካ አስተዳደሮች እና ፖሊሲ አውጪዎች የመስጠት ኃላፊነት አለበት። በተጨማሪም ታማኝ የሆኑ ሳይንሳዊ ጆርናሎች ላይ ለማሳተም ከፍተኛ ጥረት ያደርጋል።

የማቋረጥ ነፃነት፡ በጥናቱ ለመሳተፍ ፍቃደኛ ሆነው ከጀመሩ በኋላ በማናቸውም ሰዓት ጥናቱን ሊያቋርጡ ይችላሉ። ለዚህም

ማንም ሰው ያቋረጡበትን ምክንያት እንዲያብራሩ ሊያስገድድዎ አይችለም።

መገናኘት የሚችሉት ሰው አድራሻ፡ የጥናቱ ተሳታፊ ስለጥናቱ ሁኔታ እና ይዘት ግልጽ ካልሆነለት በማናቸውም ሰዓት መረጃ የመጠየቅ መብት አለው። ዋና አጥኚዋን እና አማካሪዎችን ማግኘት ይችላሉ። ለበለጠ መረጃ እና ስለፕሮጀክቱ ማረጋገጥ የሚፈልጉት ነገር ካለ በሚከተለው አድራሻ መጠቀም ይችላሉ።

የሚገናኘው ሰው፡ ዋና አጥኚ፡

ደረጀ ግዛው ሞባይል ስልክ 0960270201

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አማካሪዎች

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11.6 Annex: 6 Amharic Informed Consent Form

በመረጃ የተደገፈ የስምምነት ቅጽ

ይህን ቅጽ አንብቤአለሁ፣ወይም ከላይ የተገለፀውን ሁኔታ ለመረዳት በምችለው ቋንቋ ተነቦልኛል ፣ስለሆነም፣ፈቃደኛ ነኝ እና ፈቃዱን በመፈረም ተሳትፎዬን አረጋግጣለሁ።

የተሳታፊው ስም _____

በጥናቱ ለመሳተፍ ተስማምተዋል፡-

አዎ ____ አይ_____ (ከመካከላቸው አንዱን ሊቃል ፈቃድ ምልክት አድርግበት)

ፊርማ _____ (የጽሑፍ ፈቃድ ከሆነ)

ቀን_____

11.7 Annex: 7 Amharic Inversion question

ክፍል ፡ማህበራዊ ና ስነ-ህዝባዊ ገፅታዎችን የተመለከቱ ጥያቄዎች

የፋብሪካው ስም _____

መጠይቅ መለያ ቁጥር _____

የሥራው ክፍል ስም _____

ተ.ቁ	ጥያቄ	የመልስ አማራጮዎች	መለያ	ተ.ቁ
101	ፆታ	1. ወንድ 2. ሴት		
102	እድሜ	_____		
103	ሀይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3.ፕሮቴስታንት 4. ካቶሊክ 5. ሌላ፡ይጠቀስ		
104	የትምህርትደረጃ	1. መፃፍ እና ማንበብ የማይችል/የማትችል 2. መፃፍና ማንበብ የሚችል/የምትችል 3.የመጀመሪያ ደረጃት/ት(1-8) ያጠናቀቀ/ች 4. ሁለተኛ ደረጃት/ት(9-12) ያጠናቀቀ/ች 5. ከቴክኒክ ና ሙያ ትምህርት ቤት የተመረቀ/ች 6. ዲፕሎማ 7. የመጀመርያ ዲግሪ 8. ሁለተኛ ዲግሪ እና ከዚያ በላይ		

105	የጋብቻ ሁኔታ	1. ያገባ/ች 2. ያላገባ/ች 3. የፈታ/ች 4. የሞተበት/ባት 5. ተለያይተው የሚኖሩ አግብቶ/ታ		
106	የቅጥር ሁኔታ	1.ቋሚ 2.ጊዜያዊ		
107	የሙያው አይነት	----------		
108	በሥራ ቦታዎ ስንት ቀን ወይም ወር ወይም አመት አገለገሉ?	----------		
109	የወር ደመወዝ	----------		

ክፍል ሁለት፡የሥራ ቦታ ጉዳትን በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
201	ባለፉት ሁለት ሳምንታት ውስጥ ከሥራ ጋር በተያያዘ የደረሰብዎት ጉዳት አለ?	1. አዎን 2. የለም		
202	201 አዎን ከሆነ ስንት ጊዜ?	1. አንድ ጊዜ ብቻ 2. ከአንድ ጊዜ በላይ		
203	ባለፉት አስራ ሁለት ወራት ውስጥ ከሥራ ጋር በተያያዘ የደረሰብዎት ጉዳት አለ?	1. አዎ 2. የለም		የለም ካሉ ወደተ.ቁ 301 ይሻገሩ
204	203 አዎን ከሆነ ስንት ጊዜ?	1. አንድ ጊዜ ብቻ 2. ከአንድ ጊዜ በላይ		
205	በጉዳቱ የተጎዳው የሰውነት ክፍል	1. አዎን 2. የለም		
	1. አይን	1. አዎን 2. የለም		
	2. ጥርስ	1. አዎን 2. የለም		
	3. እጅ	1. አዎን 2. የለም		
	4. ጆሮ	1. አዎን 2. የለም		
	5. ጉልበት	1. አዎን 2. የለም		
	6. የእግር ጣት	1. አዎን 2. የለም		
	7. እጅ ጣት	1. አዎን 2. የለም		
	8. ራስ	1. አዎን 2. የለም		
	9. የላይኛው ክንድ	1. አዎን 2. የለም		
	10. የታችኛው ክንድ	1. አዎን 2. የለም		
	11. ጭን	1. አዎን 2. የለም		
	12. ከጉልበት በታች ያለው	1. አዎን 2. የለም		
	13. እግር	1. አዎን 2. የለም		
	14. ጀርባ	1. አዎን 2. የለም		
	15. ደረት	1. አዎን 2. የለም		
	16. በተለያዩ የሰውነት ክፍሎች	1. አዎን 2. የለም		
	17.ሌላ ካለ ይጠቀስ	_____		
206	የጉዳቱ አይነት			

	ı. ጭረት	ı. አዎን	2. የለም		
	2. መቆረጥ	ı. አዎን	2. የለም		
	3. ቃጠሎ	ı. አዎን	2. የለም		
	4. መወጋት	ı. አዎን	2. የለም		
	5. ስብራት	ı. አዎን	2. የለም		
	6. ወለምታ	ı. አዎን	2. የለም		
	7. መታፈን	ı. አዎን	2. የለም		
	8. በኤሌክትሪክ መያዝ	ı. አዎን	2. የለም		
	9. የአካል መጉደል	ı. አዎን	2. የለም		
	ıo. መመረዝ	ı. አዎን	2. የለም		
	ıı. ሌላ ካለ ይጠቀስ	_____			
207	ጉዳቱ በደረሰበት ወቅት ምንሲሰሩ ነበር	_____			
208	የጉዳቱ ምክንያት				
	ı. ማሽኖች	ı. አዎን	2. የለም		
	2. በሚወድቁ እቃዎች	ı. አዎን	2. የለም		
	3. በመመታት	ı. አዎን	2. የለም		
	4. ኤሌክትሪክ	ı. አዎን	2. የለም		
	5. በተፈናጣሪ ነገሮች	ı. አዎን	2. የለም		
	6. የእጅ መሣሪያዎች	ı. አዎን	2. የለም		
	7. እሳት	ı. አዎን	2. የለም		
	8. ትኩስ ነገሮች	ı. አዎን	2. የለም		
	9. መውደቅ	ı. አዎን	2. የለም		
	ıo. ግጭት	ı. አዎን	2. የለም		
	ıı. ከባድ እቃዎችን በማንሳት	ı. አዎን	2. የለም		
	ı2. ሌላ ካለ ይጠቀስ	_____			

209	የጉዳት ምክንያት	1. ለስራ ሂደት አድስ መሆን 2. ስለ ግልጉዳዮች ማሳብ 3. አደጓ ከቁጥጥር ዉጭ እንደሆነ ያስባሉ 4. ሰዎች የሚያስቡት የሥራ በህር ነበር 5. ተገቢ ያልሆነ የእጅ ሥራ መሳሪያ 6. በቂ የሆነ የማሽን መከሊከያ አለመኖር 7. የዯህንነት ና ትምህርት እጥረት 8. PPE አለመጠቀም 9. ስልክ በስራ ላይ ኦላይን መጠቀም 10. ሌላ ይጥቀሱ_____		
210	ጉዳቱ የደረሰበት ቀን			
	1. ሰኞ	1. አዎን 2. የለም		
	2. ማክሰኞ	1. አዎን 2. የለም		
	3. እሮብ	1. አዎን 2. የለም		
	4. ሐሙስ	1. አዎን 2. የለም		
	5. አርብ	1. አዎን 2. የለም		
	6. ቅዳሜ	1. አዎን 2. የለም		
	7. እሁድ	1. አዎን 2. የለም		
211	ጉዳቱ የደረሰበት ሰዓት			
	1. ጧት	1. አዎን 2. የለም		
	2. ከሰዓት	1. አዎን 2. የለም		
	3. ማታ	1. አዎን 2. የለም		
	4. ለሊት	1. አዎን 2. የለም		
212	በደረሰብዎት ጉዳት ምክንያት በጤና ተቋም ተኝተው ያውቃሉ?	1. አዎን 2. የለም		
213	212 አዎን ከሆነ ለስንት ሰዓት	1. 24 ሰዓት ና ከዚያ በታች 2. ከ 24 ሰዓት በላይ		
214	212 አዎን ከሆነ የትነበር የተኙት			
215	ለህክምና ያወጡት ወጪ ምያህል ነበር?			
216	ከሥራ ጋር በተያያዘ ጉዳቶች ምክንያት ባለፉት አስራ ሁለት ወራት			

ክፍል ሦስት፡የስራ ቦታን በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
301	በሳምንት ምን ያህል ሰዓት ይሰራሉ?	ከ 48 በተች 48 ሰዓት ከ48 ሰዓት በላይ		
302	የሥራ ቦታ ደህንነትን በተመለከተ ቁጥጥር ይደረጋል?	1. አዎን 2. የለም		
303	በስራዎ ውስጥ ምንም አይነት የፈረቃ ሽክርክሪቶች ነበሩዎት	1. አዎን 2. የለም		
304	ምን አይነት የሙያ ደህንነት ስልጠና/ ትምህርት ወስደዋል?	1. አዎን 2. የለም		
305	ከመጠን በላይ ሙቀት አለ	1. አዎን 2. የለም		
306	ከየትኛውም ምንጭ የስራ ጤና እና ደህንነትን በተመለከተ ምን አይነት መረጃ አልዎት	1. አዎን 2. የለም		
307	በስራ ቦታዎ ላይ በቂ ብርሃን አለ	1. አዎን 2. የለም		

ክፍል አራት፡የሠራተኛውን ባህሪ በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
401	አልኮል መጠጥ ጠጥተው ያውቃሉ?	1. አዎን 2. የለም		
402	የሚጠጡ ከሆነ ስንት ጊዜ ?	1. በየቀኑ 2. ከ 1-3 ቀን በሳምንት 3. አልፎ አልፎ		
403	ሲጋራ ያጨሳለሉ?	1. አዎን 2. የለም		
404	403 መሌስዎ አዎ ከሆነ ምንያህል ጊዜ ያጨሳሉ?	1. በየቀኑ 2. ከ 1-3 ቀንበሳምንት 3. አልፎአልፎ		
405	ጫት ቅመው ያውቃሉ?	1. አዎን 2. የለም		
406	405 መሌስዎ አዎ ከሆነ የሚቅሙ ከሆነ ስንት ጊዜ?	1. በየቀኑ 2. ከ 1-3 ቀን በሣምንት 3. አልፎአልፎ		
407	የእንቅልፍ ችግር አለብዎት ?	1. አዎን 2. የለም		
408	407 መሌስዎ አዎ ከሆነ መንስኤው ምንዴ ነው ይላሉ	1. ከ 8 ሰአታት በላይ በመስራት ላይ 2. በሌሊት መሥራት 3. ከአንድ አካባቢ በላይ በመስራት ላይ 4. PPE አለ መጠቀም 5. ሌላ----------		
409	በሚሰሩት ስራ ደስተኛ ነዎት	1. አዎን 2. የለም		
410	በስራ ቦታዎ የጉዳት መከላከያ መሣሪያዎችን ተጠቅመው ያውቃሉ ?	1. አዎን 2. የለም		የለም ካሉ ወደተ.ቁ 412 ይሻገሩ
411	የሚጠቀሙ ከሆነ ምን አይነት ?			
	1. ጓንት	1. አዎን 2. የለም		
	2. የጆሮ መከላከያ	1. አዎን 2. የለም		
	3. የአፍንጫ ና አፍ መከላከያ	1. አዎን 2. የለም		
	4. የጭንቅላት መከላከያ			
	5. የሥራ ልብስ	1. አዎን 2. የለም		
	6. የብየዳ መነጽር /የሴፍቲ መነጽር	1. አዎን 2. የለም		
	7. የፊት መከላከያ	1. አዎን 2. የለም		
	8. ቦቲ ጫማ/የሴፍቲ ጫማ	1. አዎን 2. የለም		
	9. ሌላ ካለ ይጠቀስ	----------		

412	የማይጠቀሙ ከሆነ ምክንያትዎ ምንድን ነው ?	1. የመከላከያ መሣሪያዎች ባለመኖራቸው 2. የደህንነትና ጤንነት ትምህርት ስለ ማይሰጥ 3. ለአጠቃቀም ምቹ ስላልሆነ 4. የስራ አፈፃፀምን ስለሚቀንስ 5. የደህንነት ና የጤና ጠንቅ ሊያስከትል ስለሚችል 6. ሌላ ካለ ይጠቀስ----------		

ክፍል አምስት የሰራተኞች ጤንነትን በተመለከተ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	መለያ	ዝለል
501	ባለፉት 15 ቀናት ውስጥ ከሚከተሉት የጤና ችግሮች የትኛውአ ጋጥሞታል?			
	የዓይን ማቃጠል	1. አዎን 2. የለም		
	የቆዳ ማሳከክ ወይም አለርጂ	1. አዎን 2. የለም		
	ቶሎ ቶሎ የመድከም ስሜት	1. አዎን 2. የለም		
	አክታ እና ደም የተቀላቀለበት ሳል	1. አዎን 2. የለም		
	ከሶስት ሳምንታት በላይ የቆየ ሳል	1. አዎን 2. የለም		
	ሌላ ካለ ይጠቀስ	_____		
502	በደረሰብዎት ችግር ምክንያት ወደህክምና ተቋም ሄደው ነበር	1. አዎን 2. የለም		
503	ቁ502 አዎን ከሆነ የት ነበር የሄዱት?			

ክፍል ስድስት: Ergonomics and work-related factors

ተ.ቁ	ጥያቄ		ይቻላል	ኮድ	ዝለል
601	መጎተት		1. አዎ 2.አይ		
602	መግፋት		1. አዎ 2.አይ		
607	ከባድማንሳት		1. አዎ 2.አይ		
608	ንዝረት	የእጅ-ከንድንዝረት	1. አዎ 2.አይ		
		የሙሉ ሰውነት ንዝረት	1. አዎ 2.አይ		
609	መሸከም		1. አዎ 2.አይ		

11.8 Annex: 8 Amharic Observational checklists

1. ሁሉም የሰራተኞች አካባቢዎች በቂ ብርሃን አላቸው?

1. አዎ 2. አይ

አንድ ወረቀት በእርሳስ ለማንበብ አስቸጋሪ ካልሆነ አዎ ይሞላል ።

2. የሥራው አካባቢ የአየርማ ናፈሻ ዘዴ ለሚሠራው ሥራ ተስማሚ ነው?

1. አዎ 2. አይ

ጥሩ የአየር ዝውውር ካለ አዎ ይሞላል።

3. የማስጠንቀቂያ ምልክቶች ወይም የደህንነት ደንቦች አሉ?

1. አዎ 2. አይ

አዎ በጥናት ጊዜ እንደዚህ ያለ ዝግጅት እጥረት አያስፈልገውም

4. ሰራተኞቹ አስፈላጊውን የግል መከላከያ መሳሪያዎችን ይጠቀማሉ?

1. አዎ 2. አይ

አዎ በጥናቱ ጊዜ የደህንነት መሳሪያ እጥረት ከሌለ።

5. ኢንዱስትሪው የጤና እና የደህንነት ሰራተኞች አሉት?

1. አዎ 2. አይ

የጤና እና የደህንነት ሰራተኞች በቃል ወይም በጽሁፍ ማስረጃዎች የተረጋገጡ እንቅስቃሴዎችን በመቆጣጠር እና በመከታተል ላይ በንቃት ተሰማርተዋል።

6. ሰራተኞች ደህንነቱ የተጠበቀ የማሽን አሰራር ሂደቶችን መከተላቸውን ለማረጋገጥ ቂጥጥር አለ?

1. አዎ 2. አይ

7. የሥልጠና ፍላጎቶች ከአዳዲስ ሰራተኞች፣መሳሪያዎች ወይም ሌሎች ለውጦች ጋር በተያያዘ ግምት ውስጥ ይገባሉ?

1. አዎ 2. አይ

አዎ በለውጥ ምክንያት የሚሰጠውን የሥልጠና ምሳሌ ይጠይቃል።

8. ኢንዱስትሪው የመጀመሪያ እርዳታ መሣሪያዎች አሉት?

1. አዎ 2. አይ

አዎ የመጀመሪያ እርዳታ መሳሪያዎች በምርት ቦታው ላይ እንዲገኙ እና ይዘቱ በታዘዘው መሰረት እንዲሆን ይፈልጋል።

9. ምሳ በግቢው ውስጥ ሲበሉ የሚበሉት ለመርዝ መርዛማ ነገሮች ወይም ሌሎች የጤና ጠንቅ ባለላቸው ቦታዎች ነው?

1. አዎ 2. አይ

10. በመተንፈስ፣በመዋጥ፣በቆዳ በመምጠጥ ወይም በመነካካት ጉዳት ሊያስከትሉ የሚችሉ አደገኛ ንጥረ ነገሮች ተለይተዋል?

1. አዎ 2. አይ

11.9 Annex: 9 Afan Oromo Participant's Information sheet

Odeeffannoo Hirmaataa

Mata duree projekti qorannichaa: - Madaallii miidhaan hojii fi wantoota isa waliin walqabatan hojjettoota warshaa simintoo naannoo oromiyaa, Itiyoophitaati Bara 2015 A.L.I

Maqaa qorataa ijoo: - Dereje Gizaw

Maqaa jaarmiyaa: - University Addis Ababa Mana Barumsaa Fayyaa Hawaasaa

Seensaa: - Nagaa akkam bultan/ooltan _____ dha. University Addis Ababaa Mana Barrumsa Fayyaa Hawaasaa keessatti barataa mastersii fayyaa hawaasaa yoon ta;u qorannnoo kan gaggeessuf kanan dhufee dha. Gaaffiiwwan muraasa waliigalaatti Hawaas-dimoogiraafii, Naannoo hojii, Amala hojii fi Irgonomiksii ilaalatan of qaba. Akka carraa ta'ee hirmaattoota gaafatamuu danda'an keessaa isa tokko ta'uun filatamtani jirtu.

Kaayyoon piroojektii qorannichaa: - Kaayyoon qorannoo kanaa Madaallii Miidhaa hojii fi wantoota isa waliin walqabatan hojjettoota warshaa simintoo naannoo oromiyaa biratti madaaluudha. Hojiin qorannoo kuni barruu qorannoo guutinsa gartokkee Fayyaa Hawaasaa digrii lammaffaa (postgraduate master of Public Health thesis) kan oolu dha.

Adeemsa: - Malli qorannichaa dhaabbata irratti hundaa'ee qorannoo qaxxaamuraa (cross sectional study) dha. Yeroon hirmaataan nama gaaffii fi deebii gageessu waliin qabu irraa eegamu daqiiqaa soddoma hin caalu. Odeeffannoon amanamaa ta'e kan isin nuuf kennitu hubannoo dhimma yaadameef barbaachisaa waan ta'eef qorannoo kana irratti akka hirmaattan isin gaafanna. Kana malees, hirmaannaan addaa kee adeemsa tooftaa saamuda carraaquu kan carraa filannoo walqixa ta'e kennu ta'us, furmaata saamudaatiin mirkanaa'a. Waa'ee Hawaas-dimoogiraafii, Naannoo hojii, Amala bakka hojiiti fi Ergonomiksiin walqabatan waan isin gaafannu ta'a.

Balaa /mijachuu dhabuu: - Qorannoon yaadame kun hirmaattota qorannoo irratti ilaalcha namummaa hin qabnee fi miidhaa qaamaa, loogii hawaasummaa, miidhaa sammuu fi kasaaraa dinagdee kamiyyuu hin qabu.

Faayidaa: - Qorannichi akka dhuunfaattis ta'e gareetti hirmaataaf faayidaa maallaqaa, eegumsa fayyaa fi ijaarsa dandeettii yeroo gabaabaa Kan hin qabne ta'us yeroo dheeraa keessatti garuu jaarmiyaa dhimmi ilaalatuu fi qaamoleen imaammata baasan ilaalcha imaammataa fi kallattii akka qabaataniifi yaada fi argannoo irratti hundaa'uun tarsiimoo fi dizaayinii sagantaalee fayyaa hojii bocuu. Kana malees hojiin qorannoo akka daataa bu'uuraa dirree irratti ni gargaara.

Onnachiiftuu/kaffaltii hirmaannaa: - Qorannoon kun hirmaattotaaf onnachiiftuu /kaffaltii tokkollee hin kennu.

Iccitii: - Iccitii daataa qorannoo eegumsa nageenya qabu hundeessuuf qorataan ijoo yeroo odeeffannoo walitti qabuu maqaa fayyadamuu dhiisee koodii ni fayyadama. Daataan jalqabaa hanga xiinxalli daataa gaggeeffamutti kaabinoota keessatti kan cufamu yoo ta'u, qorataa ijoo fi gorsaa kaayyoo daataa sakatta'uu fi qulqulleessuuf malee namni kamiyyuu argachuu hin danda'u. Odeeffannoo hirmaattonni hayyama kennaniin alatti kaayyoo biraatiif itti fayyadamuun hirmaattotaaf naamusa kan hin qabnedha. Odeeffannoon ati kennitu akkaataa inni amala dhuunfaa fi iccitii kee adda baasee hin ibsamu. Ittisa Qorannoo fi hojiin dhumaa inistiitiyuutii komishinii fayyaa hawaasaa fi akaadaamii fi seeneetii yunivarsiitiin erga mirkanaa'ee booda gaaffiin daataa jalqabaa haala nageenya qabuun ni gubama.

Mirga diduu ykn ofirraa baasuu: - Hirmaataan kamiyyuu qorannoo kana irratti fedhii isaatiin ni hirmaata. Yeroo kamiyyuu gaaffilee deebisuuf fedhii hin qabneef deebii kennuu dhiisuu danda'u ykn inni/isheen yoo deebii illee dhaaban maaliif akka dhaaban akka ibsaniif hin dirqisiifaman.

Nama qunnamuu qaban: - Qorataa muummee

Dereje Gizaw Bilbila harkaa 0960270201

Imeelii: derejegizaw6@gmail.com irratti ergaa

Gorsitoota:-1) Prof. Abarraa Kumee bilbila harkaa 0911882912

Imeelii: aberakumie2@yahoo.com

2) Dr. Tafarrii Abegaaz bilbila harkaa 0911361607

Imeelii: teferiabegaz@gmail.com

11.10 Annex: 10 Afan Oromo Informed Consent Form

Unka hayyama odeeffannoo qabu

Unka kana dubbiseera, ykn afaan haal-duree armaan olitti ibsame hubachuu danda'uun naaf dubbifameera, kanaaf, hayyama mallatteessuudhaan hirmaannaa koo fedhii qaba, mirkaneessas.

Maqaa hirmaataa _____

Qorannicha irratti hirmaachuuf waliigaltee irra gahe:

Eeyyee _____Lakki_____ (filannoo tokkoratti mallatteessi).

Mallattoo _____ Guyyaa_____ .

11.11 Annex: 11 Afan Oromo Inversion Question

Gaffilee afaan oromoo

Yuunivarsiitii Addis Ababa, Kolleejjii Saayinsii Fayyaa, Mana Barumsaa Fayyaa hawaasaa

Mata duree: - Qo'annoo miidhaan hojii irratti gahu fi wantoota kanaan walqabatan hojjettoota warshaa simintoo naannoo oromiyaatti Bara , 2015 A.L.I

Kutaa tokkoffaa: Odeeffannoo hawaas-dimoogiraafii.

Maqaa warshaa _____

Lakkoofsa eenyummaa gaaffilee_____

Maqaa kutaa hojii_____

lakk	Gaaffii	Deebii ta'uu danda'u	koodii	Gar darbii
101	Saalaa	1. Dhiira 2. Dubartii		
102	Umrii	----------waggoodhan		
103	Amantaa	1. Ortodoksii 2. Muslima 3. Pirootestaantii 4. Kaatolikii 5. Kanneen biroo		
104	Sadarkaa barnootaa	1. Dubbisuu fi barreessuu kan hin dandeenye 2. Dibbisuu fi barreesuu danda'uu 3. Mana barumsaa sadarkaa tokkoffaa (1-8) 4. Mana barumsaa sadarkaa 2ffaa (9-12) 5. Mana barumsaTeeknikaa ogummaa irraa eebifame 6. Dippiloomaa 7. Digirii tokkoffaa 8. Digirii lammaffaa fi isaa ol		
105	Haala gaa'elaa:	1. Fuudhaa fi heeruma 2. Tokkicha 3. Hiikkaan 4. Dubartoota abbaan manaa irraa du'e 5. Addaan bahuu		
106	Akkaataa qaxarrii	1. Dhaabbataa 2. Yeroodhaaf		

107	Ramaddii hojii	clinker Omisha simintoo Daakuu Injinariingii Kan biro_____		
108	Bara tajaajilaa			
109	Mindaa ji'aa billion			

Kutaa Lama: amala miidhaan hojii

lakk	Gaaffii	Deebii ta'uu danda,u	koodii	Gara
201	Torbee lamaan darban keessatti taatee hojii kee irrattii miidhaan sirra gahe mudate jiraa?	1. Eeyyee 2. Lakk		
202	Yoo eeyyee ta'e Q201 yeroo meeqa?	1. Yeroo tokko 2. Yeroo tokkoo ol		
203	Hojii irratti taatee miidhaan sirra gahe si mudatee jiraa dhuma ji'a 12 kana keessa.	1. Eeyyee 2. Lakkii		Yoo lakki ta'e, Darbi gara Q 301tti
204	Kutaa qaamaa dhibee kanaan qabame	1. Yeroo tokko 2. Yeroo tokkoo ol		
205	Kutaa qaamaa dhibee kanaan qabame			
	1. Ija	1.Eeyyee 2.Lakki		
	2. Ilkaan	1.Eeyyee 2.Lakki		
	3. Harka	1.Eeyyee 2.Lakki		
	4. Gurra	1.Eeyyee 2.Lakki		
	5. Jilba	1.Eeyyee 2.Lakki		
	6. Quba miila	1.Eeyyee 2.Lakki		
	7. Quba Harkaa	1.Eeyyee 2.Lakki		
	8. Mataa	1.Eeyyee 2.Lakki		
	9. Harka Gubbaa	1.Eeyyee 2.Lakki		
	10. Harka gadii	1.Eeyyee 2.Lakki		
	11 .Dugda	1.Eeyyee 2.Lakki		
	12. Miila Gubbaa	1.Eeyyee 2.Lakki		
	13. Miila Gadii	1.Eeyyee 2.Lakki		
	14. Duuba	1.Eeyyee 2.Lakki		
	15. Laphee	1.Eeyyee 2.Lakki		
	16. Bakka Hedduu	1.Eeyyee 2.Lakki		
	17. Kanneen biroo ibsu	_____		
206	Gosa miidhamuu			

	1. Abraashinii	1.Eeyyee 2.Lakki		
	2. Muruu	1.Eeyyee 2.Lakki		
	3. Gubuu	1.Eeyyee 2.Lakki		
	4. Boca baasuu	1.Eeyyee 2.Lakki		
	5. Caccabuu	1.Eeyyee 2.Lakki		
	6. Buqqa'uu	1.Eeyyee 2.Lakki		
	7. Ukkaamfamuu	1.Eeyyee 2.Lakki		
	8. Elektiroodhaan qabamuu	1.Eeyyee 2.Lakki		
	9. yaalumsan qaama murame	1.Eeyyee 2.Lakki		
	10. Summii	1.Eeyyee 2.Lakki		
	11. Kan biroo, ibsi	_____		
207	Yeroo miidhaan irra gahe maal hojjechaa turte	_____		
208	Sababoota miidhamuu			
	1. Maashinoota	1.Eeyyee 2.Lakki		
	2. Wantoota Kufaniitiin rukutamuu	1.Eeyyee 2.Lakki		
	3. Rukutuu	1.Eeyyee 2.Lakki		
	4. Humna ibsaa	1.Eeyyee 2.Lakki		
	5. Wantoota addaan cicciruu	1.Eeyyee 2.Lakki		
	6. Meeshaalee harkaa	1.Eeyyee 2.Lakki		
	7. Ibidda	1.Eeyyee 2.Lakki		
	8. Wantoota ho'aa	1.Eeyyee 2.Lakki		
	9. Kufaatii	1.Eeyyee 2.Lakki		
	10. Wantoota waliin walitti bu'uu	1.Eeyyee 2.Lakki		
	11. Wantoota ulfaatoo kaasuun	1.Eeyyee 2.Lakki		
	12. Kan biroo, ibsi	_____		
209	Sababa Miidhaa	Adeemsa hojiif haaraa ta'uu Dhimma dhuunfaa yaaduu Warri sun balaan to'annaa ala jedhanii yaadu Warri yaadan amala hojii ture Meeshaa harkaan hojjetu sirrii hin taane Eegumsi maashinii dhabamuu/gahaa ta'uu dhabuu Barnoota nagummaa dhabuu Sababa PPE fayyadamuu dhabuu irraa kan ka'e Hojii irratti toora interneetii irratti chat godhaa Kan biroo, ibsi		

210	Guyyaa miidhamuu:-			
	1.Wiixata	1.Eeyyee 2.Lakki		
	2.Kibxata	1.Eeyyee 2.Lakki		
	3.Roobii	1.Eeyyee 2.Lakki		
	4.Kamisa	1.Eeyyee 2.Lakki		
	5.Jimaata	1.Eeyyee 2.Lakki		
	6.Sanbata	1.Eeyyee 2.Lakki		
	7.Wiixata	1.Eeyyee 2.Lakki		
211	Yeroo miidhamuu			
	1.Ganama	1.Eeyyee 2.Lakki		
	2.Waaree booda	1.Eeyyee 2.Lakki		
	3.Galgala	1.Eeyyee 2.Lakki		
	4. Halkan walakkaa	1.Eeyyee 2.Lakki		
212	Sababa miidhaan ji'a 12 darban keessatti hospitaala galtee turtee?	1. Eeyyee 2. Lakki		
213	Yoo Eeyyee G. 212, yeroo hammamiif	1. sa'atii 24 gadi 2. sa'atii 24 ol		
214	Yoo Eeyyee G. 212 bakki sun eessa ture			
215	baasii			
216	Ji'oota 12 darban keessatti Baay'ina guyyoota sababa miidhaan hojiitti hojii irraa haftan meeqa?			

Kutaa sadaffaa: Odeeffannoo naannoo hojii

Lakk	**Gaaffii**	**Deebii ta'uu danda'u**	**koodii**	**Gara darbi**
301	Torbanitti sa'aatii meeqa hojjetu	Sa'aatii 48 gadi Sa'aatii 48 Sa'aatii 48 ol		
302	To'annoon fayyummaa fi nagummaa yeroo hunda ni jiraa?	1. Eeyyee 0. Lakki		
303	Hojii keessan keessatti dabareedhan hojjetuu	1. Eeyyee 0. Lakki		

304	Leenjii/ barnoota nageenya hojii qabaattaniittuu?	1. Eeyyee 0. Lakki		
305	Ho'i humna ol ta'e ni jiraa	1. Eeyyee 0. Lakki		
306	Fayyummaa fi Nagummaa ilaalchisee odeefannoo ni qabduu madda kamiirayyuu haa ta'u	1. Eeyyee 0. Lakki		
307	Bakka hojii keessan ifti gahaan ni jiraa?	1. Eeyyee 0. Lakki		

Kutaa afur: Odeeffannoo Amala Hojjettootaa

lakk	**Gaaffii**	**Deebii ta'uu danda'u**	**koodii**	**Gara darbi**
401	Alkoolii ni dhugduu?	1. Eeyyee 2. Lakki		
402	Yoo 401f eeyyee ta'e, yeroo meeqa?	1. Guyyaa hunda 2. Guyyaa 1-3/torbanitti 3. Darbee darbee		
403	Sigaaraa ni xuuxaa	1. Eeyyee 2. Lakki		
404	Yoo eeyyee ta'e 403, yeroo meeqa?	1. Guyyaa hunda 2. Guyyaa 1-3/torbanitti 3. Darbee darbee		
405	Caatii ni qamaatu	1. Eeyyee 2. Lakki		
406	Yoo eeyyee ta'e Q405, yeroo meeqa?	1. Guyyaa hunda 2. Guyyaa 1-3/torbanitti 3. Darbee darbee		
407	Rakkoo hirribaa qabdaa	1. Eeyyee 2. Lakki		
408	Yoo eeyyee ta'e G 407 sababni jeequmsa hirribaa maaliif	Sa'atii 8ti ol hojjechuu Halkan hojechuu Iddoo tokko ol hojjechuu Meeshalee ittisa dhuunfaa fayyadamuu dhabuu		
409	Hojii hojjechaa jirtu kanatti quuftee jirtaa?	1.Eeyyee 2.Lakki		
410	Meshaa Eegumsa dhuunfaa ni fayyadamtuu?	1.Eeyyee 2.Lakki		Yoo hin jiru ta'e gara G 412.
411	Yoo eeyyee ta'e Q410, gosa akkamii?			

	1. Guwaantii	1.Eeyyee 2.Lakki		
	2. Gurra cufuu	1.Eeyyee 2.Lakki		
	3. Meeshaalee hafuura baafannaa	1.Eeyyee 2.Lakki		
	4. barneexxaa mataa	1.Eeyyee 2.Lakki		
	5. Walumaagalatti	1.Eeyyee 2.Lakki		
	6. Fullee ijaa	1.Eeyyee 2.Lakki		
	7. Gaachana fuula	1.Eeyyee 2.Lakki		
	8. Bootii/kophee nageenyaa	1.Eeyyee 2.Lakki		
	9. Kanneen biroo, ibsi	_____		
412	Sababoonni ittisa dhuunfaa fayyadamuu dhiisuu keessaniif maali	1. Hanqina meeshaalee ittisaa 2. Barumsa nageenyaa fi fayyaa dhabuu. 3. Itti fayyadamuuf mijataa miti 4. Raawwii hojii hir'isuu 5. Balaa nageenyaa fi fayyaa uumuu		

Kutaa shanaffaa: odeeffannoo fayyaa hojjettootaa

Lakk	Gaaffii	Deebii Ta'uu danda'u	koodii	Gara darbi
501	Torban lamaan darban keessatti mallattoolee kana keessaa tokko si mudateeraa?			
	a. Ija namaa gubuu			
	b. Alarjii gogaa ykn dhangala'aa gogaa			
	c. Dadhabbii waliigalaaa ykn dadhabbiin			
	d. Qufaa kan fincaan furdaa ykn dhiiga maddisiisu			
	e. Qufaa torban 3 ol turuu			
	f. Kaan biraa ibsaa_____			
502	Dhaabbata fayyaa daawwattaniittuu			
503	Yoo Q502 eeyyee bakki sun eessa ture?			

Kutaa jahaffaa: Odeefannoo Ergonoomiksii fi Hariiroo hojiin walqabatan

Lakki	Gaaffii		kan danda'amu	koodii	Gara darbi
601	Harkisuu		1. Eeyyee 2.Lakk		
602	Dhiibuu		1. Eeyyee 2.Lakk		
607	Ulfaatina kaasuun		1. Eeyyee 2.Lakk		
608	Raafamni	Raafamni harkaa	1. Eeyyee 2.Lakk		
		Raafamni qaama guutuu	1. Eeyyee 2.Lakk		
609	baatanii deemuu		1. Eeyyee 2.Lakk		

11.12 Annex: 12 Afan Oromo Observation checklists

Cheeklistii ilaalcha naannoo hojii warshaa Simintoo Naannoo Oromiyaa,Itiyoophiyaa

Maqaa warshaa_____ Maqaa kutaa hojii_____ .

1. Bakki hojii hundi ibsa gahaa qabaa?

1. Eeyyee 2. Lakki.

Waraqaa qalamaan barreeffame dubbisuuf rakkoon yoo hin jiraanne eeyyee jechuun gaafata.

2. Sirni qilleensa naannoo hojii hojii hojjetamaa jiruuf mijataadhaa?

1. Eeyyee 2. Lakki.

Qilleensi gaariin yoo jiraate eeyyee jechuun barbaachisa.

3. Mallattoon akeekkachiisaa ykn seera nageenyaa ni jiraa?

1. Eeyyee 2. Lakki.

Eeyyee jechuun naannoo sakatta'iinsaatti qophiin akkasii dhabuu hin barbaadu.

4. Hojjettoonni meeshaalee ittisa dhuunfaa barbaachisoo ta'an ni fayyadamu?

1. Eeyyee 2. Lakki.

Eeyyee jechuun meeshaalee nageenyaa naannoo sakatta'iinsaatti mul'atan fayyadamuu dhabuu hin barbaadu.

5. Industirichi hojjettoota fayyaa fi nageenyaa qabaa?

1. Eeyyee 2. Lakki.

Eeyyee argachuun yookaan bu'aa kaka'umsa hojjettoota fayyaa fi nageenyaatiin hojiirra oolchuu yookaan sagantaa barreeffamaa tarkaanfii isaan waliin hojjetameef barbaada.

6. Hojjettoonni hojimaata hojii maashinii nageenya qabu hordofaa akka jiran to'annoon gahaan jiraa? 1. Eeyyee 2. Lakki

7. Hojii haaraa, meeshaalee ykn jijjiirama biroo wajjin walqabatee fedhiin leenjii ilaalamaa jiraa?

1. Eeyyee 2. Lakki

Eeyyee jechuun fakkeenya leenjii akka bu'aa jijjiiramaatti kenname barbaada.

8. Industirichi meeshaalee gargaarsa jalqabaa qabaa?

1. Eeyyee 2. Lakki.

Eeyyee jechuun meeshaaleen gargaarsa jalqabaa naannoo oomishaatti akka argamanii fi qabiyyeen akka ajajametti akka ta'u gaafata

9. Nyaanni laaqanaa bakka sanatti yeroo nyaatamu, bakka meeshaaleen summii qaban ykn balaa fayyaa biroof hin saaxilamnetti nyaatama?

1. Eeyyee 2. Lakki

10. Wantoonni balaafamaa afuura baafachuu, liqimsuu, gogaa xuuxuu ykn tuttuqaa miidhaa geessisuu danda'an adda baafamaniiru?

1. Eeyyee 2. Lakki

11:13 Annex: 13 Assurances of Principal Investigators

I, the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the resarch project .I would provide a timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research.I will communicate timely to my advisors all stakeholdrs involving in the study including my source of funding for this research.

Name of the students_____

Date_____

Signiture_____

Approval of primary Advisor

Name of primary advisor_____

Date_____

Signitur_____