

**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**ASSESSMENT OF PREVALENCE OF WORK RELATED INJURIES
AMONG SMALL AND MEDIUM SCALE INDUSTRIAL WORKERS
IN NORTH GONDAR ZONE, AMAHARA REGIONAL STATE**

By

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partial fulfillment of the requirement for the degree in Master in Public Health**

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Declaration

I, the undersigned, declared that this is my work and that all sources of materials used for this thesis have duly acknowledged

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Contents

Acknowledgment	i
Table of contents	ii
List of tables	iii
List of figures	iv
List of annexes	iv
Abbreviations	v
Abstract	vi
Introduction	1
Literature review	3
Objectives	10
Methods and materials	11
Ethical considerations	17
Results	19
Discussion	41
Strengths and limitations of the study	47
Conclusion and recommendations	49
References	51
Annexes	56

List of tables

Table 1. Socio demographic characteristics of the respondents in small and medium scale industries, Gondar woreda, Nov- Dec 2004.	20
Table 2. Distribution of work-related injury in the last 12 months among respondents, Gondar woreda, Nov- Dec 2004.	22
Table 3. Distribution of work related injury by Part of body affected and types in the last 12 months among respondents ,Gondar woreda, Nov- Dec 2004.	24
Table 4. Distribution of work related injuries in the last 12 months by cause among respondents, Gondar woreda, Nov- Dec 2004.	26
Table 5. Distribution of work-related injury by the day of week and time among respondents, Gondar woreda, Nov- Dec 2004.	27
Table 6. Reported workplace and behavioural characteristics of respondents, Gondar Woreda, Nov. - Dec. 2004.	29
Table 7. Occupational health and safety hazards identified in selected industries, Gondar Woreda, Nov. - Dec. 2004.	31
Table 8. Selected socio demographic determinants of work related injuries by type of industry, Gondar woreda, Nov- Dec 2004.	33
Table 9. Selected work environment factors related work-related injuries by type of industry, Gondar woreda, Nov- Dec 2004.	35
Table 10. Behavioural factors related to work-related injuries by type of industry, Gondar woreda, Nov- Dec 2004.	37
Table 11. Summary of the stepwise Logistic regression analysis of the relative effect of socio demographic, work environment and behavioural factors on the prevalence of work related injuries, Gondar Woreda, Nov.-Dec. 2004.	40

List of figures

Figure 1. Determinants of work-related injuries-A Conceptual Framework	9
Figure 2.Schematic presentation of sampling procedure	14

List of Annexes

1. Annex 1. English version questionnaire	56
2. Annex 2. Amharic version questionnaire	62
3. Annex 3.workplace observation checklist	67
4. Map of study area	69

Abbreviations

CSA	Central Statistical Authority
ILO	International Labour organization
MOLSA	Ministry of Labour and Social Affairs
MSI	Medium scale industries
SSI	Small scale industries
WHO	World Health Organization

Abstract

Background: Throughout the world, work related injuries continue to cause serious public health problems and are leading cause of death, disability and disease. In developing countries including Ethiopia, the risk of having work related injury is 10 to 20 times higher than that of developed countries.

Objectives: This study investigated the magnitude and extent of work-related injuries among small and medium scale industrial workers in Gondar Woreda.

Methods: Stratified random sampling technique was employed to identify the industries. A total of 962 workers at production site were interviewed from both industries. Three hundred twenty one from small and 641 from medium scale industries were selected proportionate to population size. Workers from each industry were selected using simple random sampling technique. Trained data collectors administered a standardized questionnaire through face-to-face interview. Physical examination, record review and workplace observation were done to ascertain the self-reported information. Data were analysed by stepwise binary logistic regression model.

Results: The over all annual prevalence rate of work related injury was 335/1000 exposed workers, with 355/1000 and 324/1000 among small and medium sale industrial workers, respectively. Fifty five (17.1%) of the injured respondents were hospitalised, accounting for 40% hospitalisation more than 24 hours. One hundred and three (53.9%) of the injured respondents were absent from work for more than 3 days. There were 2 deaths as result of work related injuries in the last 12 months. The significant contributing factors for work related injuries in both industries were young age(<30 years) [adjusted OR: 1.41, 95 % CI: (1.03-1.93)], job categories, 5 years or less in the present job [OR: 1.53, 95 % CI: (1.12-2.08)] , working 48 hours or less per week [OR: 0.68, 95 % CI: (0.49, 0.94)] ,workplace supervision [OR: 0.61, 95 %CI: (0.45, 0.83)] ,sleep disorder[OR: 1.49, 95 %CI: (1.04,2.14)] and job satisfaction [OR: 0.59, 95 %CI: (0.43,0.83)] .

Conclusion: Young age, job category, lack of experience, and sleep disorders were increased the risk of work related injuries. Working 48 hours or less, workplace supervision, and job satisfaction decreased the occurrence of work related injuries. Preventive measures concerning health and safety training, regular workplace supervision and establishment of

active and functional occupational health and safety programmes are essential to safeguard the health and safety condition of workforce in small and medium scale industries.

1. Introduction

Work-related injuries present a major public health problem resulting in serious social and economic consequences that could be prevented if appropriate measures are taken (1, 2, 3).

Annually, throughout the world, an estimated 271 million people suffer work related injuries, and 2 million die from their injuries. The estimated economic loss caused by work-related injuries and disease is equivalent to 4 % of the world's gross national product (4). The impact is 10 to 20 times higher in developing countries including Ethiopia, where the greatest concentration of the world's workforce is located (5).

Moreover, working conditions for the majority of the three billion workers world wide, do not meet the minimum standards and guidelines set by the World Health Organization and International Labor Organization for occupational health, safety and social protection. The majority of the world's workforce does not have access to occupational health services. Only 5 to 10 percent of workforce in developing countries and 20 to 50 percent of workforce in developed countries have access to some kind of occupational health services. The main problem of the absence of occupational health services is the continuous presence of hazards in the workplace such as dust, heat, noise, toxic chemicals, and dangerous machines leading to a huge burden of work-related injuries, death and disease (6).

In Ethiopia, the epidemiology of work related injuries is lacking due to scarce national and local data. According to labor proclamation No.377/2003, the Ministry of Labor and Social Affairs of Ethiopia is the organ charged with the responsibility to inspect labor administration, labor conditions, occupational safety and health (7). So far, only few studies have been done to identify work-related injuries and related occupational health

and safety problems among large industrial workers (8,9,10). However, information regarding the present status on the disaggregate magnitude and factors affecting work-related injury is lacking for small and medium scale industries. Furthermore, there are contrasting and contradicting debate concerning the health, safety and welfare of people working in small-scale industries. Some studies suggest that small-scale industries are more dangerous to work in than that of medium industries (6, 11, 12).

There is rapid industrialization due to favorable investment policy, which may result in increased number of industries and employment in Ethiopia. However, epidemiological information regarding health and safety condition of workforce in small and medium scale industries is absent. Therefore, it is important to know the prevalence, severity and determinants of work-related injuries among these workers. There are also studies that suggest small-scale industries are more dangerous to work in than that of medium scale industries. Hence, it is important to test the hypothesis that injury outcomes are the same for both types of industries. The main aim of this study is therefore, to assess the prevalence of work-related injuries and factors affecting injury among small and medium scale industrial workers in North Gondar, Amhara Regional State. The finding of this study will help for the development of effective preventive strategies, and any cost-benefit analysis on occupational health and safety legislation and occupational health services. It could be also part of baseline information for policy makers.

2. Literature review

2.1 Occupational health and safety

Occupational health and safety is one of the most important aspects of human concern. It aims an adaptation of work to man and each man to his job for the promotion and maintenance of the highest degree of physical, mental and social well being of workers in all occupations. An occupational health service has to meet the special needs of the undertaking concerned and the people employed. The needs of the undertakings with respect to working population should be well identified and properly addressed (13, 14).

The discipline covers the following key components:

1. the availability of occupational health and safety regulations at workplace
2. the availability of active and functional occupational health and safety committee at workplace
3. monitoring and control of factory hazards to health
4. supervision and monitoring of hygiene and sanitary facilities for health and welfare of the workers
5. inspection of health safety of protective devices
6. pre-employment, periodical and special health examination.
7. performance of adaptation of work to man
8. provision of First Aid
9. health education and safety training to the worker
10. Advice to employers on the above mentioned items
11. Reporting of occupational deaths, diseases, injuries , disabilities , hazards and their related preventive measures at working

The benefit of occupational health service in developing countries is seen locally as well as on a national level. The positive impact of occupational health service locally may be observed in reducing morbidity and work-related injuries. In addition, this also means fewer losses to employer and worker as there will be a reduction of wage losses and decreased compensation costs. The reduction of absenteeism is of great importance concerning skilled labor, especially so in countries where there is a shortage of skilled labour.

Work related injuries are costly to the community as whole, they represent a burden which is constantly growing and which affects the standard of living of every one. Work related injury involves for the worker temporary or permanent adverse consequences of an objective or subjective nature, at both the personal and occupational level. The psychological impact of injuries cannot be ignored.

In developing countries like Ethiopia, the experience in the practice of occupational health is limited. Records of work-related injuries and diseases are lacking (8, 9,10,11,13,14).

2.2. Magnitude of work related injuries

Small and medium scale industries employ about 80 % of the workforce and contribute over 90 % of all industries in developing countries. Workers in these industries are at great risk of work-related injuries, chronic illness, stress, disability or death because of low educational and literacy rates, unfamiliarity with work process and exposures, and inadequate training (6, 11, 15, 16).

Studies that are available on industrial injuries indicated that work related injuries occur with great frequency and much greater severity in developing countries. The injury rate among small-scale industrial workers in Zimbabwe was 131 per 1000 exposed workers per year (17). The injury rate in Nigerian factories was 22 per 1000 exposed workers per year (18).

According to study conducted among 268 smaller industrial workers in Norway, injury rate of 317 per 1000 exposed workers was observed in one year period (19). Study carried out in Thailand in 2001 reported that there were 189,621 cases of occupational injuries. Of this number, 607 were deaths, 20 cases of disability, and 48,078 cases of over 3 days lost from work (20). Results from US study showed rate of 75 per 1000 exposed workers per year (21).

In Ethiopia, few attempts have been made to identify work-related injuries and their determinants among large industrial workers. The injury rate among 4,462 industrial workers in Addis Ababa was 80 per 1000 exposed workers per year (8). Study done among 3,100 textile factory workers in Addis Ababa reported rate of 200 injuries per 1000 exposed workers per year (9). Reports from Department of Environmental Health of Ministry of Health of Ethiopia revealed that among 16,610 industrial workers in Addis Ababa prevalence rate of 723 injuries per 1000 exposed workers was observed (10).

2.3. Part of body affected, type, causes and day of the week of work related injuries

Work-related injuries affect different parts of the body. Among the parts of body affected among Brazilian steel workers, the commonest were hands; arms and eye (22).

The commonest part of body affected among eleven industrial workers in Addis Ababa were fingers (37.3%) and hands (11.6%) (8). In textile factory study in Addis Ababa, the most common part of body affected by work-related injuries were fingers (42%), lower leg

(18.95), hands (13.3%) (9). Reports from Department of Environmental Health of Ministry of Health of Ethiopia listed eye, hand and finger as the most affect parts of the body (10).

Different studies have shown different causes of work-related injuries. According to study done in eleven urban industries in Addis Ababa, hit by or against object and fall were the commonest causes of work-related injuries (8). Findings from textile factory study in Addis Ababa, demonstrated that the most frequent causes of work-related injury were machinery 42(29.4%), hit by or against objects 29 (20.3%)(9). Department of Environmental Health of Ministry of Health of Ethiopia reported that striking (25.5%), falling (12.8 %) and flying objects from machines (8.5%) were the major causes of work-related injury (10).

Regarding the distribution of work-related injuries by the days of the week, most studies revealed that the highest injury rates occurred on Monday's and the lowest on Thursday's and Friday's. Absenteeism is higher on Monday's than other days of the week in most industrialized countries, which results in workers to stand in for absent workers and undertake unfamiliar jobs on that day. The most common time of injury is from 8 am to 10 am. It was suggested by the investigators that this could have been due to fatigue or the speeding up of production at these times in an effort to meet a target before break (8,9, 23).

2.4 Factors related to work related injuries

Many authorities believe that work-related injuries result from a complex interplay of multiple risk factors. Exposure to physical, mechanical and chemical hazards and the performance of unsafe practices by workers are the leading causes of work-related injuries. Similarly, psychosocial factors, work organization, socio demographic characteristics of workers and environmental and social conditions are other potentially risk factors as depicted in Figure 1 (1, 3, 21, 24, 25, 48).

Reports from France, U.S and China revealed that men have the highest rates of work-related injuries than women. These studies explained that the difference would be in part by the difference in jobs for the same job category and possible by the difference in the perception of risk and in behavior (1, 21, 25, 26). However, studies conducted in eleven urban industries and textile factory in Addis Ababa reported that gender has no association with the prevalence of work-related injuries (8, 9).

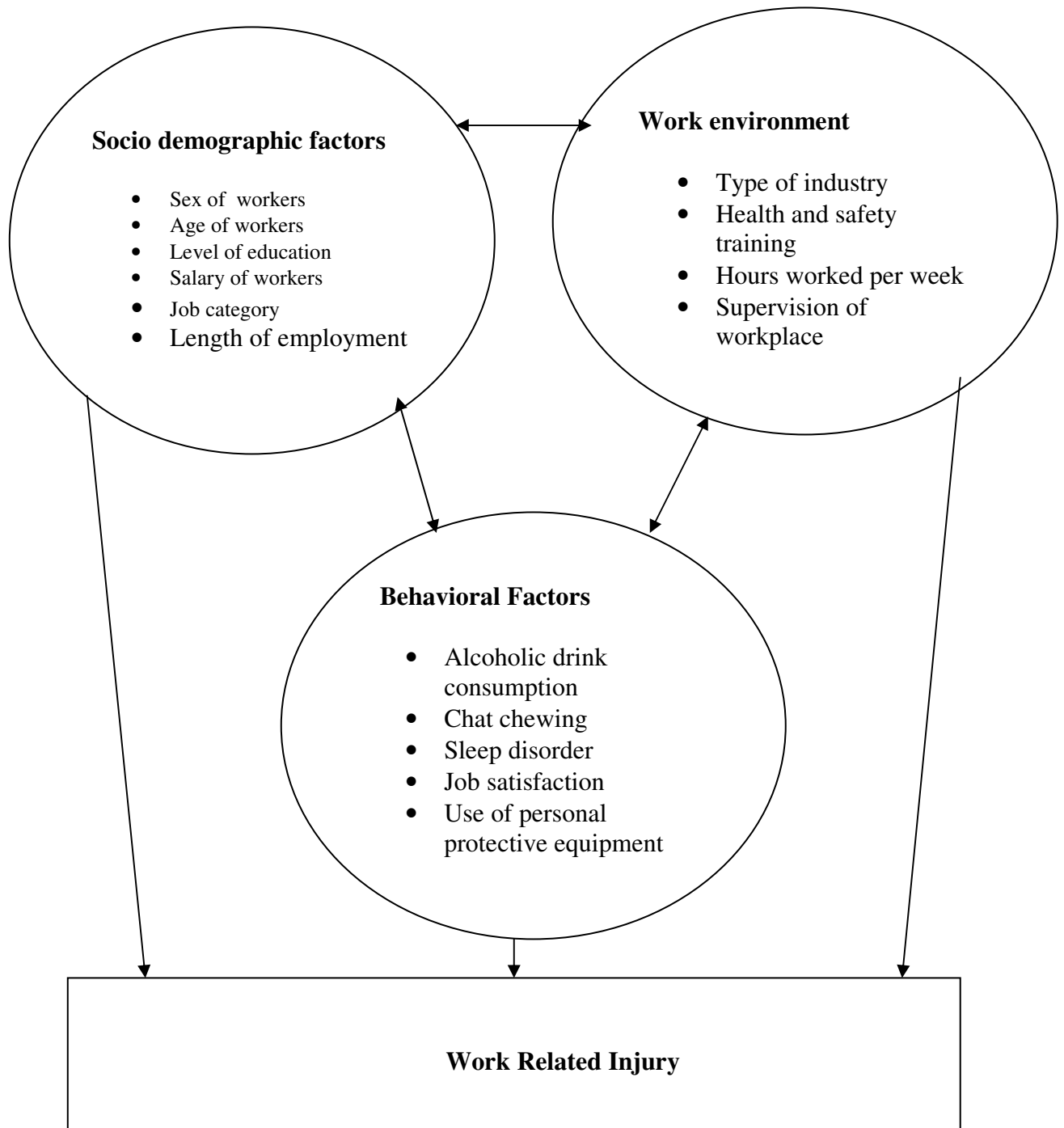
Different investigators showed that there is difference in the rate of work related injuries in age groups. Study done in eleven urban factories in Addis Ababa revealed that the highest rate of work-related injury was observed in the age group 15-19 years (8). Age groups less than 30 years were more affected by work-related injuries according to textile factory study in Addis Ababa (9). Ministry of Labor and Social Affairs of Ethiopia has reported that the majority (18 %) of work related injuries were observed in the age group of 25-29(27). These studies emphasized that work-related injuries in young subjects 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.

Different investigations reported that low education status, low monthly salary, low working experience (5 years or less) in present job, lack health and safety training, sleep disorders, job category and alcoholic drink consumption were common risk factor for work-related injuries (1,3,8,9,23,24,25).

Finally, this study aims to produce relevant information on magnitude, causes and factors related to work related injuries among small and medium scale industrial workers in North Gondar, Amhara regional state. This study also tests the hypothesis that injury outcomes are the same for both small and medium scale industrial workers. Such information can be used to development of preventive measures and effective intervention priorities to safeguard the health and safety condition of the work force in small and medium scale industries. As part of prevention and information dissemination, the information got will help program planners and policy makers to improve and strengthen their efforts on the issue.

Figure 1. Determinants of work-related injuries-A Conceptual Framework for study of Work-related injury prevalence (adapted from reference 21).



3. Objectives

3.1 General objectives:

To assess the magnitude and extent of work-related injuries among small and medium scale industrial workers in North Gondar Zone.

3.2 Specific objectives:

1. To determine the prevalence rate of work-related injuries.
2. To assess the severity of work-related injuries.
3. To identify determinants of work-related injuries.

4. Methods and materials

4.1 Study design: Institution based comparative cross-sectional study planned to assess and compare prevalence of work-related injuries among small and medium scale industrial workers in Gondar Woreda.

4.2. Study area: **The study area is North Gondar zone, which is one of the 11 zones in the Amhara national regional state (annex 4). Gondar, the capital of the zone, is one of the historical towns in the country located 745 km Northwest of Addis Ababa. Administratively, the Zone is structured into 18 woredas, 60 urban and 683 rural kebeles. The total population is estimated to be 2,088,684 with 105,689 male and 1,028,986 females. Of these, 23,661(11.3%) live in urban towns and 1,852,059(88.7%) resides in the rural part of the zone. Most of the people the zone (90 %) are economically dependant on traditional rain fed agriculture. The dominant religion is of orthodox Christian followed by Muslim and other minorities. About 60.9 % urban and 8.16 percent of rural population are literate (28). This study was carried out in one purposely selected wereda namely, Gondar Woreda. It has total of 140 small and 11 medium scale industries with total of 566 and 872 employees, respectively (29,30)**

4.3 Source population: All employees working in small and medium scale industries in the study area.

4.4 Study population:

Inclusion criteria: All employees who were directly engaged in the production process in the selected industries irrespective of sex and age were included in the study.

Exclusion criteria: Employees who were not directly involved in the production process such as administrative staff were not included in the study because by virtue of their occupation they were not exposed to occupational health and safety hazards.

4.5 Sample size: The sample size was calculated using sample size determination formula for two population proportions with the following assumptions.

$$n,(\text{ for each group})=\left\{\frac{Z_{1-\alpha/2}\sqrt{(1+1/r)p(1-p)}+Z_{1-\beta}\sqrt{P_1(1-P_1)+[P_2(1-P_2)]/r}}{(P_1-P_2)}\right\}^2$$

Assumptions.

- No national or local data on the prevalence of work-related injuries among small and medium scale industrial workers. Hence, prevalence of 50 % was used in order to maximize the sample size
- P_1 (50 %): assumed prevalence of work –related injuries among small-scale industrial workers since there was no previous studies.
- P_2 (40%): assumed prevalence of work –related injuries among medium scale industrial workers to detect 10 % difference between the two study groups(n_1 and n_2)
- n_1 : study population of small scale industries
- n_2 : study population of medium scale industries
- r : the population allocation ratio between n_1 and n_2 :1:2
- $Z_{1-\alpha/2}$: a standard Z score which is 1.96, corresponding to a 95% confidence level for rejecting a true null hypothesis; $H_0: p_1=p_2$,
- $Z_{1-\beta}$: the Power of study to detect 10% difference between the two study units, 80%
- P =(pooled population proportion); $\frac{p_1 n_1 + p_2 n_2}{n_1 + n_2}$
- None response rate of 5 %.

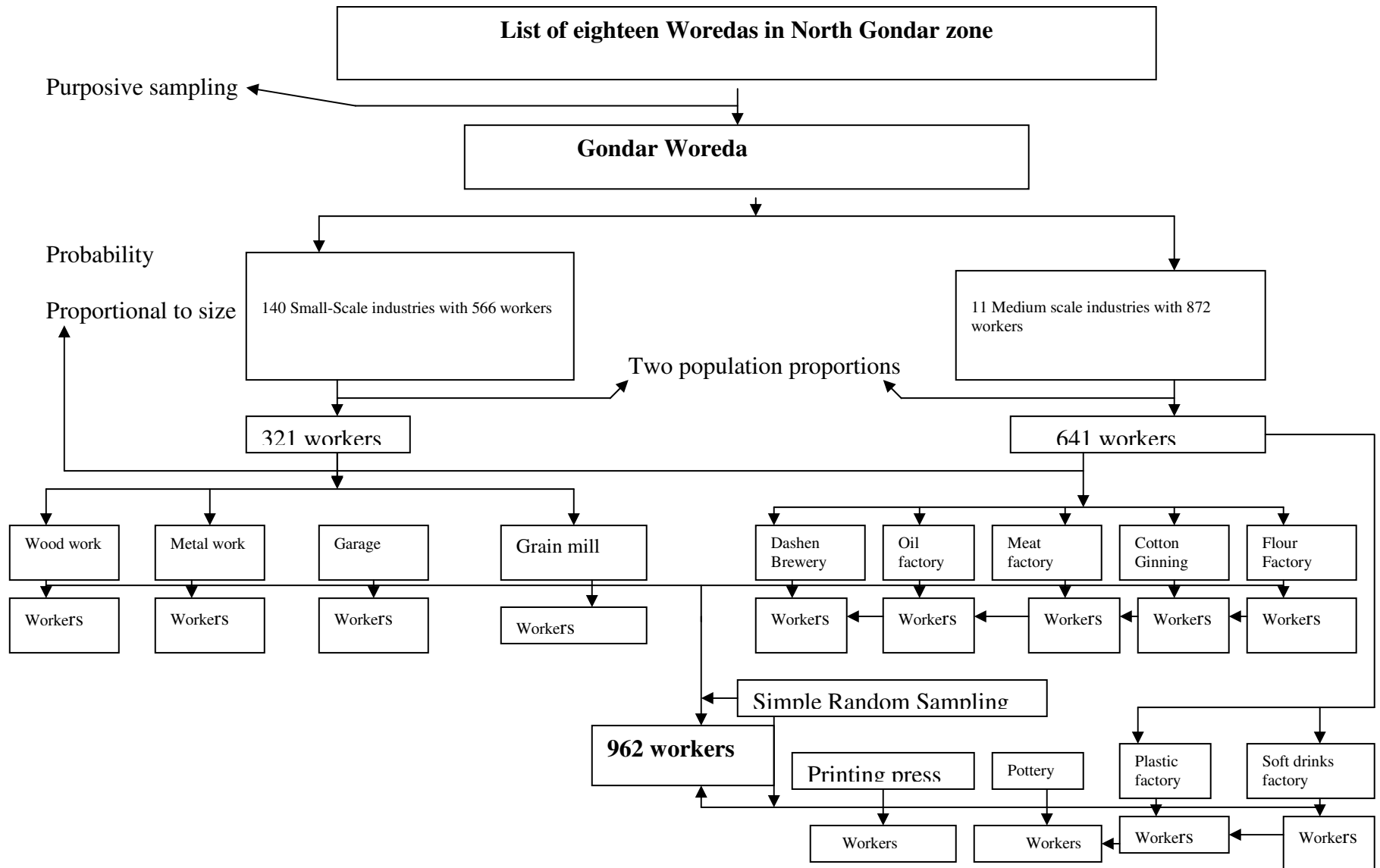
Based on these assumptions, the total calculated sample size was 962. Of these 321 participants for small and 641 participants for medium scale industries were allocated.

4.6 Sampling procedure.

Stratified random sampling technique was applied to get the desired sampling unit (industries). From 16 woredas in North Gondar zone, Gondar Woreda was selected since the majority of small and medium scale industries are found in this woreda. Fifty two out 140 small and all eleven medium scale industries found in Gondar woreda were included

in the study. For the purpose of this study, the selected industries were stratified into two categories, namely small and medium scale industries. The calculated sample size was allocated to each stratum. Again, small-scale industries were further stratified into four categories. Similarly, medium scale industries were also stratified into eleven categories. The required sample sizes for each stratum of industries were allocated using probability proportional to size. Sampling frame consisted of all workers in production sites was obtained each industry management and simple random sampling technique was administered to identify the potential subjects (workers).Figure 2 schematic presentation of sampling procedure.

Figure 2. Schematic presentation of sampling procedure



4.7 Data collection procedure

A standardized questionnaire was developed based on published studies, and simply adapted to this study with certain modification. It was administered by trained data collectors to collect quantitative data. Physical examination was done on injured workers to identify the part of body affected and type of injury. Record review and workplace observation were done to supplement quantitative data. The questionnaire composed of four parts: socio demographic, injury characteristics, work environment and behavioral variables. The socio demographic portion asked: gender, sex, religion, education level, marital status, monthly salary, working experience and area of residence. Injury characteristics portion: inquired about causes of work related injuries, part of body affected, type, severity and time of injury. Work environment part: asked about hours worked per week, workplace supervision, health and safety training and behavioral portion: inquired about alcoholic drink consumption, chat chewing, sleep disorder, job satisfaction, and use of personal protective equipment. It was prepared in English and translated to Amharic and then backs to English to verify the translation. (Annexes 1, 2, 3). Ten second year degree programme environmental health students who speak Amharic and taken occupational health and safety course prior to the study collected the data. Two Nurses who had experience on research work and familiar with the study areas supervised data collection process. Training for data collectors and supervisors given for three days. The questionnaire was pre tested for its understandability and metric characteristics in 48 respondents having similar characteristics with the study subjects. Based on the pre test results, the questionnaire was additionally adjusted quantitatively, contextually and terminologically, and administered on the whole sample of workers in November and December of 2004.

4.8 Data quality assurance

Every day the completed questionnaires handled to the supervisors on each day of data collection. After checking for consistency and completeness, the supervisors submitted the filled questionnaires to the principal investigator. Incorrectly, filled or missed ones were sent back to data collectors for correction. Any thing, which was unclear and ambiguous, were corrected on the next day. Five percent of the samples were rechecked by supervisors whether the interviewers have done their job correctly or not. The collected data was double entered by principal investigator to verify whether the data was properly entered or no by data clerk.

4.9 Operational definitions

- **Excessive heat:** heat is recorded as excessive if a worker is found sweating when naked or with light clothing; if investigator feels as sudden heat wave when entering into the industry (11, 31).
- **Excessive noise:** noise that makes it difficult to communicate with your neighbor without shouting (11, 31).
- **Medium scale industry:** any industry that uses power driven machine and employ more than 10 workers (30).
- **Severity of injury:** characterized by death, hospitalization more than 24 hours and absence from work over three days in the last one year (32,33).
- **Small scale industry:** any industry that uses power driven machine and employ less than 10 workers (29).
- **Work related injury:** a condition sustained by a worker in connection with the performance of his or her work (7).

4.10 Study variables

Dependent variable: work-related injuries.

Independent variables:

1. **Socio demographic variables** : Sex, age, religion, educational level, marital status, monthly salary, working experience, job category, area of residence.
2. **Work environment variables:** hours worked per week, workplace supervision, health and safety training.
3. **Behavioral variable:** alcoholic drink consumption, chat chewing, sleep disorder, job satisfaction, and use of personal protective equipment.

4.11 Data analysis procedures.

Data was entered and analyzed using Epi-Info version 6, and SPSS statistical package for windows, version 11.0. Descriptive statistics of the collected data was done for most variables in the study using standard statistical parameters: percentages, means and standard deviations. Crude odds ratios with 95 % confidence interval were used to measure the association of dependent and independent variables. Adjusted odds ratios with 95% confidence intervals were calculated for each of independent variables in stepwise forward binary logistic regression model with self-reported work-related injury as the primary dependent variable to assess the determinants.

Ethical considerations

The study was carried out after getting permission from the ethical clearance committee of Addis Ababa University Medical Faculty through Department of Community Health. Then, data was collected after getting written consent from North Gondar Zonal administration. Informed verbal consent was obtained from the owners of each industry and study participant. Confidentiality was granted for information collected from each industry and study participant. Each respondent was informed about the objective of the study and privacy during interview was insured. First aid was provided to injured workers at the time of visit and severely injured workers were referred to the near by health facilities. At the end of each

interview session, the interviewers provided brief information about how to prevent work related injuries to each study participants.

Communication of results.

Findings of the study is submitted to Department of community Health of Faculty of Medicine of Addis Ababa University. It will also be communicated to North Gondar Zonal administration, North Gondar Ministry of Labor and social affairs, to each studied industry and to those organizations concerned with the promotion of Occupational health and safety at workplaces. Peer reviewed publication will be also considered

5. Results

A total of 52 small and 11 medium scale industries were visited in 21 "kebeles" found in Gondar woreda. We interviewed 962 workers if they had experienced work related injury in the last 12 months. Out of 962 study subjects who responded to the interviews, 321(33.4%) were from small and 641(66.6 %) were from medium scale. There was no non-response found during the data collection.

5.1 Social demographic characteristics of respondents

The 962 respondents included 754 males and 208 females of mean age (SD) 28.5 ± 9.7 years (range, 14-69 years). Thus, the total response rate was 962(100 %), for men 754(78.4 %), for women 208(21.6%). The male: female gender ratio was 3.7:1. About sixty six percent of the respondents in both industries were in the age group 14-29 years and young. The majority 832 (86.5 %) of study participants were orthodox Christian religion followers. About 161(50.2%) and 295(46 %) of the small and medium scale industry respondents have attended secondary schooling, respectively. The percentage of graduates from technical or vocational school in both industries was only 154 (16%). Regarding marital status of the respondents, the majority 534 (55.5%) were currently single. A significant number 193(60.1%) of small-scale industry respondents had 200 Birr per month or less while 439(45.6%) medium scale industry respondents reported this figure. The median monthly salary for small and medium scale industrial respondents was 160 Birr and 300 Birr, respectively. Most (66.2 %) of the respondents had working experience of five years or below. The socio demographic characteristics of respondents are summarized in Table 1.

Table1. Selected Socio demographic characteristics of the respondents by type of industry, Gondar Woreda, Nov. –Dec. 2004.

Variables	SSI (n=321)		MSI (n=642)		Total (n=962)	
	number	%	number	%	number	%
Sex						
Female	18	5.6	190	29.6	208	21.6
Male	303	94.4	451	70.4	754	78.4
Age Group						
14-29	245	76.3	391	61.9	636	66.1
30-44	53	16.5	184	28.7	237	24.6
45+	23	7.2	66	10.3	89	9.3
Mean (SD)	25.7±9.9		29.8± 9.		28.5 ± 9.7	
Religion						
Orthodox	267	83.2	565	88.1	832	86.5
Protestant	0	0	5	0.8	5	0.5
Muslim	54	16.8	64	10.0	118	12.3
Others	0	0	7	1.1	7	0.7
Educational level						
Illiterate	24	7.5	34	5.3	58	6.0
Can read and write	12	3.7	31	4.8	43	4.5
Primary	70	21.8	181	28.2	251	26.1
Secondary	161	50.2	295	46.0	456	47.4
12+	54	16.8	100	15.6	154	16.0
Marital status						
Married	91	28.2	284	44.3	375	39.0
Single	223	69.5	311	48.5	534	55.5
Divorced	4	1.2	20	3.1	24	2.5
Widowed	1	0.3	24	3.7	25	2.6
Separated	2	0.6	2	0.3	4	0.4
Monthly salary in Birr						
≤ 200	193	60.1	176	27.4	369	38.4
201-600	100	31.2	339	52.9	439	45.6
600+	28	8.7	126	19.7	154	16.0
Working experience in years						
≤ 5	241	75.1	396	61.8	637	66.2
6+	80	24.9	245	38.2	325	33.8

Note: SSI= Small scale industries; MSI=Medium scale industries

5.2 Characteristics of work-related injuries

A total of 322 respondents were reported work –related injuries during the last 12 months, giving an overall annual prevalence rate of 335 per 1000 exposed workers per years. Out of the total work related injuries, 114(35.5%) and 208 (32.4%) were occurred among small and medium scale industrial workers, respectively. One hundred fifty eight (49.1%) of the injured respondents sustained more than one injury. Moreover, a total of 115(12%) respondents had experienced work-related injuries in two weeks period prior to data collection. Of this cases 63(54.8%) reported that they had sustained work related injury once (Table 2).

Table 2. Distribution of work-related injury in the last 12 months among respondents by type of industry, Gondar Woreda, Nov. –Dec. 2004

Variables	SSI (n=321)		MSI (n=642)		Total(n=962)	
	number	%	number	%	number	%
Work-related injuries						
in the last 12 months						
Yes	114	35.5	208	32.4	322	33.5
No	207	64.5	433	67.6	640	66.5
Number of occurrence						
Once	67	55.8	97	35.5	164	50.9
More than once	47	41.2	111	64.5	158	49.1
Work-related injuries						
in the last 2 weeks						
Yes	28	8.7	87	13.6	115	12.0
No	293	91.3	554	86.4	847	88.0
Number of occurrence						
Once	22	78.6	41	47.1	63	54.8
More than once	6	21.4	46	52.9	52	45.2

Note: SSI=Small scale industries; MSI=Medium scale industries

Hands were the body part with the highest frequency of work-related injuries, 126 (30%), and fingers 99 (24%) and eye 81(19%) were other sites frequently affected. The main types of injuries reported were abrasions 100(23.2%), cuts 82 (19%), eye injury 81(18.8 %), puncture 61 (14.4%) and dislocation 28 (6.5%) (Table 3).

Table 3. Distribution of work related injury by Part of body affected and types in the last 12 months among 322 injured respondents, Gondar Woreda, Nov–Dec. 2004

Variables	number	%
Body part affected		
Hand	126	30.0
Finger	99	23.6
Eye	81	19.3
Toe	26	6.2
Back	19	4.5
Lower leg	15	3.6
Head	10	2.4
Ear	8	1.9
Knee	8	1.9
Tooth	5	1.2
Upper arm	5	1.2
Lower arm	3	0.7
Upper leg	2	0.5
Others	13	3.1
Total	420	100
Types of injury		
Abrasion	100	23.1
Cuts	82	19.0
Eye injury	81	18.8
Puncture	61	14.1
Dislocation	28	6.5
Fracture	26	6.0
Burn	23	5.3
Ear injury	8	1.8
Suffocation	8	1.8
Others	15	3.5
Total	432	100

In this study, the causes for work related injury were highly variable, but the most common agent stated as cause were machinery 88(23.9%), Splinters 80 (21.7%) and hand tools 61 (16.6%) (Table 4). A significant number 94 (28.5%) of the work-related injuries occurred on Monday. The most (40.8%) common time of injury was in the morning (Table 5).

Table 4. Distribution of work related injuries in the last 12 months by cause among 322 injured respondents, Gondar Woreda, November - December 2004

Variables	number	%
Cause of injury		
Machinery	88	23.9
Splinters	80	21.7
Hand tools	61	16.6
Fall	26	7.1
Acid and hot substances	24	6.5
Collision with objects	17	4.6
Hit by fallen objects from height	16	4.3
Lifting heavy objects	16	4.3
Electric	16	4.3
Fire	7	1.9
Others	17	4.4
Total	368	100

**Table 5. Distribution of work-related injury by the day of week and time among
322 injured respondents, Gondar Woreda, Nov. –Dec. 2004**

Variables	number	%
Days of the week		
Monday	94	28.5
Tuesday	37	11.2
Thursday	40	12.0
Friday	37	11.0
Saturday	30	9.0
Sunday	12	3.6
I don't remember	35	10.6
Total	330	100
Time of injury		
Morning	133	40.8
Afternoon	123	37.7
Evening	16	4.9
Midnight	24	7.4
I don't remember	30	9.2
Total	326	100

5.3 Severity of work-related injuries

Of the total 322 injured respondents, 55 (17.1%) were hospitalized, accounting for 40% hospitalization more than 24 hours. One hundred and three (53.9%) were absent from work for more than 4 days. In addition, 191 working days were lost as result of 322 work related injuries. There were 2 reported deaths as result of work related injuries in the sampled industries in the last 12 months.

5.4 Work environment and behavioral characteristics of respondents.

Four hundred ninety and seven (51.7 %) respondents worked more than 48 hours per week. Five hundred seventy one (59.4 %) of the respondents were reported that their workplaces were not supervised regularly. Most (56.4 %) of the respondents were not taken any health and safety training.

Three hundred eighty four (39.9%) and 86(8.9%) of the respondents consumed alcohol and chewed chat at their workplace, respectively. About 175(18.2%) of the respondents reported that they had sleep disorder at their workplace. The majority 739(76.8%) of the respondents were satisfied by their current job. A significant number 589(61.2%) of the respondents were used personal protective equipment at their workplace, while 373 (38.8%) were not used any type of personal of protective equipment. The most frequent reported reasons for non use of protective equipment were lack personal protective equipment 296 (30.8%), and absence of health and safety education 37 (9.9%) (Table 6).

**Table 6. Reported work environment and behavioral characteristics of respondents,
Gondar Woreda, Nov. - Dec. 2004.**

	<u>SSI (n=321)</u>	<u>MSI (n=641)</u>	<u>Total(n=962)</u>
Variables	n (%)	n (%)	n (%)
Hours worked per week			
≤ 48	257(80.1)	208(32.4)	465(48.3)
48+	64(19.9)	433(67.6)	497(51.7)
Workplace supervision			
Yes	135(42.1)	256(39.9)	391(40.6)
No	186(57.9)	385(60.1)	571(59.4)
Health and Safety training			
Yes	153(47.7)	266(41.5)	419(43.6)
No	168(52.3)	375(58.5)	543(56.4)
Drink alcohol			
Yes	117(36.4)	264(41.7)	384(39.9)
No	204(63.6)	374(58.3)	578(60.1)
Chew chat			
Yes	47(14.6)	39(6.1)	86(8.9)
No	274(85.4)	602(93.9)	876(91.1)
Sleeping disorder			
Yes	31(9.7)	144(22.5)	175(18.2)
No	290(90.3)	497(77.5)	787(81.8)
Job satisfaction			
Yes	265(82.6)	474(73.9)	739(76.8)
No	56(17.4)	167(26.1)	223(23.2)
Use PPE			
Yes	244(76.0)	345(53.8)	589(61.2)
No	77(24.0)	296(46.2)	373(38.8)

Note : SSI= Small scale industries; MSI= Medium scale industries

5.5. Work environment observation

In this study, sixty three sampled industries were inspected to identify potential occupational health and safety hazards and health and safety service provisions. The survey revealed that workers in small and medium scale industries were highly exposed to high level of heat, noise, air born contaminants such as dusts particles and fumes, unguarded machines, exposed electric wires and other chemical hazards such as caustic soda, sulfuric acid, varnishes, glue, naphtha and gasoline. The hazards identified by type of industry are summarized in Table 7. Moreover, out of the 63 industries surveyed, only 18 (28.6%) had health and safety instructions and 5(7.9 %) had medical or First Aid facilities in their workplace.

Table 7. Occupational health and safety hazards identified in selected industries, Gondar Woreda, Nov. - Dec. 2004.

Type of industry	Hazards identified
Wood work	Sharps, varnishes, glue, excessive noise, unguarded machine, and exposed electric wires
Metal work	Lead, glare, fumes, paints, excessive noise, unguarded machine, exposed electric wires ,and Sharps
Garage	Sharps, solvents, car paints, naphtha, gasoline, and sulfuric acid.
Food grain mills	Excessive dust, excessive noise, unguarded machine, and exposed electric wires
Cotton Ginning	Excessive dust, excessive heat, excessive noise, unguarded machine and exposed electric wires
Brewery	Excessive heat, excessive noise, broken bottles, caustic soda, and radiation
Printing factory	Radiation, solvents, and unguarded machine
Meat processing factory	Animals bite, sharps
Pottery	Excessive dust, excessive heat, and sharps

5.6 Socio demographic, work environment and behavioral determinants

5.6.1 Socio demographic determinants

Table 8 demonstrates the crude (unadjusted) statistics of socio demographic determinants of work related injuries. Age at interview, job category, and working experience were identified as the major socio demographic determinants of work -related injury in both industrial workers.

When we compare the prevalence of work-related injuries among respondents who reported work-related injuries with those who were not reported work-related injuries in age group less than 30 years and 30 years and above, the difference was statically significant. More work-related injury occurred in those who were below 30 years as compared to 30 years and above [OR=1.41,CI: 1.05-1.80)].

Working experience was also another variable that showed positive association with prevalence of work-related injury. Workers who reported lower working experience (5 years or less) were more likely to report work-related injury than their counterparts [OR=1.40, 95% CI=1.05-1.87)].

Work related injury was statistically associated with job category. Workers who were daily laborer [OR= 1.6, 95% CI: 1.09-2.55)], mechanic [OR: 1.88, 95%CI: 1.17-3.03)] and welder [OR: 2.79, 95%CI: 1.69-4.61] by job category were more likely to report work-related injury than light and bottle inspectors, electricians, chemist, potter, carpenter and butcher. However, in this study the frequency of work-related injury was not associated with sex, educational status and monthly salary of respondents (Table 8).

Table 8. Selected socio demographic determinants of work related injuries by type of industry, Gondar woreda, Nov- Dec 2004.

Type of industries					
Variable	SSI workers (n=321)		MSI workers (n=641)		Both (n=962)
	<u>Injured</u>		<u>Injured</u>		
	Yes	No	Yes	No	Crude OR (95% CI) :
Sex					
Female	3(16.7)	15 (83.3)	55 (28.9)	135 (71.1)	0.72(0.51-1.00)
Male	111 (36.6)	192(63.4)	153 (33.9)	298 (66.1)	1.00
Age Group					
<30	86(35.1)	159 (64.9)	143(36.6)	248(63.4)	1.41(1.05-1.88) *
≥30	28(36.8)	48(63.2)	65 (26)	185(74)	1.00 [@]
Educational level					
Primary and below	37(47.4)	41(52.6)	68 (37.6)	113(62.4)	0.86(0.57-1.30)
Secondary	58 (47.9)	63(52.1)	89(30.2)	206 (69.8)	0.81(0.54-1.21)
12+	19(38.2)	35(64.8)	38(38.0)	62(62.0)	1.00 [@]
Job category					
Daily laborer	9 (24.3)	28(75.7)	68(37.6)	113(62.4)	1.67(1.09-2.55) *
Mechanic	33 (37.1)	56(62.9)	20(40.0)	30(60.0)	1.88(1.17-3.03) *
Machine operator	37(92.5)	3 (7.5)	77(31.4)	168(68.6)	1.39(0.92-2.11)
Welder	48(52.2)	44(47.8)	5(26.3)	14 (73.7)	2.79(1.69-4.61) *
Others	21(22.6)	72(77.4)	38(26.0)	108 (74.0)	1.00 [@]
Work experience					
≤5 years	85(35.3)	156(64.7)	144(36.4)	252(63.6)	1.40(1.05-1.87) *
6+ years	29(36.3)	51(63.7)	64(26.1)	181(73.9)	1.00 [@]
Monthly salary in Birr					
≤200	64 (33.2)	129(66.8)	45(25.6)	131(74.4)	0.98(0.64-1.52)
201-600	37(37.0)	63(63.0)	130(46.8)	148(53.2)	1.44(0.95-2.16)
601+	13(46.4)	15(53.6)	33(26.8)	93 (73.8)	1.00 [@]

Note: * =significantly associated; @=reference group; SSI= Small scale industries;

MSI= Medium Scale Industries

5.6.2 Work environment determinants

Table 9 presents workplace characteristics of respondents in relation to occurrence of work related injuries. From the workplace variables hours worked per week, workplace supervision, health and safety training showed significant association with the prevalence of work related injuries.

Respondents who worked 48 hours and less per week were less likely to report work-related injury than their counterparts [OR= 0.56 , 95% CI: (0.42-0.75)]. Work place supervision, and health and safety training showed significant association with the prevalence of work related injuries. Workers who regularly supervised and had health and safety were less likely to report work related injuries [(OR: 0.5, 95% CI :(0.42-0.75) and OR: 0.60, 95%CI :(0.45-0.79)], respectively, than those who were not regularly supervised and had no health and safety training (Table 9).

Table 9. Selected workplace factors related work-related injuries by type of industry, Gondar woreda, Nov- Dec 2004.

Type of industries					
Variable	SSI workers (n=321)		MSI workers (n=641)		Both (n=962)
	<u>Injured</u>		<u>Injured</u>		Crude OR (95%CI :
	Yes	No	Yes	No	
Hours worked/week					
≤48	34 (35.1)	63(64.9)	12(20.7)	46(79.3)	0.56(0.42-0.75) *
>48	80(35.7)	144(64.3)	196(33.6)	387(66.4)	1.00 [@]
Workplace supervision					
Yes	43(31.8)	92(68.2)	59(23.1)	197(76.9)	0.56(0.42-0.75) *
No	71(38.2)	115(61.8)	149(38.4)	239(61.6)	1.00 [@]
Health and St					
Yes	43(28.1)	110(71.9)	71(46.4)	195(73.3)	0.60(0.45-0.79) *
No	71(25.5)	207(74.5)	137(36.5)	238(46.4)	1.00 [@]

Note: St= safety training; * =significantly associated; @=reference group; SSI= Small scale industries; MSI= Medium Scale Industries

5.6.3 Behavioral determinants

This study revealed that the occurrence of work related injury was not associated with alcohol consumption [OR=1.16, 95% CI: (0.88, 1.52)], chat chewing [OR=1.33, 95% CI: (0.85, 2.10)] and use of personal protective equipment [OR=0.85, 95% CI: (0.65, 1.12)].

Sleep disorder was positively associated with work related injuries. Respondents who had sleep disorder were more likely to report worker-related injury than their counterparts were [OR=1.84, 95% CI: (1.32-2.57)]. This study also revealed that workers who had current job satisfaction and regular work place supervision were less likely to report work-related injury (Table 10).

Table 10. Behavioral factors related to work-related injuries by type of industry, Gondar woreda, Nov- Dec 2004.

Variable	Type of industries					Crude OR (95%CI :
	SSI workers (n=321)		MSI workers (n=641)		Both (n=962)	
	<u>Injured</u>		<u>Injured</u>			
	Yes	No	Yes	No		
Drink Alcohol						
Yes	51(43.6)	66(56.4)	85(31.8)	182(86.2)	1.16(0.88-1.52)	
No	63(30.9)	141(69.1)	123(32.9)	251(28.1)	1.00 [@]	
Chew chat						
Yes	17 (36.2)	30(63.8)	17(43.6)	22(56.4)	1.33(0.85-2.10)	
No	97(35.4)	177(64.6)	191(31.7)	411(68.3)	1.00 [@]	
Sleeping disorder						
Yes	10(32.3)	21(67.7)	69(47.9)	75 (52.1)	1.84(1.32-2.57)*	
No	104(35.9)	186(64.1)	139(28.0)	358(72.0)	1.00 [@]	
Job satisfaction						
Yes	94 (18.5)	171(64.5)	126(26.6)	348(73.4)	0.50(0.37-0.68)*	
No	20(35.7)	36(64.3)	82(49.1)	85(50.9)	1.00 [@]	
Use PPE						
Yes	43(31.9)	92(68.1)	59(23.1)	197(76.9)	0.85(0.65-1.12)	
No	71(38.2)	115(61.8)	149(38.4)	239(61.6)	1.00 [@]	

Note: * =significantly associated; @=reference group; SSI= Small scale industries; MSI= Medium Scale Industries

Logistic regression analysis

Stepwise forward binary logistic regression analysis was carried out by taking the conceptual framework (fig.1) into account to assess the relative effect of the explanatory variables on the dependent variable (Table 11). To avoid an excessive numbers of variables and unstable estimates in the subsequent model, only variables reached a p-value less than 0.3 were kept in the subsequent analyses.

The overall effect of the selected socio demographic variables (Table 8) on the occurrence of work related injury was assessed in the first step. In the second step of the analysis, the work environment variables (Table 9) were added, and their effect was assessed in the presence of the socio demographic variables. Behavioral factors (Table 10) were entered in the third step. In this step, the effect of the selected behavioral factors was assessed in the presence of both socioeconomic

and workplace factors. Table 11 presents the socio demographic, workplace and behavioral variables which remained in each step of the analysis.

Among the mentioned socio demographic explanatory variables computed, in the first step of analysis, job categories like mechanic, and welders remained significant in the final step, while age at interview was statistically significant in the second step of analysis.

Workers who aged below 30 years had more than 1.4 times higher odds of having work related injury than workers who aged 30 years and above[OR:1.41,95% CI(1.03,1.93)] in the second step of analysis. However, its significance disappeared in the first and third level of analysis.

According to this study welders sustained more than three times higher odds of having work related injuries than the other job categories [OR:3.23, 95% CI:(1.98,5.28)]. The odds of having work related injuries in workers who had working experience of 5 years or below were 1.5 times higher than the odds of workers who had served 6 years and above at the time of survey.

From work environment variables analyzed in the second step, hours worked per week and supervision of workplace found significant in the final model. Respondents who worked 48 hours and below per week and those who supervised regularly at the time of the survey were less likely to experience work related injury than those who were worked more than 48 hours per week and not supervised [(OR: 0.68, 95% CI :(0.49, 0.94) and OR: 0.61, 95%CI : (0.45, 0.83)], respectively. The difference in the prevalence of work-related injuries was assessed among small and medium scale industrial workers. In this study, no statistically significant difference was observed between the two groups [OR:1.14, 95% CI :(0.78, 1.67)].

Sleep disorder and job satisfaction showed significant association in the final step of analysis [(OR: 1.49, 95% CI

:(1.04, 2.14) and (OR: 0.59, 95%CI :(0.43, 0.83)],
respectively(Table 11).

Table 11. Summary of the stepwise Logistic regression analysis of the relative effect of socio demographic, work environment and behavioral factors on the prevalence of work related injuries, Gondar Woreda, Nov.- Dec. 2004

Variables	Crude OR (95% CI)	Adjusted OR (95% CI)		
		Model 1	Model 2	Final
Model 1 (Sociodemo. variables) #				
Age group in years				
(≤ 29 Vs 30+**)	1.41(1.05, 1.88) *		1.41 (1.03, 1.93)*	
Job category				
Daily laborer	1.67(1.09, 2.55) *	1.92(1.26, 2.92) *	1.42(0.92, 2.20)	1.37(0.88, 2.13)
Mechanic	1.88(1.17, 3.03) *	1.99(1.26, 3.14) *	1.99(1.26, 3.18) *	2.09(1.31, 3.33) *
Machine operator	1.39(0.92, 2.11)	1.37(0.92, 2.06)	1.15(0.76, 1.73)	1.11(0.73, 1.68)
Welder	2.79(1.69, 4.61)*	2.84(1.76, 4.59) *	3.05(1.87, 4.96) *	3.23(1.98, 5.28) *
Others**				
Work experience				
(≤5 years Vs 6+***) years	1.40(1.05-1.87)*	1.53(1.12-2.08)*		
Monthly salary in Birr				
≤ 200	0.98(0.64-1.52)	0.73(0.46-1.15)	0.67(0.42-1.07)	
201-600	1.44(0.95-2.16)	1.29(0.86-1.95)	1.14(0.75-1.74)	1.19(0.78-2.88)
600+**				
Model 2 (Socio demographic + work environment variables) #				
Type of industry				
(SSI Vs MSI**)	1.15(0.86, 1.54)			
Hours worked per week				
(≤ 48 Vs 48+**)	0.56 (0.42-0.75)*		0.61 (0.45-0.88) *	0.68(0.49, 0.94) *
Workplace supervision				
(Yes Vs No**)	0.56 (0.42-0.75)*		0.57(0.42- 0.77) *	0.61(0.45-0.83) *
Model 3 (Socio demographic + work environment +behavioral variables) #				

Sleep disorder

(Yes V _s No**)	1.84 (1.32-2.57)*	1.49(1.04-2.14)*
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Job satisfaction

(Yes V _s No**)	0.50 (0.37-0.68)*	0.59 (0.43-0.83)*
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Note: #: Only variables reached p-value less than 0.3 were kept in the subsequent analysis, and displayed in the table.

** : Reference group; * : Significant at p<0.01; SSI: Small Scale Industry; MSI: Medium Scale Industry.

Discussion

This institution-based study attempted to assess the prevalence of work-related injuries in the last 12 months among small and medium scale industrial workers in North Gondar Zone. In addition, the study tried to investigate the severity of work-related injuries with its determinants. So far, few studies were done only among large-scale industrial workers in Ethiopia.

In our study, the overall annual prevalence rate of work related injury was 335 injuries per 1000 exposed workers. The two-week period incidence, on another hand, was 120 injuries per 1000 exposed workers. This figure is markedly greater than rates reported by other studies. Study done in eleven industries in Addis Ababa reported rate of 80 injuries per 1000 exposed workers in one-year period (8). Textile factory study in Addis Ababa reported rate of 200 injuries per 1000 exposed workers in three months recall period(9). Other studies have showed various rates of this problem in industrial workers: in Zimbabwe (17) 133 per 1000 and Norway (19) 317per 1000 per exposed workers. Such variations in the prevalence of work related injuries are linked to level of development, status of workforce in a given country, psychological and epidemiological factors and methods of data collection.

In this study, a large discrepancy was observed between the annual prevalence and two week incidence rates. This discrepancy might be explained by the fact that prevalence rate measures the amount of work related injuries that is present already in population while incident rate measure the rapidity with which newly injured workers develop over time. Another possible explanation could be recall bias as some workers forget some minor injuries

occurred to them in one year period and remember those injuries that they sustained in two weeks period. There could be social desirability bias related to compensation and leadership or organization structure of sampled industries. This may result in over or under reporting of injuries. In addition, there could be seasonal variations in the occurrence of work related injuries in sampled industries. The seasons may result in limited supply of raw materials to some industries and workers are given their annual leave or evacuated from their work. This may lead to low frequency of injury, due to less activity and less crowding of workers. On another hand seasons may result in increased production which may lead to increased employment. This may lead to increased frequency of injury, due to increased industrial activity and increased crowding of workers.

This study has depicted the hands 126 (30%), followed fingers 99(24%) and eye 81 (19%) as the most commonly involved area of the body. In this study, the observation of working environment of 63 industries revealed that 35(55.6 %) lack protective arrangements on machines and equipment and lack of use of personal protective equipment, the most active part of their body, which has directly exposure to the machines such as hand and finger, were more affected by the work-related injury. Abera (8) and Elias (9) listed the fingers as the region most commonly involved work-related injuries. Among the parts of body affected among Brazilian steel workers, the commonest were hands; arms and eye (22).

The most frequent causes of work-related injury were machinery 88(23.9%), splinters 80(21.7%) and hand tools 61(16.6%). This could be due to unguarded machine parts, defective tools and non use of personal protective equipment by workers. Investigation done in textile factory in Addis Ababa indicate that machines 42(29.4 %) as the most frequent

causes of injury (9).According to annual report of Ministry of Labor and Social Affairs of Ethiopia in 2001/2002, machines and hand tools were the major causes for work-related injuries(27).

Investigators found that the largest number of work-related injuries was occurred on Monday's 94(28.5%). The reasons could be absentees that lead to the substitution of other workers in the place of absent workers. Although alcohol consumption was not statistically associated with the prevalence of work-related injuries in our study, its consumption on weekends might contribute to this situation. According to studies done in eleven urban industries in Addis Ababa and textile factor, the highest work-related injury rate was occurred on Monday's. The reason given by the authors in the above-mentioned studies was workers undertaken unfamiliar jobs on Monday's in place of their absent colleagues.

According to our study, the most common time of work-related injury was in the morning. It was probably due to speeding up production to meet the target before break. This finding is in agreement with studies done in eleven industries and textile factory in Addis Ababa where the most common time injury was from 8 am and 10 am (8,9). Similarly, studies done in British and Sweden showed that more work related injuries occurred in the morning than in the afternoon, with a peak time for injuries occurred after mid morning(9).

The assessment of severity of work related injury revealed that 55(17.1%) respondents were hospitalized as result of 322 injures, accounting for 40% hospitalization more than 24 hours. One hundred and three (53.9%) of the injured respondents were absent from work for more than 3 days. There were 2 deaths as result of work related injuries. According to the

literatures severity of work-related injuries increase medical, compensation cost and production losses to the employees and employer. Study done in Lebanon showed that the cost of work related injuries sharply increased with the severity of injury. This study has also reported that three (0.1%) deaths related to work-related injuries consumed 3.8% of the overall costs. Further, injuries that resulted in the hospitalization costs 12 times as much per injury as those did not (33).

In this study the inspection of work environment demonstrated that every worker is exposed to some kind of hazards; every work is associated with hazards such as excessive noise, excessive dust, unguarded machines, and chemicals that may be obvious and acute, or insidious and slow. This finding is in agreement with study done in Jimma, Nigeria and Tanzania (11, 18, 31). A one year study done in the chip wood enterprises in Jimma identified 70 % of workers being involved in one or more accidents such as with noise(5%), Machine(50%), Chemicals (20%), and other physical hazards(5%)(11).

The survey also revealed that there was inadequate health and safety provisions such as health and safety education programs, personal protective equipment, health and safety instructions and First Aid facilities as desired in sampled industries. Because of lack of health and safety training to wards danger of their occupation, 9.9 % of workers did not use the personal protective equipment. Other studies in small and medium scale industries also revealed that most workers operating with no knowledge of hazards associated with particular activities (11, 31). The study found that the majority 58(92.1%) of the surveyed industries did not have no any medical or even First Aid services.

The present study showed that the prevalence of work related injury increased with young age (<30 yrs), job category (daily laborer, mechanic and welder), work experience (5 years or less), and sleeping disorder. The rate seemed to decrease with low working hours per week, job satisfaction and work-place supervision.

Regarding age groups, a higher risk was found in subjects aged less than 30 years (OR=1.41, 95% CI=1.04-1.91). This observation was also reported by other investigators (1, 3, 8, 9, 21, 24,25,35,36,37,49).The findings indicate that the reasons for higher work-related injuries amongst young people include lack information , lack of training, lack of supervision ,lack of experience on the job , lack of knowledge and skill. Many workers begin work at an early age and often without safety training.

Most occupational health and safety studies conducted in developing countries revealed that increasing educational levels have been associated with decreasing work related injuries. This may be explained that education is likely to enhance workers health and safety practice that prevent them from work-related injuries (8,9,25). However, in our study educational level was not associated with occurrence of work-related injuries. This could be explained in part education only cannot eliminate injury when the level of hazards is high and when the use of reliable techniques and safe work organization are limited.

Laborers, mechanic and welder experienced more work related injuries than other workers. This could demonstrate that job category proxies for occupational hazards and the difference in the perception of risk and behavior (22, 24).This finding highlights that improvement in

working conditions and training should be carried out for all workers, but especially for workers with higher risk, that is laborers, mechanic and welders.

The present study showed that 5 years or less in the present job played a role in work-related injuries. Similar findings were detected in different studies (1, 3, 24). These studies showed that lack of experience influences the interaction between the person and other workers, knowledge of machines and tools in use and their defects, and awareness of surrounding hazards, independently of age.

One potentially important determinant of work related injury is work time- that is, the length of time worked per shift, week or indeed any other time. In this study, workers who were worked 48 hours and below per week were less likely to sustain work related injuries than their counter parts. This difference could partly explained as fatigue associated with long hours of work may increase the likelihood of work related injuries, and that exceptionally long hours may also result in injuries associated with breaching physical endurance limits. Long work time impair rest and sleep (48).

The results of present study have revealed that the occurrence of work-related injury is significantly related to sleep disorder. This could explain that sleep disorders affect the ability to maintain wakefulness, concentration, ability in assessing or watching the work environment and working conditions and performing duties and health status. Most occupational health and safety studies conducted in developing and developed countries strongly agree with this report (1, 24, 25, 38, 39,40, 41).

An increasing numbers of studies have considered job satisfaction and regular supervision of workplace as one of the most pervasive and influential factor in the occurrence of work related injuries in the work environment (21, 44, 45). The result of this study reveled risk of work-related injuries decreased with job satisfaction and workplace supervision.

Our study pointed out that no statistically significance difference was observed in the prevalence of work-related injuries between small and medium scale industrial workers. This might be explained, to some extent, by lack of difference in working conditions, working environment and status of work force in both types of industries. It must also possible to exclude the difference that might be recall bias in determining the outcome. Because many studies have shown that small-scale industrial workers are at great risk of work related injuries because of low education and literacy rates, inadequate training, unfamiliarity with work processes and exposures (6, 11, 12).

Strengths and limitations of the study

I. Strengths

1. As there is no published data on the prevalence, severity and determinant of work related injuries among small and medium scale industrial workers in Ethiopia, the results of this study can provide some information.
2. Use of multiple methods of data collection like physical examination, record review and work place observation to validate the self -reported information regarding work related injuries and work conditions.
3. Multiple determinant factors considered in this study were analyzed using a stepwise logistic regression technique. This technique helps control for interaction and confounding factors, and also to identify the most important risk factors for intervention.
4. Being a comparative study design could be mentioned as the strength of study..

II. Limitations

1. The study was a one -year cross sectional study. The possibility of recall biases resulting in under or over reporting and misreporting of events was likely.
2. There could be social desirability bias which might relate to compensation and also leadership or organization structure of sampled industries. This may result in over reporting of injuries.
3. There could be seasonal variations in occurrence of work injuries. The seasons may result in limited supply of raw materials to some industries and workers are given their annual leave or evacuated from their work. This may lead to low frequency of injury, due to less activity and less crowding of workers. On another hand seasons may result in increased production which may lead to increased employment. This may lead to increased frequency of injury, due to increased industrial activity and increased crowding of workers.

4. Workers who become injured may stay at home. The exclusion of some injured workers may obviously underestimate an association or the chance of its being detected.
5. The shortage of studies with similar methodological approach and on subjects with similar background characteristics to compare results.

Conclusion and recommendations

Work-related injury prevention and control involves studying the patterns and risk factors of injuries and applying the findings to public policy with the goal of reducing the frequency and severity of work-related injuries. The results of this study found high rates of work-related injuries among small and medium scale industrial workers. The overall annual prevalence rate of work-related injury was 335 per 1000 exposed workers. Fifty five (17.1%) of the injured respondents were hospitalized, accounting for 40% hospitalization more than 24 hours. One hundred and three (53.9%) of the injured respondents were absent from work for more than 3 days. There were two deaths as result of work related injuries in the last 12 months.

In agreement with other studies, the work environment inspection revealed that in all industries workers were highly exposed to physical, chemical, mechanical and other occupational health and safety hazards. Moreover, there was inadequate provision of health and safety services to workers.

Consistent with other studies, workers who were young, less experienced, daily laborer, mechanic and welder by job category, and sleep disorder had significantly higher risks of work-related injury. There is growing body of evidence suggesting that there are social and demographic gradients in the occurrence of work-related injuries. Consistent with other studies, working 48 hours or below per week, job satisfaction and workplace supervision were significantly decreased the occurrence of injuries. These reinforces that the need to consider psychological and work organization factors when devising a comprehensive plan for the

prevention of work-related injuries. No statistically significant relationship between the type of industry and the risk of work-related injuries was detected.

Based on the above findings and conclusions for sustained prevention and control of work-related injuries, the following recommendations are made for action:

1. Provide appropriate health and safety training for workers, beginning with the first day of their employment.
2. Strength strict supervision of workplace and working conditions.
3. Establish active and functional health and safety programmes.

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Annexes

Annex 1: English version questionnaire

Addis Ababa University

Faculty of Medicine

Department of Community Health

Questionnaire for assessment of work-related injuries among small and medium scale industrial worker in North Gondar Zone.

Questionnaire identification number _____

Identification

Name of industry _____ Type of industry: 1. Small-scale 2. medium scale

Final product _____

Address: Kebele _____

Verbal consent form before conducting interview

Greeting

Hello, I am _____. I am working in the research team of Addis Ababa University of Medical Faculty of Community Health of Department. I would like to ask you a few questions about an incident at job that resulted in injuries to you in the previous 12 months. This will help us to improve occupational safety, health and working environment services provided to you based on your answer to our questions. Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential. Your participation is voluntary and you are not obliged to answer any question you do not wish to answer. If you feel discomfort with the interview please feel free to drop it any time you want. This interview will take about 30 minutes. Do I have your permission to continue?

1. If yes, continue to the next page
 2. If no, skip to the next participant by writing reasons for his/ her refusal
-

Informed consent Certified by

Interviewer: Code _____ Name _____ signature _____

Date of interview _____ Time started _____ Time completed _____

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

Checked by Supervisor: Name _____ signature _____ Date _____

Questionnaire identification number _____

Section one: Socio demographic information.

NO.	Question	Possible Response	Skipping	Code
101	Sex	1.Female 2.Male		
102	Age (If he or she does not know ask before and after event significant)	_____ Years		
103	Religion	1.Orthodox 2.Catholic 3. Protestant 4.Muslim 5. Others specify.		
104	Educational level	1. Illiterate 2.Can read and write 3.Primary school (1-8) 4. Secondary school (9-12) 5.Graduated from Technical and Vocational school		
105	Marital status:	1.Married 2.Single 3.Divorced 4.Widowed 5.Separated		
106	Employment pattern	1.Permanent 2.Temporary		
107	Job category	_____		
108	Service duration in day or month or year in the same workplace	_____		
109	Daily or monthly salary in birr	_____		
110	Area of Residence	1.Urban 2.Rural		

Questionnaire identification number _____

Section Two: Work related injury characteristics

No	Question	Possible Response	Skipping	Code
201	Have you had an incident at job that resulted in an injury to you in the last two weeks?	1.Yes 2.No		
202	Have you had an incident at job that resulted in an injury to you in the last 12 months?	1.Yes 2.No	If no, Skip to Q 301	
203	If yes to Q201 or /and 202, how many times?	1. Once 2. More than once		
204	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. Upper Leg 1.Yes 2.No 12. Lower Leg 1.Yes 2.No 13. Back 1.Yes 2.No 14. Chest 1.Yes 2.No 15. Multilocation 1.Yes 2.No		

		16. Other specify _____		
--	--	-------------------------	--	--

Questionnaire identification number _____

205	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. Eye injury 1.Yes 2.No 8. Ear injury 1.Yes 2.No 9. Suffocation 1.Yes 2.No 10. Electrocutions 1.Yes 2.No 11. Amputation 1.Yes 2.No 12. Poisoning 1.Yes 2.No 13. Other, specify_____		
206	What were you doing at the time of injury	_____		
207	Causes of injury	1. Machinery 1.Yes 2.No 2. Hit by Falling objects 1. Yes 2.No 3. Electricity 1.Yes 2.No 4. Splintering objects 1. Yes 2.No 5. Hand tools 1.Yes 2.No 6. Fire 1.Yes 2.No 7. Acids and hot substances 1.Yes 2.No 8. Falls 1.Yes 2.No 9. Collision with objects 1.Yes 2.No 10. Lifting heavy objects 1.Yes 2.No 11. Other, specify_____		

Questionnaire identification number _____

208	Day of injury:	1.Monday 2.Tuesday 3.Wednesday 4.Thursday 5.Friday 6.Saturday 7.Sunday	1.Yes 2.No 1.Yes 2.No 1.Yes 2.No 1.Yes 2.No 1.Yes 2.No 1.Yes 2.No 1.Yes 2.No		
209	Time of injury	1.In the morning 2.In the Afternoon 3.In the evening 4. In the midnight	1.Yes 2.No 1.Yes 2.No 1.Yes 2.No 1.Yes 2.No		
210	Were you hospitalized as result of injury in the last 12 month	1. Yes 2. No			
211	If Yes Q. 210, for how long	1. less than 24 hrs 2.more than 24 hrs			
212	Number of days lost due to injury at work last one year (in days)	_____			

Section three: Work environment information

30	Hours worked per week	_____			
302	Workplace regularly supervised	1.Yes 2.No			
303	Have you had any safety training in connection with	1.Yes 2.No			

	new employment, new equipment or other Changes?			
--	---	--	--	--

Section four: Information on workers behavior

401	Do you drink alcohol?	1. Yes 2 No		
402	If yes to 401, how often?	1. Every day 2. 1-3 days/wk 3.Occasionally		
403	Do you chew chat?	1. Yes 2. No		
404	If yes to Q403, how often?	1. Every day 2. 1-3 days/wk 3.Occasionally		
405	Do you have any sleeping disorders	1. Yes 2. No		
406	Are you satisfied with the job or task required to do	1.Yes 2.No		
407	Do you use any personal protective equipment?	1.Yes 2.No	If no skip to Q 409	
408	If yes to Q407, what type?	1.Gloves 1.Yes 2.No 2.Ear plug 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 1.Yes 2.No 9.Others, specify ____		
409	What are your reasons for not using personal protective	1. Lack of protective equipment. 2. Lack of safety and heath education. 3.Not comfortable to use 4.Decrease work performance		

	equipment?	5.Create safety and health hazards 6.Other, specify_____		
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That is the end of our questionnaire. Thank you very much for taking time to answer these questions. We appreciate your help.

Annex 2: Amharic version questionnaire

ህክምና ፋካልቲ
የሕብረተሰብ ጤና ትምህርት ክፍል

ይህ መጠይቅ በሰሜን ጎንደር ዞን በሚገኙ መለስተኛና መካከለኛ ኢንዱስትሪ ስራተኞች መካከል ከሥራ ጋር በተያያዘ የደረሱ ጉዳዮችን ለማጥናት የተዘጋጀ ነው ።

የመጠየቂያ ቅጽ መለያ ቁጥር _____

መለያ

የኢንዱስትሪው ስም _____ የኢንዱስትሪው አይነት 1. መለስተኛ 2. መካከለኛ የምርት ወጤት _____ ቀበሌ _____

ቃለ መጠይቁን ከማድረግ በፊት የተሳታፊዎች ፍቃድኝነት መጠየቂያ ቅፅ ሰላምታ፣ እንድምን አሉ? እኔ/ወር/ወ/ሪት _____ እባላለሁ።

እዚህ የመጣሁት ይህንን ጥናት የሚያካህድ የአዲሳባ ዩንቨርሲቲ ህክምና ፋካልቲ የህብረተሰብ ጤና ትምህርት ክፍል ቡድን አባል ሆኜ ነው።

ከዚህ በመቀጠል ከሥራ ጋር በተያያዘ ባለፉት 12 ወራት ውስጥ የደረሰዎት ጉዳዮችን በተመለከተ የተወሰኑ ጥያቄዎችን ልጠይቅዎት እወዳለሁ። ከእርሶ የሚገኘው መልስ በሀገራችን ለሚከናወነው የሙያ ድህነት ጤንነትና የስራ አካባቢ አገልግሎትን ለማሻሻል ከፍተኛ እገዛ ይኖረዋል።

ከአረስዎ የሚናገሩትን ማንኛውንም መልስ በሚስጥር እንጠብቃለን። ከዚህ ጥናት ጋር በተያያዘ በማንኛውም ቦታና ጊዜ ሥምዎ እንደይዳኛና እንደማይጠቀስ ልንገልፅልዎ እንወዳለን። በአጠቃላይ መጠይቁ ወደ 30 ደቂቃ ገደማ የሚወስድ ሲሆን በጥናቱ የምናሳትፎት የእርሶን ሙሉ ፈቃድኝነት ስናገኝ ብቻ ነው። በመጠይቁ ሂደት ለመመለስ የማይፈልጉትን ጥያቄዎች ያለመመለስ መብትዎ የተጠበቀ ነው።

በጥናቱ ለመሳተፍ ፈቃደኛ ነዎት?

1. አዎ _____ ወደሚቀጥለው ይሸጋገሩ።
2. የለም _____ ፍቃደኛ ያልሆኑበትን ምክንያቶች በመጻፍ ወዳሌላ ተጠያቂ ይሸጋገሩ።

ፍቃድኝነትን ያረጋገጠው የጠያቂ ለያ ቁጥር _____ ሥም _____ ፊርማ _____ ቀን _____

መጠይቁ የተሞላበት ቀን _____ የተጀመረበት ሰዓት _____

የተጠናቀቀበት ሰዓት _____

ስለመረጋገጡ የተቆጣጠሪ ሥም _____ ፊርማ _____ ቀን _____

ውጤት:

1. ተጠቃሏል
2. ተጠያቂው አልተገኘም

- 3. ተጠያቂው ተቃውሞዋል
- 4. በከፊል ተጠናቋል

ክፍል አንድ: ማህበራዊ ስነ ህዝባዊ ገፅታዎችን በሚመለከት

ተ.ቁ	ጥያቄ	አማራጭ መልሶች	መሻጋገር	ኮድ
101	ፆታ	1. ሴት 2. ወንድ		
102	አድሜ በአመት	_____		
103	ሀይማኖት	1. ኦርቶዶክስ 2. ካቶሊክ 3. ኻርቲብያንት 4. ሙስሊም 5. ሌላ ካለ ይጠቀስ		
104	የትምህርት ደረጃ	1. መፃፍና ማንበብ የማይችል /የማትችል 2. መፃፍና ማንበብ የሚችል/የሚትችል 3. የመጀመሪያ ደረጃ ት/ት (1-8) ያጠናቀቀ/ች 4. ሁለተኛ ደረጃ ት/ት (9-12) ያመናቀቀ/ች 5. ከቴክኒክና ሙያ ትምህርት ቤት የተመረቀ/ች		
105	የጋብቻ ሁኔታ	1. ያገባ/ች 2. ያላገባ/ች 3. የፈታ/ች 4. የሞተበት/ባት 5. አግብቶ/ታተለያይተዉ የሚኖሩ		
106	የቅጥር ሁኔታ	1. ቋሚ 2. ጊዜያዊ		
107	የሙያ አይነት	_____		
108	በሥራ ቦታዎ ስንት ቀን ወይም ወር ወይም አመት አገለገሉ?	_____		
109	የወር ደሞወዝ	_____		
110	መኖሪያ ቦታ	1. ከተማ 2. ገጠር		

ክፍል ሁለት :የስራ ቦታ ጉዳትን በተመለከተ

ተ.ቁ ጥያቄ መሻጋገር

ኮድ

አማራጭ መልሶች

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.አዎን 2. የለም የለም ካሉ ወደ ተ.ቁ

301 ይሻገሩ

204 203 አዎን ከሆነ ስንት ጊዜ? 1. አንድ ጊዜ ብቻ 2.ከአንድ ጊዜ በላይ

205 በጉዳቱ የተጎዳ የሰውነት ክፍል

- | | | |
|-----------------------|--------|-------|
| 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 እግር | 1.አዎን | 2.የለም |
| 13. ጆርባ | 1.አዎን | 2.የለም |
| 14. ደረት | 1. አዎን | 2.የለም |
| 15. በተለያዩ የሰውነት ክፍሎች | 1.አዎን | 2.የለም |
| 16.ሌላ ካለ ይጠቀስ_____ | | |

206 የጉዳቱ አይነት

- | | | |
|---------------------|-------|--------|
| 1. ጭረት | 1.አዎን | 2.የለም |
| 2. መቆረጥ | 1.አዎን | 2.የለም |
| 3. ቃጠለሎ | 1.አዎን | 2.የለም |
| 4. መውጋት | 1.አዎን | 2.የለም |
| 5. ስብራት | 1.አዎን | 2.የለም |
| 6. ወለምታ | 1.አዎን | 2.የለም |
| 7. አይን ላይ የደረሰ ጉዳት | 1.አዎን | 2.የለም |
| 8. ጆሮ ላይ የደረሰ ጉዳት | 1.አዎን | 2.የለም |
| 9. መታፈን | 1.አዎን | 2.የለም |
| 10. በኤሌክትሪክ መያዝ | 1.አዎን | 2. የለም |
| 11. የአካል መጉደል | 1.አዎን | 2.የለም |
| 12. መመረዝ | 1.አዎን | 2.የለም |
| 13. ሌላ ካለ ይጠቀስ_____ | | |

207 ጉዳቱ በደረሰበት ወቅት ምን ሲሰሩ ነበር _____

208	የጉዳቱ ምክንያት	1.ማሸኞች	1.አዎን	2.የለም
		2.በሚወድቁ እቃዎች በመመታት	1.አዎን	2.የለም
		3.ኤሌክትሪክ	1.አዎን	2.የለም
		4.በተፈናጣሪ ነገር	1.አዎን	2.የለም
		5.የእጅ መሣሪያዎች	1.አዎን	2.የለም
		6.እሳት	1.አዎን	2.የለም
		7.አሲድ እና ትኩስ ነገሮች	1.አዎን	2.የለም
		8.መውሰቅ	1.አዎን	2.የለም
		9.ግጭት	1.አዎን	2.የለም
		10.ከባድ እቃዎችን በማንሳት	1.አዎን	2.የለም
		11.ሌላ ካለ ይጠቀስ_____	1.አዎን	2.የለም

209	ጉዳቱ የደረሰበት ቀን	1.ሰኞ	1.አዎን	2.የለም
		2.ማክሰኞ	1.አዎን	2.የለም
		3.እርብ	1.አዎን	2.የለም
		4.ሐሙስ	1.አዎን	2.የለም
		5.አርብ	1.አዎን	2.የለም
		6.ቅዳሜ	1.አዎን	2.የለም
		7.አሁድ	1.አዎን	2.የለም

210	ጉዳቱ የደረሰበት ሰዓት	1.ጧት	1.አዎን	2.የለም
		2.ከሣዓት	1.አዎን	2.የለም
		3.ማታ	1.አዎን	2.የለም
		4.ሰላት	1.አዎን	2.የለም

211 በደረሰበዎት ጉዳት ምክንያት በጤና ተቋም ተኝተዉ ታክመዉል? 1. አዎን 2. የለም

212 211 አዎን ከሆነ ለስንት ሰዓታት 1. ከ24 ሰዓትና ከዚያ በታች 2. 24 ሰዓት በላይ

213 ከሥራ ጋር በተያያዘ ጉዳቶች ምክንያት ባለፈት አሰራ ሁለት ወራት ውስጥ ከሥራ የቀሩበት ቀናት ብዛት _____

ክፍል ሶስት: የስራ ቦታን በተመለከተ

301 በሰዎች ምን ያክል ሰዓት ይሰራሉ? _____

302 የሥራ ቦታ ቁጥጥር ተደርጎ ያውቃል? 1. አዎን 2. የለም

303 የሥራ ቦታ ደህንነትን በተመለከተ አዲስ ሆነዉ ስቀጠሩ ወይም በአዳዲስ አሰራሮች ወይም በሌሎች ለዉጦች ምክንያት ሥልጠና ወስደዉ ያዉቃሉ? 1. አዎን 2. የለም

ክፍል አራት፡ የስራተናውን ባህሪ በተመለከተ

- 401 አልኮል መጠጥ ጠጥተው የወቃሉ? 1. አዎን 2. የለም
- 402 የሚጠጡ ከሆነ ስንት ጊዜ? 1. በየቀኑ 2. ከ1-3 ቀን በሳምንት 3. አልፎ አልፎ
- 403 ጫት ቅመው ያወቃሉ? 1. አዎን 2. የለም
- 404 የሚቅሙ ከሆነ ስንት ጊዜ? 1. በየቀኑ 2. ከ1-3 ቀን በሳምንት 3. አልፎ አልፎ
- 405 የእንቅልፍ ችግር አለበዎት? 1. አዎን 2. የለም
- 406 በሚሰሩት ስራ ደስተና ነዎት 1. አዎን 2. የለም
- 407 በስራ ቦታዎ የጉዳዮች መከላከያ መሣሪያዎች ተጠቅመው ያለወቃሉ? 1. አዎን 2. የለም የለም
ካሉ ወደ ተ.ቁ
- 409 ይሻገሩ
- 408 ተጠቅመው ያሚያወቁ ከሆነ ምን አይነት? 1. ጋንት 1.አዎን 2.የለም 1.አዎን
2.የረሮ መከላከያ 2.የለም
3.የአፍንጫና አፍ መከላከያ 1.አዎን
2.የለም
4.የጭንቅናት መከላከያ 1.አዎን
2.የለም
5.የሥራ ልብስ 1.አዎን
2.የለም
6.የብዩዳ መነጻር 1.አዎን
2.የለም
7.የፊት መከላከያ 1.አዎን
2.የለም
8.ቦቲ ጫማ 1.አዎን
2.የለም
9.ሌላ ካለ ይጠቀስ_____
- 409 የማይጠቀሙ ከሆነ ምክንያትዎ ምንድን ነው?
1.የመከላከያመሣሪያዎች ባለመኖራቸው ምክንያት
2.የደህንነትና ጤና ትምህርት ስለማይሠጥ
3.ለአጠቃቀም ምቹ ስላልሆነ
4.የሥራ አፈፃፀምን ስለሚቀንስ
5.የደህንነትና የጤና ጠንቅ ሊያስከትል ስለሚችል
6.ሌላ ካለ ይጠቀስ_____

ይህ የጥያቄዎቻችን መጨረሻ ነው። እነዚህን ጥያቄዎች በመመለስ ጊዜ ወስደው ላደረጉልን ተብብር በጣም አናመሰድናለን።

Annex 3: checklist for observation of working environment

Addis Ababa University

Faculty of Medicine

Department of Community Health

Checklist for observation of working Environment in small scale and medium scale industries in North Gondar Zone.

Checklist identification number: _____

Identification

Name of industry _____ Type of industry 1.SSI 2.MSI

Major hazardous raw material in use _____

Final product _____

Address: Kebele _____

Total number of employees directly involved in production processes _____

Hazards in working environment

- 1 Is there excessive heat in the workplace? 1. Yes 2. No: A yes requires that a worker is found sweating when naked or with light clothing; if investigator feels as sudden heat wave when entering into the industry.
- 2 Is there excessive dust in the workplace? 1. Yes 2. No. A yes requires if the investigator experiences sudden sneezing upon entering the industry or if the worker's eye brows, hair, nostrils and cloths is observed by investigators to be covered with dust particle.
- 3 Is there excessive noise in the workplace? 1. Yes 2. No. A yes requires that it difficult to communicate with nearby worker without shouting.
- 4 Is there warning signs or safety rules? 1. Yes 2. No. A yes requires no lack of such arrangement at inspection around.
- 5 Do the employees use the necessary personal protective equipment? 1. Yes 2. No. A yes requires no lack in use of safety devices seen at inspection around.
- 6 Does all production equipment have the appropriate protective arrangements?
1. Yes 2.No .A yes requires no lack of such arrangement (poorly installed electric wire or unguarded machine or equipment) at inspection around.

- 7 What is the most dangerous incident in the industry during the last 12 months, and any preventive measures been implemented? 1. Yes 2. No. Attainment of yes requires specification of the incident and preventive measures.
- 8 Does the industry have copy of the most important safety and health regulations?
1. Yes 2.No. A yes requires a copy of the regulation.
9. Does the industry have of health and safety personnel? 1. Yes 2.No. Attainment of yes requires either implementation as result of initiative from heath and safety personnel or written programme for action worked out with them.
10. Does the industry follow written health and safety plan for action in the workplace?
1. Yes 2.No.A yes requires completion of at least one of the measures in the plan.
11. Does the industry have meetings to discuss safety and health factors with the employees in the last six months? 1. Yes 2.No. A of yes requires minutes with written conclusions.
12. 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.
13. 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

That is the end of our observation. Thank you very much for taking time to answer these questions. We appreciate your help.

Name of inspector _____

Signature _____ **Date** _____

Annex 4.

Map of Study area

