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SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF OCCUPATIONAL INJURIES AND ILLNESS SYMPTOMS AMONG ADDIS ABABA CITY SOLID WASTE COLLECTORS

BY

DANIEL BOGALE (BSc)

ADVISORS: ABERA KUMIE (MD, MSC, PhD)
WORKU TEFERA (MPH, PhD Fellow)

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Assessment of occupational injuries and illness symptoms among Addis Ababa city solid waste collectors

By

Daniel Bogale

Department of community health faculty of medicine Addis Ababa University

Approved by examining board

_____	_____
Department of graduate committee	signature
Dr. Abera Kumie	_____
Advisor	signature
Dr. Belayneh Girma	_____
External examiner	signature
Ato Seifu Hagos	_____
Internal examiner	signature

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List of acronyms and abbreviation

AAU	Addis Ababa University
CI	Confidence Interval
ETB	Ethiopian Birr
MSDs	Musculoskeletal Disorders
MSE	Micro and Small Enterprise
MSW	Municipal Solid Waste
PI	Principal Investigator
PPE	Personal Protective Equipment
REC	Research Ethics Committee

Abstract

Background: Municipal solid waste workers are highly exposed to health and environmental safety risks due to exposure to heavy workloads, bio-aerosols, volatile compounds, potentially hazardous or even infectious materials. In our country, like many developing countries, municipal solid waste is collected manually and collection of household waste is also a job which requires repeated heavy physical activities such as lifting, carrying, pulling, and pushing.

Objective: To assess occupational injuries and illness symptoms and factors affecting injuries among solid waste collectors in Addis Ababa city.

Methods: Cross-sectional study design was employed to assess occupational injuries and illness symptoms among household solid waste collectors. There were 280 household solid waste collector unions in five randomly selected sub-cities. A total of 876 workers from 92 unions which were proportionally allocated to each sub-city were participated in the study. A structured questionnaire based face to face interviews and observational check list for personal protective device status and utilization pattern were used to collect data.

Results: The response rate of this study was 97.9% and female respondents were account 71.2%. The median age of the study subjects was 33 years (ranging from18 to 70 years). The overall occupational injury prevalence rate in the last 12 months was 383 (43.7%). None use of personal protective equipments while being on duty [AOR: 2.62, 95%CI: (1.48-4.63)] and as compared to those who had five and more children, odds of injuries for those who had 3-4 children was reduced by around half [AOR: 0.52, 95%CI: (0.30-0.93)]. The prevalence of dermal illness symptoms; itching and eczema among study participants were 27.7% and 33.6% respectively. In this study total of 311 (35.5%) participants reported that they had been troubled with musculoskeletal symptoms (joint and back pain) during the last 12 months.

Conclusion: There are injuries and illness symptoms among this group of workers in a level that need immediate measure. So, implementation of basic occupational health and safety services like training on occupational health and safety with the provisions of personal protective devices and follow up of their appropriate utilization among this group of workers are highly advisable.

1. Introduction

1. 1 Background

Solid waste collectors throughout the world are exposed to occupational health and accident risks related to the content of the materials they are handling, emissions from those materials, and the equipment being used. They have high occupational health risks, including risk from contact with human faecal matter, papers that may have become saturated with toxic materials, bottles with chemical residues, metal containers with residue pesticides and solvents, needles and bandages from hospitals, and batteries containing heavy metals. Furthermore, they are exposed to exhaust fumes of waste collection trucks traveling to and from disposal sites and dust from disposal operations, all do contribute to occupational health problems (1-3). The waste collector's job involves repetitive motion awkward working positions, forceful hand exertion, and frequent manual handling. Dim lighting in early morning hours, and rain, are inevitable. All such conditions potentially contribute to ergonomic problems (1).

While standards and norms for handling municipal solid wastes in industrialized countries have reduced occupational and environmental impacts significantly, the risk levels are still very high in most developing countries because of inadequate understanding of the magnitude of the problem. In low-income countries, solid waste collectors are likely to have a low socio-economic status and the medical problems of these workers are further compounded by various socioeconomic factors such as poverty, lack of education, poor housing conditions and poor diet. Farther more, this group of workers are exposed directly and without adequate personal protection to municipal solid waste (MSW) which includes hazardous substances, they are more susceptible to occupational hazards (2-4). The common health problem investigated among this working group include respiratory symptoms, irritation of the skin, nose and eyes, gastrointestinal problems, fatigue, headaches, psychological problems, allergies, musculoskeletal and dermal injury risks such as strains or sprains, contusions, fractures, and lacerations (5, 6).

Solid waste collection by its nature is monotonous work and it makes workers to search some means to escape. So they easily fall to prey several evils like drinking, smoking and taking other drugs (2). Apart from the social atrocities that these workers face, they are exposed to certain

health problems by virtue of their occupation (7). In order to work, especially at physically demanding jobs such as solid waste collection, the worker must be relatively healthy. In this environment, the worker's health is his/her greatest asset and a precondition for the sustainable generation of income. If he or she has acquired a work related a severe injury or disease, then the worker leaves the workforce, leading to underestimate the prevalence of disease and injury in that workforce (1, 5).

Protection of workers from occupational hazards depend on availability and proper utilization of protective equipments, which in low and middle income countries may be in short supply and inadequate monitoring of utilization (8). Moreover, cleaning workers often lack training, tools and information in order to perform their work in the best healthy and safe manner. Waste collectors with middle age and low level of education are at higher risk of occupational injuries. Regular awareness programs should be implemented to impart education regarding safer work procedures and use of personal protective devices. In addition to these, routine medical checkup program for all solid waste collectors should be implemented and maintained, to keep them safe and secure (7, 9, 10).

1.2 Rationale of the study

Like many developing countries, municipal solid waste in Addis Ababa city is collected manually. It requires repeated heavy physical activities such as lifting, carrying, pulling, and pushing. The waste awaiting collection is readily available to insect and rodent vectors and scavenging animals which are potential carriers of enteric pathogens. Workers are transferring waste from any kind of container into sacks or directly into a pushcart which is pushed over rough, unpaved or cobbled, inclined roads to collection sites, where the waste is manually emptied into a container or truck. Workers have less protection whereas most waste is not safely contained in readily liftable load sizes. In addition to this, they cannot afford to get early checkup and treatment while they faced any health problems. There is inadequate credible evidences on occupational injuries and illnesses of waste handlers and workers in the country which is paramount for designing new strategies to address the problem for both governmental and none governmental organizations. Therefore, this study was designed to investigate magnitude of occupational injuries and illness symptoms and contributing factors among solid waste collectors in Addis Ababa city.

2. Literature Review

According to the Protocol of 2002 to the Occupational Safety and Health Convention, 1981 (No. 155), the term "occupational disease" covers any disease contracted as a result of an exposure to risk factors arising from work activity (11). It is estimated that every year over 1.2 million workers are killed due to work-related accidents and diseases and 250 million occupational accidents and 160 million work-related diseases are occurring. The economic loss related to these accidents and diseases are estimated to 4% of world Gross National Product (12).

There are many health hazards encountered by solid waste workers. These hazards can be categorized as biological, chemical, mechanical, physical, ergonomic and psychosocial hazards that lead workers to variety of health problems. Exposure to harmful gases such as methane and hydrogen sulfide, cardiovascular degeneration, musculoskeletal disorders, infections like hepatitis, and helicobacter, skin problems, respiratory system problems and easy to serious physical injuries are some of health problems encountered by solid waste collectors (9).

2. 1 Biological hazards

It has been reported that increased exposure to bio-aerosols and volatile compounds lead to elevated incidence of work-related respiratory, gastrointestinal and skin problems among waste collectors compared to the general workforce (6, 13, 14). A personal sampling campaign for culturable bacteria and fungi in the breathing zones of waste collectors in a variety of typical work settings was performed in the province of Quebec, Canada. Total culturable bacterial and fungal counts were analyzed and compared to ambient environmental levels (background) to determine the degree of incremental exposure among workers. Similar exposures to culturable bacteria and fungi have show adverse health effects such as nausea, diarrhea, upper respiratory tract irritation, and allergy (15). According to the study conducted in Miami, Florida on solid waste collectors, illnesses reported by the collectors included: rash or skin disease (46.1%), asthma, chronic coughing, breathing trouble, sinus congestion (29.4%), diarrhea, stomach trouble (22.5%), and allergies (22.1%) (1). Similarly, study in Colombo reviled that back pain, traumatic injuries, itchy rash, and cough were the common health problems among solid waste collectors and drainage cleaners (16).

2.2 Injuries and Ergonomic hazards

Cuts, bruises and ruptures in the body, back pain, joint pain, elbow injury, wrist pain and other physical pains and aches are some examples of physical injuries (16, 17). The work of waste collectors involves considerable heavy lifting as well as other manual handling of containers, increasing the risk of musculoskeletal problems and dermal injury risks such as strains or sprains, contusions, fractures, and lacerations (5, 6). While injury rates for all Florida industrial workers decreased, the injury rates of MSW workers almost doubled from 1993 to 1997 (5). Another study result indicated that MSW workers suffer a routinely high rate of injury. Garbage collectors in particular may be injured at a rate of 80 injuries per 100 collectors per year. This finding indicates that garbage collection is one of the most dangerous professions in the United States (18). According to the study conducted in Miami, Florida on solid waste collectors, the most frequently reported injuries by solid waste collectors surveyed were: strain or sprain (44.7%), cut/wound (42.5%), serious bump or bruise (34.5%) (1). Different studies were showed that most injuries were caused by bumping against or being hit by goods, vehicles, or objects, falling from a higher elevation, overloading of body or internal organs, stepping on or making contact with a sharp object, and stumbling and falling from the same level, pulling/pushing, repetitive motion, awkward body posture (19, 20). Unsorted inorganic wastes and labor-intensive waste handling practices are the leading causes of high rate of physical injuries (17).

2.3 Psycho-social hazards

There are different forms of social/psychological problems that workers face from different work settings. Some of these problems are humiliation, verbal abuse, sexual abuse, isolation, lack of learning / lack of career as part of future plans and encouragement to take risks (21). Workers in solid waste collection settings also face systematic harassment and stigmatization either from supervisors or from residents and it is characterized by a sense of unjust treatment. Victims of mobbing often suffered ill health such as depression and post-traumatic stress and they sometimes responded by violent behaviors such as smoking, drinking, chewing chat, etc (11). Alcohol consumption and smoking were identified as the main psycho-social problems among solid waste workers. Most of employees in this work place admitted to increasing or starting the habits of drinking alcohol and smoking after they are joining current line of work (16).

2.4 Occupational safety issues

A basic occupational training program and specialty courses shall be provided as needed to ensure that workers are oriented to the specific hazards of individual work assignments. The training of workers themselves in occupational health and safety issues, as well as workers' rights within the workplace has been an important part of improving working conditions. Workers prior to commencement of new assignments have received adequate training and information enabling them to understand the hazards of work and to protect their health from hazardous ambient factors that may be present. The training must adequately cover: a) knowledge of materials, equipment, and tools; b) known hazards in the operations and how they are controlled; c) potential risks to health; d) precautions to prevent exposure; e) hygiene requirements; f) wearing and use of protective equipment and clothing; and g) appropriate response to operation extremes, incidents and accidents. These messages can be delivered by frequent campaigns through the mass media, seminars, and training workshops (22-24).

Workers in different workplace give different responses for not to use personal protective equipments (PPE) while they are on duty. The study conducted in Afar, Tendaho farm stated that the main reason for not using personal protective devices was absence of the devices 98.3% of the workers and absence of health and safety training among 31.3% workers (25). Poor protective measures and absence of first aid in time of injury is intensifying the problem (17).

There is paucity of data on occupational injuries and diseases, which is now becoming a concern given for the scaling up of development in Ethiopia. Specifically there is inadequate credible evidences on occupational injuries and illnesses of waste handlers and workers in the country which is paramount for designing new strategies to address the problem for both governmental and none governmental organizations. The summary of relation between health hazards and associated factors based on the above literature review is charted in Figure 1. The purpose of this study was to assess magnitude of occupational injuries and illnesses symptoms and factors among Addis Ababa city solid waste collectors.

2.5 **Conceptual frame work**

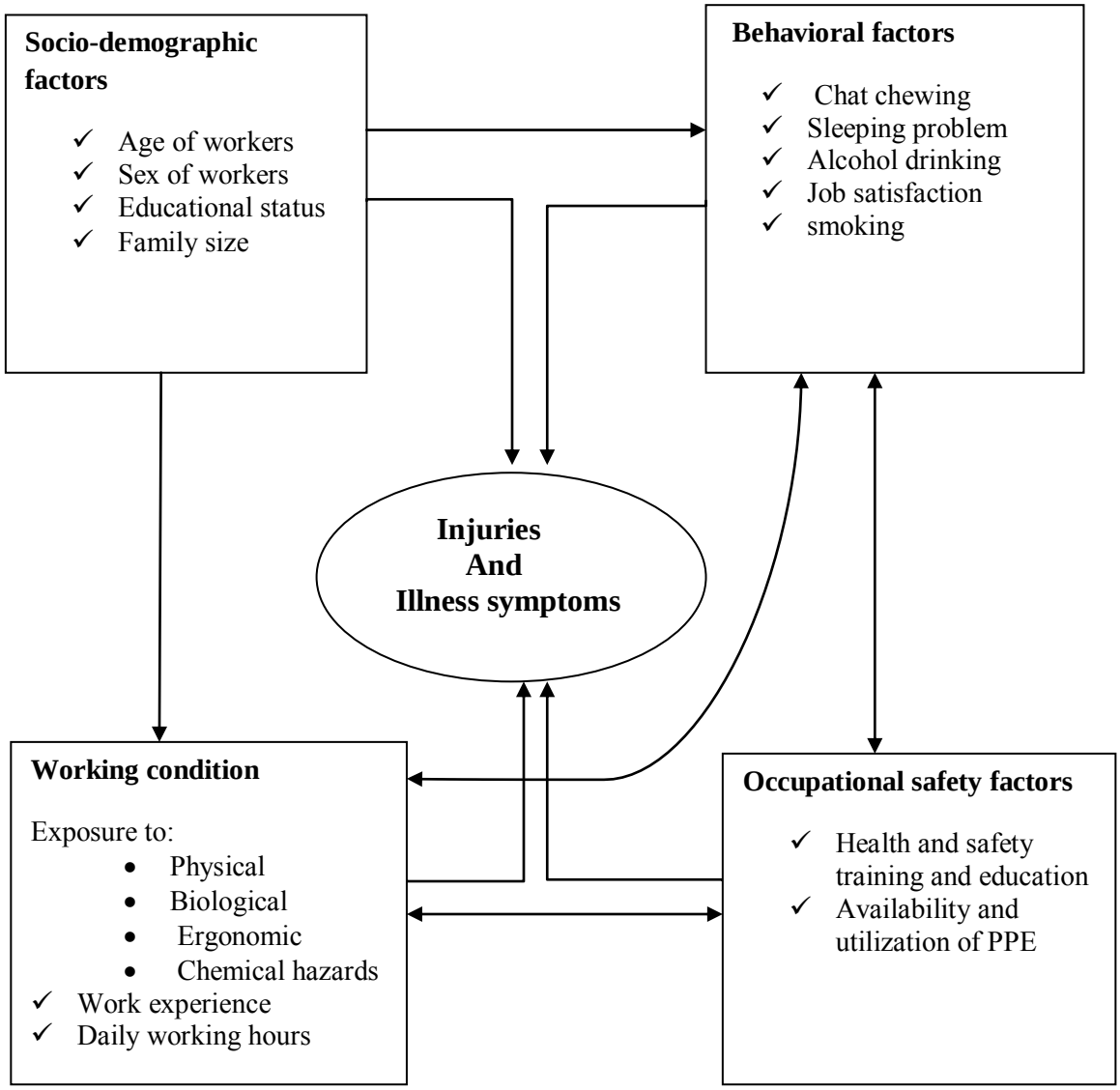

Figure1. Conceptual frame work of occupational injuries and illness symptoms

Note: These factors are affecting both injury and illness symptoms either directly or indirectly.

3. Objective of the study

3.1 General objective

To assess magnitude of occupational injuries and illness symptoms among solid waste collectors in Addis Ababa city

3.2 Specific objectives

1. To assess the prevalence of occupational injuries
2. To describe prevalence of occupational illness symptoms
3. To assess factors associated with occupational injuries

4. Methods

4.1 Study Area and period

The study was carried out in Addis Ababa, capital city of Ethiopia. It is a home for 2,738,248 people (26) with an area of 540 square kilometers (54000 hectares). Average elevation of the city is 2500 meter above sea level. The city is organized by three layers of government: City Government at the top, 10 sub-city administrations in the middle, and 113 woredas at the bottom. From the total waste generated in the city of Addis Ababa, 1482m^3 of waste is collected and transported to disposal site per day and 540,789m^3 per annual. This accounted for about 65% of the total collection and disposal of waste. The rest 5% composted, 5% recycled and 25% of the waste is dumped in unauthorized and open dumping areas. Households account for 76% of the total generation of waste, institutions/commercial, factories, hotels and health facilities comprised 18% and street sweeping for 6% of the total generation. Currently a number of micro and small enterprises are emerging to participate in primary solid waste collection. The emerging MSEs have tried to collect garbage from the households and transport it to the municipal waste containers and transfer points (27). Secondary collection is accomplished by government (municipality) and some private sectors that are from containers filed by the above mentioned unions to the final disposal site (Reppi). The city is divided in to 549 zones each comprising 800-1000 households and in each zone one MSE is assigned to work on solid waste collection (28). The number of enterprises organized to work on home-to-home solid waste collection are 518 with a total number of 5454 operators (personal communication). The study was conducted during January 2012.

4.2 Study Design

Cross-sectional quantitative study design was employed to answer the proposed objectives of this study.

4.3 Source Population

All Addis Ababa city solid waste collectors (5454) that were organized under 518 household solid waste collector unions were the source population of this study.

4.4 Study population

Solid waste collectors working in Addis Ketema, Kirkos, Lideta, Nifas Silk Lafto and Kolfe sub-cities were the study population.

Sampling units were household solid waste collector **unions** found in five sub-cities mentioned above.

The study units were all solid waste collectors working in the selected unions that were found in the above sub-cities.

Inclusion criteria

Every worker in the selected unions who was working as a solid waste collector for a minimum of one year and who can hear and speak (not deaf and damp) was included to the study. Workers may not develop or/and fill some of the illness symptoms within short period of time so that, a minimum of one year service was considered.

4.5 Sample size determination

Sample size for objective one and two was calculated using a single population proportion formula based on the following assumptions: magnitude of cut/wound among house hold solid waste collectors = 42.5% (1).

$$n = \frac{(\frac{Z\alpha}{2})^2 P(1-P)}{d^2}$$

Where: $Z\ \alpha/_2$ = Standard score corresponding to 95%CI=1.96

P = Proportion of cut/wound among house hold solid waste collectors = 42.5%

d = Margin of error/ precision = 4%

$$n = \frac{(1.96)^2(0.425)(1-0.425)}{(0.04)^2} = 586$$

After 10% contingency was added, the final sample size was = 645 workers.

The sample size for the third objective was calculated using double population proportion formula based on the following assumptions:

Proportion of occupational injuries among PPE users was assumed to be 50%,

Assuming a minimum of 10% difference detection rate among PPE users and non users and

Odds of occupational injuries among non users was 1.5 times higher than PPE users (29).

$$n_1 = \left[\frac{Z\frac{\alpha}{2}\sqrt{(1+\frac{1}{r})P(1-P)} + Z\sqrt{P1(1-P1)+\frac{P2(1-P2)}{r}}}{(P1-P2)^2}\right]^2$$

Where P_1 = 50% (proportion of occupational injuries among PPE users);

p_2 = 60% (proportion of occupational injuries among non users of PPE)

P - (Pooled proportion) = $(P_1+r\ P_2)/1+r$, P = (.5+.6)/2 = .55

α = 0.05 the probability of committing type one error (1.96)

= 20% the probability of rejecting a true difference

r = 1 the proportion of n_1 to n_2 is 1 to 1 n1= 407; n2= 407

By considering 10% non response rate n_{total}= 895

Accordingly, a double population proportion formula was yield the largest sample size which was 895. So it was the final sample size of this study.

4.6 Sampling procedures

A two-stage cluster sampling method was used to select fifty percent of sub-cities and about one third of unions in the selected sub-cities. Five sub-cities (Addis Ketema, Kirkos, Lideta, Nifas Silk Lafto and Kolfe) were selected using lottery method. On average a union contains 10 workers. Ninety unions from the above mentioned sub-cities were selected proportionally to unions they have. The design effect was not considered because the sample size was assumed enough to answer the objectives of the study. In addition to this, it was difficult cost wise to add sample size. Unions allocated to each sub-city were randomly selected from the list of total unions in that sub-city. Finally all workers in the selected union were interviewed. When the sum of workers in the selected unions was below the final sample size, additional union from woreda that has large number of unions was selected. Accordingly, at the time of data collection there were workers that were absent from work for more than a week prior to data collection time. Rather than considering them as none response, two unions were added and a total of 92 unions were included in the study. So that, none response was only for those who were absent from work at the time of data collection and not accessed on the second day of re visit.

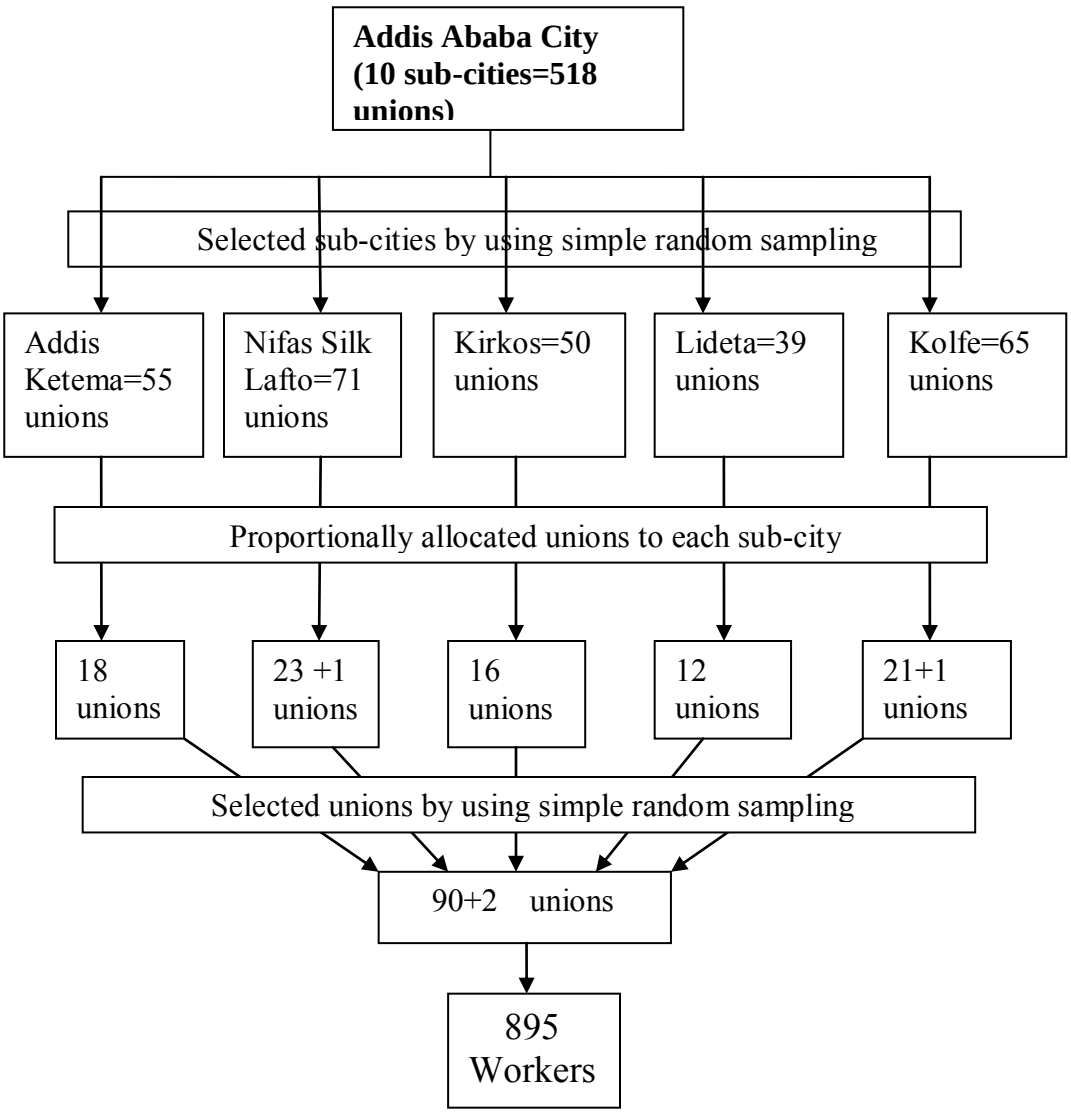

Figure2. Schematic presentation of the sampling procedure

4.7 Data collection tool and procedures

The data collection instrument (structured questionnaire) was adopted from ILO Occupational injury statistics and different relevant sources (30-32) with required modification based on outcome variables. The questionnaire was prepared in English and then translated to Amharic and later on translated back to English to insure the consistency. Pretest was conducted on one sub-city which was not included in the actual study for validation of questionnaire 15 days prior to actual data collection. Trained data collectors, 2 health officers and 2 environmental health background MPH students and 2 BSc holders (1 environmental health and 1 plant science) were collect data on work site. Two supervisors (MPH) students were supervising the data collection activities on the site.

4.8 Operational definition

Biological hazards: exposure to bacteria, viruses, fungi and other living organisms that can cause acute or chronic infections by entering the body either directly or through breaks in the skin in the work area.

Ergonomic hazards: work activities that cause the worker to experience physical and mental stress such as lifting, holding, pushing, walking and reaching.

Injury: the reported physical damage to body tissues caused by accident or by exposure to environmental stressor (33).

Illness symptom: perceived physical illnesses reported by solid waste collectors in the last 12 months in the course of their work.

Job satisfaction: It is a subjectively response of study participants about their job as it is pleasurable for them.

Micro and Small Enterprise (MSE): Small scale unions that are organized to collect waste from households to specific site which is accessible for transportation to final disposal site.

Water proof: devices that made from rubber or/and leather that do not result in leakage of fluid towards workers body.

Well dressed: if the workers are wearing protective devices properly on the right body parts for that particular PPE while they are on duty at the time of observation.

Perforated: devices or sacks that has porous and tear out so that it allows dust and fluid to workers body

4.9 Study variables

Dependent variables

- ✓ Injuries among workers
- ✓ Illnesses symptoms among workers

Independent variables

- ✓ Socio-demographic characteristics such as: Age, sex, educational status, family size
- ✓ Service year
- ✓ Daily working hours
- ✓ Safety training and education
- ✓ Availability and utilization of personal protective devices
- ✓ Behavioral factors like drinking alcohol, chewing chat and smoking cigarette
- ✓ Job satisfaction
- ✓ Sleeping disorder

4.10 Data processing and management

Data was checked for completeness and any incomplete information was excluded from the entry. Coded data was entered in to Epi Info version 3.5.1 computer software package. When the entry of every questionnaire was completed, the soft copy of every questionnaire was cross checked with its hard copy to see for the consistency. After the entry of the whole questionnaire was completed, cleaning was made to avoid missing values, outliers and other inconsistencies before analysis by using commands like frequency, sort, find and list on the same software. Cleaned data was exported to SPSS 16.0 version computer software package for analysis.

4.11 Data analysis

Descriptive statistics (frequencies, percentages and medians) of different variables was computed. Crude odds ratio with 95% CI was computed to see the presence of association between the selected independent variables at different categories and occupational injury and respiratory illness symptom. Multivariate logistic regression analysis was also made to observe the relative effect of independent variable on the dependent variable by controlling the effect of other

variables. To avoid many variables and unstable estimates in the subsequent model, only variables that reached a p-value less than 0.3 at the bivariate analysis level were kept in the subsequent model and enter method was used hierarchically (25, 29, 34, 35). First, the effect of selected socio-demographic variables on the magnitude of occupational injury and respiratory illness symptom were assessed. In the second step of analysis, occupational safety variables were included, and their effect was seen in the presence of socio-economic factors those maintain p-value less than 0.3 in the first model. Finally, behavioral factors were added to see their effect in the presence of socio- demographic and occupational safety variables that have p-value less than 0.3 in the previous models.

4.12 Data quality assurance

To maintain the quality of the data, structured and pre-tested questionnaire was used to collect information. Two days training was given to all data collectors, and supervisors in accordance with training manual developed beforehand. The collected information was frequently checked at the field by the supervisors. The overall supervision was made by the principal investigator. Questionnaire was checked for completeness every night at the time of data collection. Feedbacks on previous day activities were given for both data collectors and supervisors.

4.13 Ethical Considerations

Ethical clearance was obtained from Addis Ababa University College of Health Sciences Ethical Committee. Formal letter was written to Addis Ababa city solid waste management and recycling project office and this office then write letter back to each sampled sub-city. The principal investigator communicates these bodies. The information sheet and consent was provided for respondents to read for those who can read and the interviewer was read the paper for respondents who cannot read and finally he or she was asked for his or her agreement to participate in the study. Confidentiality and privacy was maintained by omitting their names and personal identification.

4.14 Dissemination and utilization of Results

The result of the study will be disseminated or/and communicated to Addis Ababa University College of Health Science and Addis Ababa city solid waste management and recycling project office. Furthermore the study finding will be avail to the people through publication.

5. Results

5.1 Socio-demographic characteristics

Eight hundred seventy-six workers participated in the study with 97.9% response rate. The majority of respondents were females which account 71.2% and the median age of respondents was 33 years with 18 and 70 minimum and maximum ages respectively. The majority of the respondents, 523 (59.7%) were working throughout seven days of the week where as the rest were working six and less than six days per week. Eight hundred forty-two (96.1%) of study participants were working eight hours and below and the rest were working more than eight hours per day. The median monthly income for the survey respondents was 400 Ethiopian birr with a range of 200 to 900 birr.

Table 1: Distribution of respondents by socio- demographic characteristics of Addis Ababa city solid waste collectors, January 2012

Variables	Frequency (n=876)	Percent
Sex		
Male	252	28.8
Female	624	71.2
Marital status		
Married	512	58.4
Single	191	21.8
Divorced/separated	90	10.3
Widowed	83	9.5
Educational level		
Illiterate	334	38.1
1^0 school	481	54.9
2^0 school and above	61	7.0
Employment condition		
Permanent	864	98.6
Contract	12	1.4
Other job		
Yes	94	10.7
No	782	89.3
Family size		
Two and less family	277	31.6
Three to four family	410	46.8
Five and above	189	21.6
Work experience as waste collection		
≤5 years	492	56.2
≥6 years	384	43.8
Working hours per day		
≤8 hours	842	96.1
>8 hours	34	3.9

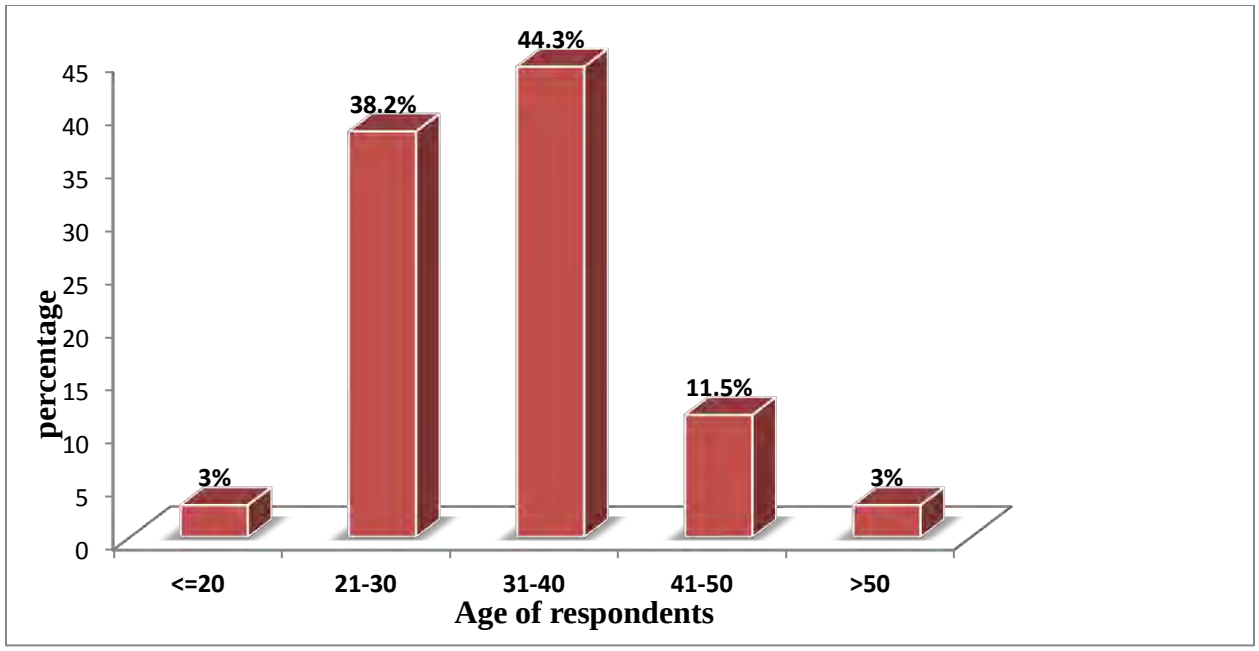

Figure3: Age category of respondents in Addis Ababa city solid waste collectors, January 2012

5.2 Occupational safety and behavioral related issues

Results on personal protective equipment utilization rate showed that only 382 (43.6%) of respondents were using PPE while they are on duty. Out of these PPE users, 86 (22.5%) of them reported that they were not using it all the time while they are on duty. No access 72 (83.7%), discomfort 22 (25.6%) and to save time 11 (12.8%) were main reasons mentioned for none use of PPE by the respondents. The majority of PPE users, 281 (73.6%) were buying PPE for themselves and others were supplied from woreda municipality, NGOs and some were picking PPE like glove from health care wastes. Municipality and NGOs were providing training for these workers first when they began this job and while they are on the job. Only 19 (2.2%) study participants were took vaccine for infectious diseases that are risk for cleaning workers.

Respondents were asked for some of behaviors and problems like work place instability, sleeping disorder and substance abuse. Sixty five (7.42%) of respondents fight with their colleague, residents and managers on the work site. Some of the reasons for those with no job satisfaction include absence of pension 25 (28.74%), it is very demanding job 18 (20.69%), searching for other job 11 (12.64%) and what type of satisfaction is expected from waste collection 8 (9.25%) were major responses given by the respondents.

Table 2: Utilization of personal protective equipments, safety training and behavioral status of Addis Ababa city solid waste collectors, January 2012

Variables	Frequency	Percent
PPE on duty (n=876)		
Yes	382	43.6
No	494	56.4
PPE all the time (n=382)		
Yes	296	77.5
No	86	22.5
First training (n=876)		
Yes	182	20.8
No	694	79.2
On job training (n=876)		
Yes	502	57.3
No	374	42.7
Smoking cigarette (n=876)		
Yes	78	8.9
No	798	91.1
Drinking alcohol (n=876)		
Yes	77	8.8
No	799	91.2
Chewing chat (n=876)		
Yes	106	12.1
No	770	87.9
Sleeping disorder (n=876)		
Yes	121	13.8
No	755	86.2
Job satisfaction (n=876)		
Yes	789	90.1
No	87	9.9

PPE-Personal Protective Equipments
First training-means whether the study participants were trained about safety issues first when they engaged in the current line of job or not.

About fifty eight percent (57.7%) of smokers were report as they started to smoke after they engaged in the current line of work. Similarly, 52%, 58.5% and 69.4% of respondents were also report as they began to drink alcohol, chewing chat and face sleeping problem respectively after they join in this work.

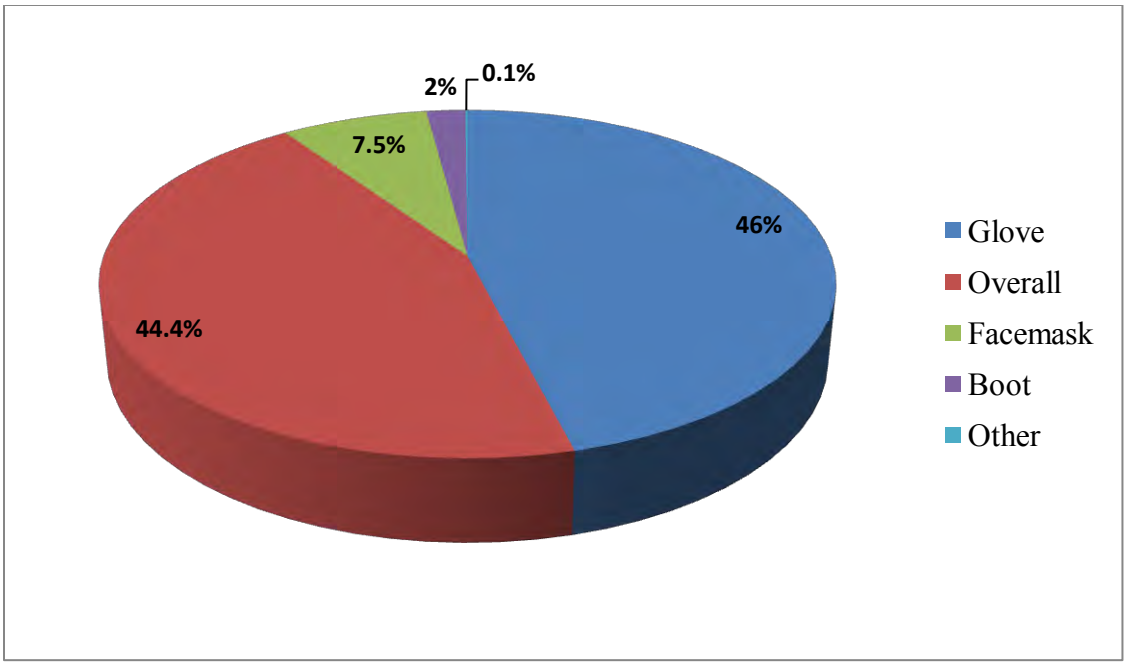

Figure 4: types of personal protective equipments used by Addis Ababa city solid waste collectors, January 2012

The study participants were interviewed on some of their personal hygiene issues. Accordingly, 810 (92.5%) of respondents were washing their hand with soap all the time after work, 214 (24.4%) take shower all the time after work, 288 (32.9%) wash their working cloth all the time after work, 239 (27.3%) use soap while washing their cloth and 779 (88.9%) change their working cloth immediately after work. Almost all, 874 (99.8%) of respondents were not sharing their working cloth or any PPE with their colleagues.

5.3 Occupational injury related issues

The overall prevalence of occupational injury was 43.7% (95% CI: 40.7, 47.1). Hand was the most injured body part and cut was the common injury type observed from this study result. In addition to below mentioned injury types dog bite, chemical splash, car and bicycle accidents and snake bite were also mentioned by the respondents.

Table 3: Distribution of injured body parts and types of injuries within the last 12 months among Addis Ababa city solid waste collectors, January 2012

Variables	Frequency	Percent
Occupational injuries		
In the past 12 months (n=876)	383	43.7
Occupational injuries		
In the past one month (n=383)	243	27.7
Number of occurrence (n=243)		
Once	52	21.4
Twice	101	41.6
More than two times	90	37.0
Injured body parts (n=383)		
Hand	232	60.75
Finger	89	23.32
Leg	79	20.63
Back	44	11.49
Knee	39	10.18
Toe	15	3.92
Eye	9	2.35
Tooth	8	2.09
Head	8	2.09
Types of injury (n=383)		
Cut	221	57.70
Puncture	146	38.12
Fall	76	19.84
Abrasion	45	11.75
Fracture	18	4.70
Strain	13	3.40
Dislocation	4	1.04
Burn	2	0.52
Other	12	3.13

Workers were exposed to injuries while they were performing various activities. From this study, one can see that this group of workers was highly injured while they are collecting wastes from home to home. These activities include transferring wastes from household's container and picking openly disposed wastes from the ground. The bar chart indicates types of activities at the time of injury. Other includes loading the track and sweeping around the container at the curb side.

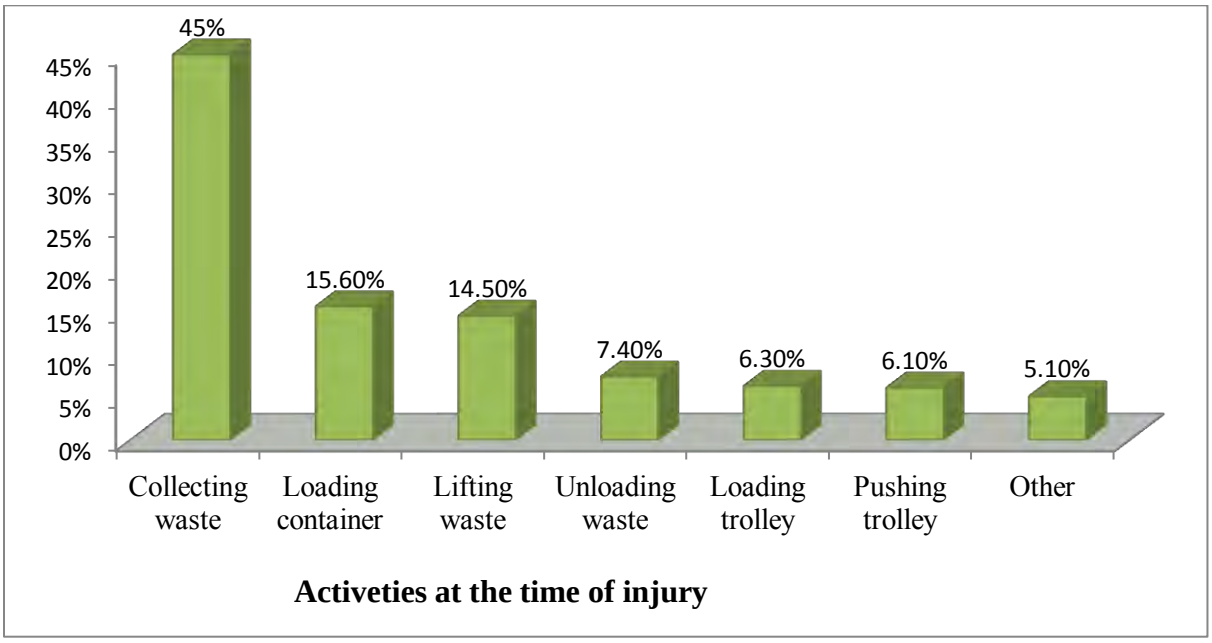

Figure 5: Types of activities performed when injury is happened among Addis Ababa city solid waste collectors, January 2012

5.4 Occupational illness symptoms

The common assumed illness symptoms related to this job were assessed among study participants. Twenty nine (3.3%) of respondents have had medically confirmed asthma out of which 15 (51.72%) of them were developing the disease after they engaged in the current line of job. prevalence of diarrhea among these study participants were assessed in the last one year. Accordingly, 55 (45.45%), 54 (44.63%) and 12 (9.92%) of respondents suffered once, twice and more than two times within the last one year from diarrhea respectively. Five hundred eighty six (66.9%) of respondents responded that they are visiting health institutions while they faced any health problem and 224 (25.6%) of respondents were out of work within the last one month due to illness with 4.25 mean days per last month. Data on the prevalence of reported symptoms are presented in Table 4.

Table 4: Types of self reported illness symptoms by the study participants within the last 12 months; Addis Ababa city solid waste collectors, January 2012

Characteristics	Frequency	Percent
General itching	243	27.7
Eczema	297	33.6
Cough	162	18.5
Dyspnea	146	16.7
Runny nose	112	12.8
Asthma	29	3.3
Eye irritation	364	41.6
Nausea	119	13.6
Diarrhea	121	13.8
Back pain	263	30.0
Joint pain	185	21.1

Note: Percent exceeds 100 because one respondent might give more than one answers

B. Bivariate analysis

Some socio-demographic variables of solid waste collectors might be expected to be associated with the extent of occupational injuries in their work environment. As the age of solid waste collectors increase in one year, odds of occupational injury was increased by 3% [OR: 1.03, 95%CI: (1.01-1.04)]. Number of working days per week was not associated with injury. However, number of working hours per day was significantly [COR: 1.18, 95%CI: (1.03-1.34)] associated with occupational injury among solid waste collectors or a unit increase of working hours was increase the odds of injury by about 1.2 times. Work experience was another variable that is significantly associated with occupational injury [COR: 1.08, 95%CI: (1.03-1.13)].

Smoking cigarette [COR: 2.10, 95%CI: (1.30-3.40)] and drinking alcohol [COR: 1.92, 95%CI: (1.19-3.08)] were significant behavioral variables to injury at bivariate level. Similarly, sleeping disorder [COR: 1.72, 95%CI: (1.17-2.54)] was other statistically significant variable. Chewing chat [COR: 1.33, 95%CI: (0.88-2.00)] and job satisfaction [COR: 1.11, 95%CI: (0.71-1.73)] were not significant for injury to occur.

Table 5: Selected Socio-demographic and occupational safety Determinants of Occupational Injuries, Addis Ababa city solid waste collectors, January 2012

Characteristics	Occupational injuries in the Past 12 months (n=876)		Crude OR (95% CI)	p-value
Sex	Yes	No		
Male	125 (49.6%)	127 (50.4%)	1.40 (1.04-1.87)	0.026
Female	258 (41.3%)	366 (58.7%)	1.00	
Educational level				
Illiterate	173 (51.8%)	161 (48.2%)	2.20 (1.24-3.92)	<0.001
1^0 school	190 (39.5%)	291 (60.5%)	1.34 (0.76-2.36)	
2^0 school and above	20 (32.8%)	41 (67.2%)	1.00	
Family size				
Two and less	100 (36.1%)	177 (63.9%)	0.50 (0.35-0.73)	0.001
Three to four	183 (44.6%)	227 (55.4%)	0.72 (0.51-1.01)	
Five and above	100 (47.2%)	87 (52.9%)	1.00	
Other job				
Yes	29 (30.9%)	65 (69.1%)	0.54 (0.34-0.85)	0.008
No	354 (45.3%)	428 (54.7%)	1.00	
Work experience				
≤ 5 years	194 (39.4%)	298 (60.6%)	1.00	
≥ 6 years	189 (49.2%)	195 (50.8%)	1.50 (1.14-1.95)	0.004
Working hours per day				
≤ 8 hours	360 (42.8%)	482 (57.2%)	1.00	
>8 hours	23 (67.6%)	11 (32.4%)	2.78 (1.35-5.82)	0.004
PPE on duty				
Yes	96 (25.1%)	286 (74.9%)	1.00	
No	287 (58.1%)	207 (41.9%)	4.13 (3.08-5.53)	<0.001
PPE on duty all the time				
Yes	62 (20.9%)	234 (79.1%)	1.00	
No	34 (39.5%)	52 (60.5%)	2.41 (1.44-4.03)	<0.001
First training				
Yes	69 (37.9%)	113 (62.1%)	1.00	
No	314 (45.2%)	380 (54.8%)	0.74 (0.53-1.03)	0.076
On job training				
Yes	200 (39.8%)	302 (60.2%)	1.00	
No	183 (48.9%)	191 (51.1%)	1.45 (1.10-1.91)	0.007

PPE-Personal Protective Equipments

First training-means whether the study participants were trained about safety issues first when they engaged in the current line of job or not.

C. Multivariate analysis

The multivariate analysis was done by considering the conceptual framework (Fig.1) and enter method was used hierarchically to assess the relative effect of the explanatory factors on the outcome variable (occupational injury). Variables that have p value greater than 0.3 at bivariate level were not considered for multivariate analysis. Furthermore, variables than were not maintaining p-value less than 0.3 were omitted in the subsequent model to avoid an excessive number of variables which might result in unstable estimates.

The overall effect of the selected socio-demographic variables on occupational injuries was assessed in the first step. In the second step of the analysis, occupational safety variables were added, and their effect was assessed in the presence of socio-demographic variables that had p-value < 0.3. Behavioral factors were entered in third step. In this step, the effect of the selected behavioral factors was assessed in the presence of both socio-demographic and occupational safety variables that had p-value <0.3. From all variables entered in all steps of analysis, only family size and utilization of PPE all the time while on duty were remained significant after adjusting for other socio-demographic, occupational safety and behavioral factors. Although sex, educational level and daily working hours showed significant association in model one, they did not show an association in the second and final model of the multivariate analysis. Behavioral variables like smoking cigarette, drinking alcohol and sleeping problem were statistically significant to occupational injury only at the bivariate level.

Table 7: Summary of Logistic Regression Analysis of the Relative Effect of Socio-demographic, Occupational safety and Behavioral Factors on the Magnitude of Occupational Injuries among Addis Ababa city solid waste collection workers, January 2012

Characteristics	Crude OR (95%CI)	**Adjusted OR (95% CI)**		
		Model 1	**Model 2**	**Final model**
Model 1: **(socio-demographic variables)**				
Sex				
(Male Vs Female ^{RG})	1.40 (1.04-1.87)*	2.35(1.65-3.36)**	1.55(0.80-3.04)	
Age	1.03(1.01-1.04)*	1.01(0.99-1.03)		
Educational status				
(Illiterate Vs $\geq 2^{0\,RG}$)	2.20(1.22-3.92)*	2.35(1.21-4.54)*		
(1^{0} school Vs $\geq 2^{0\,RG}$)	1.34(0.76-2.35)	1.41(0.78-2.56)		
Family size				
(Less or 2 Vs $\geq 5^{RG}$)	0.50(0.35-0.73)**	0.67(0.44-1.04)	0.24(0.11-0.51)**	0.21(0.10-0.44)**
(3-4 Vs $\geq 5^{RG}$)	0.72(0.51-1.01)	0.86(0.60-1.24)	0.54(0.30-0.98)*	0.52(0.30-0.93)*
Experience				
($\leq$5 yrs ^{RG}Vs $\geq$6 yrs)	1.50(1.14-1.95)*	1.20(0.85-1.69)		
Daily work hours				
($\leq$ 8hrs ^{RG} Vs> 8 hrs)	2.80(1.35-5.82)*	2.67(1.26-5.70)*	2.55(0.68-9.56)	
Other job				
(Yes Vs No ^{RG})	0.54(0.34-0.85)**	0.73(0.45-1.18)		
Model 2: **(socio-demographic variables + 0ccupational safety variables)**				
PPE on duty				
(Yes ^{RG} Vs No)	4.13 (3.08-5.53)**	----------		----------
PPE all the time				
(Yes ^{RG}Vs No)	2.41 (1.44-4.03)**		2.61(1.48-4.59)*	2.62(1.48-4.63)*
First training				
(Yes ^{RG} Vs No)	0.74 (0.53-1.03)		0.98(0.56-1.72)	
On job training				
(Yes ^{RG} Vs No)	1.45 (1.10-1.91)**		1.05(0.60-1.85)	
Model 3: **(Socio-demographic variables + Occupational safety variables + Behavioral variables)**				
Smoking cigarette				
(Yes Vs No ^{RG})	2.10 (1.30-3.40)*			1.69(0.48-6.00)
Chewing chat				
(Yes Vs No ^{RG})	1.33 (0.88-2.00)			1.18(0.48-2.91)
Drinking alcohol				
(Yes Vs No ^{RG})	1.92 (1.19-3.08)*			1.48(0.49-4.47)
Sleeping problem				
(Yes Vs No ^{RG})	1.72 (1.17-2.54)*			1.64(0.77-3.46)
Job satisfaction				
(Yes ^{RG} Vs No)	1.11 (0.71-1.73)			0.77(0.34-1.77)

RG: Reference Group ** significant at p-value <0.01, * Significant at p-value <0.05.

5.6 Observation findings

Personal Protective equipments availability and utilization (clothing)

Out of 327 gloves on utilization observed during survey, 117 (35.8%), 199 (60.8%), 208 (63.6%) and 129 (39.4%) were new, water proof, well dressed and perforated respectively.

Availability and utilization of face mask was assessed among this group of workers. Accordingly, 11 (20.7%) of total observed face mask was perforated.

Three hundred fifteen workers were used overall clothing out of which 208 (66.0%) were well dressed, 90 (28.6%) perforated, 103 (32.7%) new and only 53 (16.8%) were water proof.

Only 14 (1.6%) workers were used boot where as others used short shoes, sleeper, and some others were bare foot while they were on duty.

Types and status of cart and sacks

Types of carts were observed whether it is made from wood or metal which might be a cause for occupational hazards. The majority of carts were made from metal which accounts 92.5% where as the rest were made up of wood.

Three hundred sixty five of observed carts were easily moved by waste collectors and the rest, 302 were not easily movable (either due to their size or the types of the wheel they have).

These carts were further observed for the smoothness of their hand and general body parts that might challenge pushing and empting activities. So that, 284 of the carts were rough (not smooth) which might be an ergonomic hazards for different body parts.

The status of waste collection sacks were also observed on the spot at the time of survey. Out of 867 observed collection sacks, 852 were old 604 were perforated and 833 were over filled which might cause injuries and ergonomic hazard at the time of lifting.

6. Discussion

The response rate of this study was 97.9% that seems suitable and better than previous questionnaire studies, like 92%(13) and 95% (30). This could be resulted from the effort made to minimize the non response rate by replacing absentees by other workers. Number of female workers was higher as compared with some other studies those either with no or small number of female workers in this sector (13, 16, 36). The main reason for large number of females in this study might be this work sector is an emerging and leveled as one of small scale enterprises in the country and females are actively involved in the sector (37). The mean period of employment as solid waste worker was 5.22 years (SD $\pm$ 2.78 years) which is comparable with other studies.

The overall prevalence rate of work related injury within the past 12 months was 383 (43.7%), which is Comparable with Colombo Municipal Council workers but higher as compared with study done in Alaska (16, 38). This difference might be due to variation in regulation and culture of the residents on waste segregation at house hold level or the pattern of PPE utilization by collectors across different countries. The magnitude of injuries in this study was further compared with studies conducted in other sectors like different scale industries and farming sectors that were measured the rate of injuries within 12 months. It was higher than the prevalence of work related injury on small and medium scale industry that was 33.5% (29) but it was lower than injury rates on large scale metal manufacturing industry and Tendaho agricultural development sector which were 48.9% and 78.3% respectively (25, 34). This discrepancy could be resulted from the variation and nature of activities performed at different work sectors.

Collection had the highest incidents resulting in injury which was 219 (44.9%) followed by loading and lifting 79 (15.6%) and 71 (14.6%) respectively. These activities were also had the highest incident in other studies, collecting and disposal 61 (44.9%) each followed by lifting 26 (19.1%) in Alaska and lifting of heavy objects was the leading singular cause of injuries in USA 17.5% (20, 38). In USA, wastes might be managed in the container in a way that might facilitate collection and minimize incidents that result in injuries. However, in our country most wastes are not segregated at household level. In addition, manually loaded in to sacks, pushed or pulled through long distance to be loaded in to storage containers which is not in close proximity to where the residents are located that might result in injuries.

The main reported occupational injury types were cut injuries, 57.7% and puncture, 38.1% that is slightly lower than finding in Colombo, cut 74.4% and needle/ nail prick 42.5% (16). This slight difference could be resulted from variation in waste composition. The hands are the body part most commonly affected, followed by finger which is similar with the study conducted among cleaners in Germany (10). Similarly, these two body parts were the first to be injured in other occupational sectors (29, 34). Sometimes waste collectors wipe waste and put it in to the cart and tracks using their feet or hands. While doing so, the probability of cut, bruises and ruptures might be high.

The absence of safety training, especially on job training, limited use of personal protective devices while on duty and prolonged duration of working hours were major factors that contribute to the occurrence of injury significantly. Specially, those who were not using PPE all the time while they are on duty had 2.62 times higher odds of occupational injury than those who use PPE while on duty after some variables were adjusted. These factors were also responsible for occupational injuries in other settings (4, 25). Family size of the workers was another variable which was statistically significant in contributing occupational injuries to occur. The odds of occupational injury for those who had two or less children was reduced by [AOR: 0.21, 95%CI: (0.10-0.44)] as compared with those who had five and above children. Similarly, odds of injuries for those who had 3-4 children was reduced by around half [AOR: 0.52, 95%CI: (0.30-0.93)]. Those who had more children might spend more times on duty to satisfy the need or requirements of their large families which might increase the risk of occupational injuries among this group. Another possible reason could be, those who had large family size might not afford to buy PPE and use it consistently.

It was reported that the occupational health hazards associated with waste handling include infections of skin, eye, and respiratory system; accidents such as bone and muscle disorders resulting from the handling of heavy waste containers, infecting wounds from contact with sharp objects; poisoning and chemical burns from contact with small amounts of hazardous chemical wastes mixed with general waste (14, 39).

Different data sources showed that occupational exposure to door to door waste collection is associated with an excess of respiratory illness symptoms with a noticeable decrease in pulmonary function (5, 14, 40, 41). In this study, prevalence of cough, dyspnea (difficulty of

breathing), asthma and runny nose was assessed. The reported magnitude of aforementioned illness symptoms in this study were: cough 18.5%, dyspnea (difficulty in breathing) 16.7%, runny nose 12.8% and asthma 3.3% which is somewhat in line with study conducted in Florida; coughing 27.8%, wheezing and breathlessness 12.7%, itching nose 11.5%, asthma 8.7% and chronic bronchitis 7.8%, (5).

Work-related musculoskeletal disorders (MSDs) are impairments of bodily structures such as muscles, joints, tendons, ligaments, bones and the localized blood circulation system, that are caused or aggravated primarily by work and by the effects of the immediate environment in which work is carried out. In this study total of 311 (35.5%) participants reported that they had been troubled with musculoskeletal symptoms (joint and back pain) during the last 12 months which is nearly similar figure with study in Colombo, 38.3% (16) however, it is not comparable with study among Tehran solid waste workers 142 (65%) (13). This difference might be due to knowledge of participants in reporting the problem or it might be difference in designing data collection instrument. There is no surprise for this magnitude because collection of household waste is work which needs repeated heavy physical work such as lifting, carrying, pulling, and pushing. The role of ergonomic factors of the workplace in the development of regional musculoskeletal disorders has been a topic of considerable interest in recent years (40).

The prevalence of dermal illness symptoms; itching and eczema among study participants were 27.7% and 33.6% respectively which might be due to dermal exposure to chemicals present in waste from different sources, wet work and frequent contact with wet, dermal contact with biological agents and mechanical splash without adequate skin protection (10).

Chat chewing, alcohol consumption and smoking were the main psycho-social problems identified among the workers. Most employees admitted to starting these habits after joining the current line of work. This may be to overcome the unpleasantness of garbage and due to the tiring nature of work, increased availability of these substances and influence of other workers. However, none of this behavior was statistically significant with occupational injury and respiratory illness symptom at a multivariate level of analysis.

7. Strengths and limitations of the study

7.1. Strengths of the study

This study will be helpful for Addis Ababa city municipality and other stakeholders to develop strategies and policies related with management of health hazards arising from household waste collection having the following strengths:

- This sector is an emerging enterprise that involves large number of people with various socio-demographic compositions. Therefore, this study is an operational study so that, it is useful for policy and decision makers to prevent and control hazards arising in this sector.
- In addition to these, there was observation checklist for the status and utilization of PPE and the nature of waste collection materials directly while on use.

7.2 Limitations of the study

- As being cross-sectional study in nature, it might have drawbacks in concluding the real determinants of occupational health hazards among this group of workers.
- There was no comparison especially for occupational illness symptoms with the residents which might affect the conclusion on this problem.
- As it is self reported of health problem, there might be over or under estimation of the magnitude of the problem and there might be a recall bias.

8. Conclusion and Recommendation

8. 1. Conclusion

- The result of this study revealed that the magnitude of work related injuries are higher.
- This study dictates that having large family size and fail to use personal protective devices are the two significant factors that increase the odds of occupational injuries after adjusting for other variables among workers.
- Even if the level of illness symptoms were not assessed in the community, the magnitude of assessed illness symptoms are higher among this group of workers.

8.2 Recommendation

- Addis Ababa city solid waste management and recycling project office should have to implement basic occupational health and safety services like the provisions of personal protective devices and follow up of their appropriate utilization among this group of workers. This office should create also safe work environments and equipment by investing in better engineering solutions and also providing appropriate employee health services.
- Addis Ababa city residents should start by reducing the volume of waste generated, ensure proper segregation of waste at house hold level and avoid mixing hazardous waste to domestic wastes.
- Researchers should design studies like comparative cross-sectional and cohort study specially to determine factors affecting occupational illnesses in this sector that help to promote a safe work environment.

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Annex Data collection Tools

Addis Ababa University School of Public Health College of Health Science Questionnaire for Assessment of occupational injuries and illness symptoms among Addis Ababa city solid waste collectors 2012

1. Information sheet

How are you? I am----------. I am working in Addis Ababa University College of Health Science research team. I would like to ask you a few questions about your socioeconomic status and occupational health and safety hazards that you encounter in the course of your work. This will help us to improve occupational health and safety and wok environment management provided to you based on your answers to our questions. You were selected to participate in this study just by chance. The following are some general information about the study.

Title of the study: Assessment of occupational injuries and illness symptoms among solid waste collectors in Addis Ababa city.

Background of the study: Occupationally related health hazards are the major public health problems throughout the world today. Millions of workers die each year from an intentional occupational injuries and diseases related to their work. Even if the reports from different sources undermine these realities, morbidity, disability, death and economic loss is very high.

Objective of the study: To assess occupational injuries and illness symptoms among Addis Ababa city solid waste collectors

Benefit of the study: There is no direct short term benefit for participants. However, it may use for policy makers to evaluate this work environment and help them in designing possible preventive measures.

Risk of the study: This study has no risk for the participants.

Right of the participants: Your participation is voluntary and you are not obligate to answer any question you do not wish to answer. This interview will take about 15-20 minutes. If you fill discomfort with the interview, please fill free to drop it any time you want.

Confidentiality: 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.

2. Informed consent

I have read this form or it has been read to me in the language I understand all conditions stated above. Therefore,

1. I agree to participate 2. I do not agree

Name of **PI**: Daniel Bogale

Address: Tell 09 12 82 82 17

E-mail `dbogale386@gmail.com

Signature _____ REC: AAU, Tell: 251-011553873

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---------

If no, skip to the next participant by writing reasons for his/her refusal

English version questionnaire

Addis Ababa University College of Health Science Department of Community Health Questionnaire for Assessment of occupational injuries and illness symptoms among Solid Waste Collectors in Addis Ababa city, 2011

Questionnaire identification number_____

Name of enterprise_____

Address: sub city _____

Woreda _____

Part I Socio-demographic information of the respondents

Ser.no	Question	Possible response	Skip	code
101	Sex	1. Male 2. Female		
102	Age	_____ year		
103	Marital status	1. Married 2. Single 3. Divorced/Separated 4. Widowed		
104	Educational level	1. Illiterate 2. Can read and write 3. Grade 1-4 4. grade 5-8 5. Grade 9-12 6. grade 12+		
105	Employment condition	1.Permanent 2.Temporary/contract		
106	Work experience in years as waste collector	_____year(s)		
107	Working days per week	_____day(s)		
108	Working hours per day	_____ hour(s)		
109	How many families do you have in your home?	_____		
110	Have you any job other than this?	1. Yes (specify)_____ 2. No		
111	What is your monthly income?	_____		

Part II: Availability and utilization of personal protective measures

Ser. No	Questions	Possible answers	Skip	code
201	Do you use any PPE while you are on duty?	1. Yes 2. No →	skip to Q206	
202	If your answer for Q201 is yes, which of the following PPE you are using? (more than one answer is possible)	a. Glove 1.Yes 2.No b. Facemask 1.Yes 2.No c. Boot 1.Yes 2.No d. Overall 1.Yes 2.No e. Other (specify)		
203	If your answer for Q201 is Yes, do you use PPE all the time while on duty?	1. Yes → 2. No	Skip to Q205	
204	If your answer for Q203 is No, what are the reasons not to use safety equipments all the time? (More than one answer is possible)	a. Not to fill discomfort 1. Yes 2. No b. To safe time 1. Yes 2. No a. Not aware of risk 1. Yes 2. No b. No access 1. Yes 2. No		
205	From where do you get PPE? (more than one answer is possible)	1. It is supplied by municipality 2. It is supplied by your union 3. You buy it for your self 4. From other source (specify the source)----------		
206	Have you had training on any type of occupational safety issues when you were first engaged in this job?	1. Yes 2. No		
207	Have you ever had on job training on any type of occupational safety issues?	1. Yes 2. No →	skip to Q209	
208	If your answer for Q207 is yes, from where did you get? (multiple response is possible)	1. From your union 2. From municipality 3. From NGOs		
209	Have you had vaccination for tetanus after you engaged to this work?	1. Yes 2. No →	Skip to Q301	
210	From where did you get the vaccine? (multiple response is possible)	1. From your union 2. From municipality 3. From NGOs		

Part III Personal hygiene of solid waste collectors

Ser. no	Question	Possible answers	Skip	code
301	Do you wash your hands always with soap after work?	1. Yes 2. No		
302	Do you change your working cloth immediately after work?	1. Yes 2. No		
303	Do you wash your working cloth every day after work?	1. Yes 2. No →	skip to Q305	
304	If your answer for Q303 is yes, do you use soap while you wash your working clothes?	1. Yes 2. No		
305	Do you have a bathe (shower) always after work?	1. Yes 2. No		
306	Do you share your working cloth or any protective clothing with your colleagues?	1. Yes 2. No		

Part IV. Occupational injuries

no	question	Possible answer			Skipping	code
401	Have you had an incident that resulted injury to you in the last 12 months?	1. Yes 2. No →			skip to Q501	
402	Have you had an incident that resulted in injury in the last one month?	1. Yes 2. No				
403	If your answer for Q402 is yes, how many times?	1. One times 2. Two times 3. More than 2 times				
404	Affected body Parts for both Q401 and Q402	Body parts	1=Yes	2=No		
		1.Eye	1	2		
		2.Tooth	1	2		
		3.Hand	1	2		
		4.Knee	1	2		
		5.Toe	1	2		
		6.Finger	1	2		
		7.Head	1	2		
		8.Back	1	2		
		9. Leg	1	2		
		10.Other (specify)				

405	Type of injury	Injury types	1=Yes	2=No		
		1.Cut	1	2		
		2.Abrasion/laceration	1	2		
		3.Burn	1	2		
		4.Puncture	1	2		
		5.Fracture	1	2		
		6.Dislocation	1	2		
		7.Strain/sprain	1	2		
		8.Back	1	2		
		9.Fall	1	2		
		10.Other (specify)				
		Cause of injury	1=Yes	2=No		
406	What did you do at the time of injury?	1.Collecting waste	1	2		
		2.Lifting waste	1	2		
		3.Loading cart	1	2		
		4.Pushing/Pulling cart	1	2		
		5.Unload cart	1	2		
		6.loading container	1	2		
		7.Other (specify)				

Part V Types of diseases that solid waste collectors develop in the last 12 months in the course of their work

Ser.no	Question	Possible answers	Skip	Code
501	**Skin diseases**			
501a	Have you faced pruritus (itching) on any part of your body within the last 12 months?	1. Yes 2. No		
501b	Have you faced skin disease like inflammation, eczema and vesiculation within the last 12 months?	1. Yes 2. No		
502	**Breathing zone illnesses symptoms**			
502a	Have you suffered from longer period of cough within the last 12 months?	1. Yes 2. No		
502b	Have you suffered from dyspnoea (difficulty in breathing) within the last 12 months?	1. Yes 2. No		
502c	Have you faced rhinitis (inflammation of nasal passage) and runny nose within the last 12 months?	1. Yes 2. No		
502d	Do you have clinically confirmed asthma?	1. Yes 2. No	Skip to Q503	

502e	If your answer for Q 502d is yes, when did you acquire it?	1. Before you engaged to this work 2. After you engaged to this work		
	Other health problems			
503	Have you suffered from conjunctivitis (inflammation of the eye) within the last 12 months??	1. Yes 2. No		
504	Have you suffered from backache within the last 12 months?	1. Yes 2. No		
505	Have you faced muscular and joint pain within the last 12months?	1. Yes 2. No		
506	Do you face repeated nausea within the last 12 months?	1. Yes 2. No		
507	Have you suffered from diarrhea within the last 12 months	1. Yes 2. No →	Skip to Q509	
508	If yes, how many times you had within the last 12 months?	1. One times 2. Two times 3. More than two times		
509	Did you visit health institutions while you face any health problem?	1. Yes 2. No		
510	Was there a time when you were out of work due to illness?	1. Yes 2. No →	skip to Q601	
511	If your answer for Q513 is yes, for how long you where absent within the last one month?	_____days		

Part VI psycho-social related issues of solid waste collectors regarding to their work

Ser.no	Question	Possible answers	Skip	Co de
601	Have you ever faced any work related instability like work place violence and disagreement either with your manager, residents or colleagues?	1. Yes 2. No	If No skip to Q603	
602	If your answer for Q601 is yes, with whom it was?	1. With manager 2. With resident 3. With colleagues		
603	Are you smoking?	1. Yes 2. No →	skip to Q605	

604	If your answer for Q603 is yes, when was you began to smoke?	a. Before you engaged to this job 1.Yes 2.No b. After you engaged to this job 1.Yes 2.No		
605	Are you drinking alcohols Like beer, 'areke', 'tela' and the like?	1. Yes 2. No →	skip to Q607	
606	If your answer for Q605 is yes, when was you began to smoke?	a. Before you engaged to this job 1.Yes 2.No b. After you engaged to this job 1.Yes 2.No		
607	Are you chewing chat?	1. Yes 2. No →	skip to Q609	
608	If your answer for Q607 is yes, when was you began to smoke?	a. Before you engaged to this job 1.Yes 2.No b. After you engaged to this job 1.Yes 2.No		
609	Do you have any sleeping problem?	1. Yes 2. No →	skip to Q611	
610	If your answer for Q609 is yes, when do you develop this problem?	1. Before you engaged to this work 1.Yes 2.No 2. After you engaged to this work 1.Yes 2.No		
611	Are you satisfied with this work?	1. Yes 2. No		
612	If your answer for Q611 is no, why?	_____		

Observation checklist

I. Personal protective equipment related observation (for those who have PPE)

1. Glove a. new yes no

b. water proof/rubber yes no

c. perforated yes no

d. well dressed yes no

2. Face mask a. new yes no

b. Perforated yes no

c. well dressed yes no

3. Over all clothing a. new yes no

b. Water proof yes no

c. Well dressed yes no

d. Perforated yes no

4. Shoe cover/boot a. new yes no

b. Perforated yes no

c. Well dressed yes no

II. Working material condition related observation

1. **Trolley/push cart** a. wood b. metal

a. easily movable b. not easily movable

a. smooth b. rough/not smooth

2. Waste collection sack a. new b. old

a. perforated b. not perforated

a. easily liftable b. not easily liftable

Amharic version questionnaire

የአማርኛ ትርጉም መጠይቅ

1. ለተጠያቂዎች የሚሰጥ መረጃ ቅፅ

ጤና ይስጥልኝ? እኔ_____ እባላለሁ። በአዲስአበባ ዩኒቨርሲቲ ጥናትና ምርምር መህበር አባል ነኝ:: እዚህ የመጣሁት በዩኒቨርሲቲዉ ለሚደረገዉ ጥናት መረጃ ለመሰብሰብ ነዉ። እርሶ የሚሰጡን መረጃ በስራ ቦታ የሚደርሱ የጤና ችግሮችን ለመቆጣጠር ያግዛል።የዚህ ጥናት ተሳታፊ መሆን ከሚችሉ ሰዎች መካከል እርሶ አንዱ ሲሆኑ ከእርሶ ጋር የተገናኘነዉ እንደ እድል በእጣ በተደረገ ምርጫ ነዉ። በማህበራዊና ከሞያጋር በተያያዘ በጤና ችግር ዙሪያ የተወሰኑ መጠይቆች አለኝ። ስለጥናቱ የሚከተሉትን ነጥቦች ከተገነዘቡ በኋላ ፍቃደኛ ከሆኑ ወደ መጠይቆቹ እናልፋለን።

የጥናቱ ርዕስ፡- በአዲስ አበባ ከተማ ደረቅ ቆሻሻን በመሰብሰብ ስራላይ በተሰማሩ ሰራተኞች ላይ ከሙያ ጋር በተያያዘ የደረሱ የጤና ችግሮችን መዳሰስ።

የጥናቱ መነሻ፡- በአሁኑ ሰአት ከስራ ጋር የተያያዘ የጤና ችግር በአለም አቀፍ ደረጃ የህብረተሰብ ጤና ችግር ሆኗል። በየአመቱ በሚሊዮን የሚቆጠሩ ሰራተኞች ከስራጋር በተያያዘ ድንገተኛ አደጋና በሽታ ይሞታሉ። ምንም እንኳን ይህ ችግር በተለያዩ ዘገባዎች ዝቅ ብሎቢታይ፣ ህመም፣ ሞትና የኢኮኖሚ ቀዉስ በጣም ከፍተኛ ነዉ።

የጥናቱ አላማ፡- በአዲስ አበባ ከተማ ደረቅ ቆሻሻን በመሰብሰብ ስራላይ በተሰማሩ ሰራተኞች ላይ የሚከሰቱ የጤና እክል ግዘፈትንና ተያያዥ ጉዳዮችን መዳሰስ።

ጥቅም፡- ይህ ጥናት በቀጥታ ለተሳታፊዎች የሚሰጠዉ ጥቅም የለም ነገር ግን ከተሳታፊዎች በሚገኘዉ መረጃ ፖሊሲ አዉጪዎች የሰራተኞችን የጤና እክሎች እንዲያዉቁና መፍትሄ እንዲሹ ይጠቁማል።

ጉዳት፡- እዚህ ጥናት ላይ በመሳተፍ ተሳታፊዎች ምንም አይነት ጉዳት አይደርስባቸዉም።

ምስጢራዊነት፡- ተሳታፊዎች ስማቸዉን እንዲጠቅሱ አይጠበቅም። ማንኛዉንም ተሳተፊዎች የሚሰጡት መረጃ በሙሉ ሚሰጥራዊነት እንዲጠበቅ የጥናቱ ስነ ምግባር ያስገድዳል በመሆኑም ተሳታፊዎች የሚሰጡት መረጃ ሚስጥራዊነቱ ይጠበቃል።

2.የፍቃደኝነት መግለጫ ቅፅ

ከዚህ በላይ ስለጥናቱ የተፃፈዉን መግለጫ በሚገባኝ ቋንቋ አንብቤ ወይንም ተነቦልኝ ተረድቻለሁ። በመሆኑም በዚህ ጥናት ለመሳተፍ:

1. እስማማለዉ 2. አልስማማም

ጥናቱን የሚያካሂደዉ ዳንኤል ቦጋለ

ስልክ 09 12 81 81 17 E-mail dbogale386@gmail.com

አዲስ አበባ ዩኒቨርሲቲ REC: ስልክ 251-011553873

የጠያቂው ስም_____ ፊርማ_____
መጠይቁ የተሞላበት ቀን_____ የተጀመረበት ሰዓት_____ የተጠናቀቀበት ሰዓት_____
የመጠይቁ ዉጤት
1. ተሞልቷል 2. ተጠያቂው አሌተገኙም
3. ተቃውሞ 4. በከፊል ተሟልቷል

3. መጠይቅ

ይህ መጠይቅ በአዲስ አበባ ከተማ ደረቅ ቆሻሻን በመሰብሰብ ስራላይ በተሰማሩ ሰራተኞች ላይ ከሙያ ጋር በተያያዘ የደረሱ የጤና ችግሮችን ለማጥናት የተዘጋጀ ነዉ።

የመጠይቁ መለያ ቁጥር_____

የድርጅቱ ስም_____

አድራሻ፡ ክፍለ ከተማ_____

ወረዳ _____

ክፍል 1፡ ማህበራዊና ስነ- ሕዝባዊ ገጽታዎችን በተመለከተ

ተ.ቁ	መጠይቅ	አማራጭ	ዝለል	ኮድ
101	ጸታ	1. ወንድ 2. ሴት		
102	እድሜ	_____አመት		
103	የጋብቻ ሁኔታ	1. ያገባ/ች 2. ያላገባ/ች 3. የፈታ/ች 4. የሞተባት		
104	የትምህርት ደረጃ	1. ያልተማረ 2. ማንበብና መፃፍ የሚችል 3. 1-4 ክፍል 4. 5-8 ክፍል 5. 9-12 ክፍል 6. 12+		
105	የቅጥር ሁኔታ	1. ቋሚ 2. ኮንትራት		
106	በዚህ ስራ ክፍል የቆይታ ጊዜ	_____ዓመት		
107	በሳምንት የሚሰሩባተዉ ቀናት ስንት ናቸዉ?	_____ቀን		
108	በስራ የሚያሳልፉት ሳአት	_____ሰዓት		
109	ከዚህ ስራ ውጪ ሌላ ስራ አለዎት?	1. አዎ (ይገለፅ)_____ 2. የለም		
110	የቤተሰብዎ ብዛት?	_____		
111	የወር ገቢዎት ስንት ነዉ?			

ክፍል 2 አራስን የመከላከያ መሳርያዎች አቅርቦትና አጠቃቀም

ተ.ቁ	መጠይቅ	አማራጮች	ዝለል	ኮድ
201	ስራ በሚሰሩበት ግዜ የ አደጋ መከላከያ ይጠቀማሉ?	1. አዎ 2. የለም →	ወደ ጥ.ቁ206 ይለፉ	
202	ለጥያቄ ቁ.201 መልስዎ አዎ ከሆነ ምን አ ይነት? (ካንድ በላይ መልስ መስጠት ይቻላል)	1. ጓንት 1.አዎ 2.የለም 2. የፊት መከላከያ 1.አዎ 2.የለም 3. ቦት ጫማ 1.አዎ 2.የለም 4. ሁሉንም የሰዉነት ክፍል 1.አዎ 2.የለም 5. ሌላ ካለ ይጠቀስ_____		
203	ለጥያቄ ቁ.201 መልስዎ 'አዎ' ከሆነ መከላከያዎቹን ሁልግዜ ይጠቀማሉ?	1. አዎ → ወደ ጥ.ቁ 205 ይለፉ 2. የለም		
204	ለጥያቄ ቁ.203 መልስዎ 'የለም' ከሆነ ሁሌ መከላከያ እንዳይጠቀሙ የሚያደርጎት ነገር ምንድን ነዉ? (ካንድ በላይ መልስ መስጠት ይቻላል)	1. ስለማይመች 1.አዎ 2.የለም 2. ሰኣት ለመቆጠብ 1.አዎ 2.የለም 3. ጉዳት ያመጣል ብዬ ስለማላስብ 1.አዎ 2.የለም 4. ግዴለሽነት 1.አዎ 2.የለም 5. ስለሌለኝ 1.አዎ 2.የለም		
205	መከላከያ መሳርያዉን ከየት ነዉ የሚያገኙት? (ካንድ በላይ መልስ መስጠት ይቻላል)	1. በማዘገጃ ቤት ይሰጣል 2. በማህበችን ይሰጠናል 3. እራሴ እገዛዋለዉ 4. ከሌላ /ይጠቀስ_____		
206	በዚህ ስራ ስትሰማሩ የጥንቃቄ ስልጠና ወስደዉ ነበር?	1. አዎ 2. የለም		
207	በስራላይ እያሉ የጥንቃቄ ስልጠና ወስደዉ ያዉቃሉ?	1. አዎ 2. የለም → ወደጥ.ቁ 209 ይለፉ		
208	ለጥያቄ 207 መልሶ አዎ ከሆነ ስልጠናዉን ከየት ነዉ ያገኙት? (ካንድ በላይ መልስ መስጠት ይቻላል)	1. ከመሃበራችን 2. ከማዘጋጂያ ቤት 3. መንግስታዊ ካልሆነ ግብረሰናይ ድርጅት		
209	በዚህ ስራ ከተሰማሩበት ግዜ ጀምሮ የቲታነስ ክትባት ወስደዉ ያዉቃሉ?ቸበበቸ	1. አዎ 2. የለም → ወደጥ.ቁ 301 ይለፉ		
210	ለጥያቄ 207 መልሶ አዎ ከሆነ ክትባቱን ከየት ነዉ ያገኙት? (ካንድ በላይ መልስ መስጠት ይቻላል)	1. ከመሃበራችን 2. ከማዘጋጂያ ቤት 3. መንግስታዊ ያልሆነ ግብረሰናይ ድርጅት		

ክፍል 3፦ የደረቅ ቆሻሻ ሰብሳቢዎች የግል ንፅህና

ተ. ቁ	ጥያቄ	አማራጮች	ዝለል	ኮድ
301	ከስራ በኋላ ሁልግዜ እጅዎን በሳሙና ይታጠባሉ?	1. አዎ 2. የለም		
302	ከስራ በኋላ የስራልብሶን ወዲያዉኑ ይቀይራሉ?	1. አዎ 2. የለም		
303	የስራልብሶን በየቀኑ ያጥባሉ?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 305 ይለፉ	
304	ለጥያቄ ቁ.303 መልሶ አዎ ከሆነ ሳሙና ይጠቀማሉ?	1. አዎ 2. የለም		
305	ከስራ በኋላ ምንግዜም ገላዎን ይተጠባሉ?	1. አዎ 2. የለም		
306	የመከላከያ መሳሪያዎችን ከስራ ባል ደረባዎ ጋር በጋራ ይጠቀማሉ?	1. አዎ 2. የለም		

ክፍል 4፦ የአደጋ ምክኒያቶች

ተ. ቁ	ጥያቄዎች	አማራጮች			ዝለል	ኮድ
401	ባለፉት 12 ወራት በስራዎት ላይ ጉዳት ደርሶቦት ነበር?	1. አዎ 2. የለም →			ወደ ጥ.ቁ 305ይለፉ	
402	ባለፈዉ አንድ ወር ወስጥ በስራዎት ላይ ጉዳት ደርሶቦት ነበር?	1. አዎ 2. የለም				
403	ለጥያቄ ቁ.402 መልስዎ አዎ ከሆነ ስንት ግዜ?	1. አንድ ግዜ 2. ሁለት ግዜ 3. ከሁለት ግዜ በላይ				
404	ለጥያቄ ቁ.401 እና 402 መልስዎ አዎ ከሆነ የተነዳ ሰዉነት ክፍል	ተ.ቁ	ዝርዝር ምርጫ	1=አዎ 2=የለም		
		1	ዐይን	1 2		
		2	ጥርስ	1 2		
		3	እጅ	1 2		
		4	ጉልበት	1 2		
		5	የ እግር ጣት	1 2		
		6	የ እጅ ጣት	1 2		
		7	ቁንቅላት	1 2		
		8	ጀርባ	1 2		
		9	እግር	1 2		
		10	ሌላ(ይገለፅ)			
405	ያጋጠመ የ አደጋ አይነት	ተ.ቁ	ዝርዝር ምርጫ	1=አዎ 2=የለም		
		1	መቆረጥ	1 2		
		2	ቁረት/መላጥ	1 2		
		3	ቃጠሎ	1 2		
		4	መወጋት	1 2		
		5	ስብራት	1 2		
		6	ዉልቃት	1 2		
		7	መጨነቅ/መወጠር	1 2		
		8	የወገብ ህመም	1 2		
		9	መዉደቅ	1 2		
		10	ሌላ ካለ ይጠቀስ	1 2		
406	አደጋዉ በደረሰበት ግዜ ምን ይሰሩ ነበር?	ተ.ቁ	ዝርዝር ምርጫ	1=አዎ 2=የለም		
		1	ቆሻሻ እየሰበሰብኩ	1 2		
		2	ቆሻሻ እያነሳዉ	1 2		
		3	በጋሪ ላይ ቆሻሻ	1 2		

		4	እየጫንኩ				
		5	ጋሪ እየገፋዉ/እየሳብኩ	1	2		
		6	ከጋሪ ላይ ቆሻሻ እያራገፍኩ	1	2		
		7	የቆሻሻ ማጠራቀሚያዉን እየሞላዉ	1	2		
		8	ሌላ ካለ ይጠቀስ				

ክፍል 5. ባለፉት 12 ወራት ያጋጠሙ የበሽታ አይነቶች

ተ.ቁ	ጥያቄዎች	የሚጠበቁ መልሶች	ዝለል	ኮድ
501	**ባለፉት 12 ወራት በቆዳላይ የታዩ የህመም ምልክቶች**			
501a	ባለፉት 12 ወራት በየትኛዉም የሰዉነት ክፍሎት ላይ ረዘም ላለ ግዜ አሳክኮት ያዉቃል?	1. አዎ 2. የለም		
501b	ባለፉት 12 ወራት በቆዳዎት ላይ የመቅላት፣ መንጣት፣ሸፍ የማለት እና ዉሃ መቻጠርን በመሳሰሉ ህመሞች ተይዘዉ ያዉቃሉ?	1. አዎ 2. የለም		
502	**ባለፉት 12 ወራት በመተንፈሻ አካላት ላይ የታዩ የህመም ምልክቶች**			
502a	ባለፉት 12 ወራት ረዘም ላለ ግዜ አስሎት ያዉቃል?	1. አዎ 2. የለም		
502b	ባለፉት 12 ወራት በስራ ላይም ሆነ ከስራ ዉጪ ትንፋሾት ያጥሮታል?	1. አዎ 2. የለም		
502c	ባለፉት 12 ወራት አፍንጫዎትን የመቆጥቆጥና ፈሳሽ መዉረድ አስቸግሮት ያዉቃል?	1. አዎ 2. የለም		
502d	በህክምና የተረጋገጠ የአስም በሽታ አለቦት?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 503ይለፉ	
502e	ለጥ.ቁ. 502d መልሶ አዎ ከሆነ መቼ ነዉ የጀመሮት?	1. ከዚህ ስራ በፊት 2. ከዚህ ስራ በሓላ		
	ሌሎች የጤና እክሎች			
503	ባለፉት 12 ወራት አይኖትን የ ማሳከክና የ ማቃጠል ህመም አጋጥሞት ያዉቃል?	1. አዎ 2. የለም		
504	ባለፉት 12 ወራት ከስራዎት ጋር በተያያዘ የጀርባ ህመም አጋጥሞት ያዉቃል?	1. አዎ 2. የለም		
505	ባለፉት 12 ወራት የጡንቻና መገጣጠሚያ ህመም ተሰምቶት ያዉቃል?	1. አዎ 2. የለም		
506	የማቅለሽለሽ እና የማቅለሽለሽ ስሜት ተሰምቶት ያዉቃል?	1. አዎ 2. የለም		
507	ባለፉት 12 ወራት የተቅማጥ በሽታ ይዞት ያዉቃል?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 509ይለፉ	
508	ለጥያቄ 507 መልሶ አዎ ከሆነ ባለፉት 12 ወራት ስንት ግዜ ይዞታል?	1. አንድ ግዜ 2. ሁለት ግዜ 3. ከሁለት ግዜ በላይ		
509	ማንኛዉም የጤና ችግር ሲገጥሞት ወደ ጤና ተቻማት ሂደዉ ይታከማሉ?	1. አዎ 2. የለም		
510	በህመም ምክኒያት ከስራዎ የቀሩበት ግዜ ነበረ?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 601 ይለፉ	
511	ለጥያቄ 513 መልሶ አዎ ከሆነ ባለፈዉ አንድ ወር ዉስጥ ለምን ያህል ግዜ ቀርተዋል?	_____ቀን		

ክፍል 6 የሰራተኞች አመለካከት እና ስነ ባህሪን በተመለከተ

ተ.ቁ	መጠይቅ	አማራጮች	ዝለል	ኮድ
601	ባለፉት 12 ወራት ከአለቃዎት፣ ከነዋሪዎች ወይም ከስራ ባልደረባዎት ጋር ዘለፋና ያለመስማማታ አጋጥሞት ያዉቃል?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 603ይለፉ	
602	ለጥ.ቁ.601 መልሶ አዎ ከሆነ ከማን ጋር ነበር?	1. ከሀላፊዎት ጋር 2. ከነዋሪዎች ጋር 3. ከስራ ባልደረባዎት ጋር		
603	ሲ.ጋራ ያጨሳሉ?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 605ይለፉ	
604	ለ ጥ.ቁ.603 መጠይቅ መልሶ አዎ ከሆነ፣ መች ነዉ የጀመሩት?	1. ወደ እዚህ ስራ ከመሰማራቶ በፊት 1.አዎ 2.የለም 2. ወደ እዚህ ስራ ከተሰማሩ በኋላ 1.አዎ 2.የለም		
605	አረቄ፣ጠላ፣ቢራና የመሳሰሉ አልኮሎችን ይጠጣሉን?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 607ይለፉ	
606	ለጥ.ቁ.605 መጠይቅ መልሶ አዎ ከሆነ፣መች ነዉ የጀመሩት?	1. ወደ እዚህ ስራ ከመሰማራቶ በፊት 1.አዎ 2.የለም 2. ወደ እዚህ ስራ ከተሰማሩ በኋላ 1.አዎ 2.የለም		
607	ጫት ይቅማሉ?	1. አዎ 2. የለም →	ወደ ጥ.ቁ 609 ይለፉ	
608	ለጥ.ቁ.607 መጠይቅ መልሶ አዎ ከሆነ፣መች ነዉ የጀመሩት?	3. ወደ እዚህ ስራ ከመሰማራቶ በፊት 1.አዎ 2.የለም 4. ወደ እዚህ ስራ ከተሰማሩ በኋላ 1.አዎ 2.የለም		
609	የእንቅልፍ ማጣት ችግር (ሲተኙ ቶሎ እንቅልፍ ያለመዉሰድ ወይም መባነን) ችግር እለብዎ?	1. አዎ 2. የለም →	ወደ 611ይለፉ	
610	ለጥ.ቁ.609 መጠይቅ መልሶ አዎ ከሆነ፣ መች ጀመሮት?	1. ወደ እዚህ ስራ ከመሰማራቶ በፊት 1.አዎ 2.የለም 2. ወደ እዚህ ስራ ከተሰማሩ በኋላ 1.አዎ 2.የለም		
611	በዚህ ስራ ደስተኛ ኖት?	1. አዎ 2. የለም		
612	ለጥ.ቁ.611 መጠይቅ መልሶ አዎ ከሆነ፣ለምን?	----------		

Unions information

በጥናቱላይ በተካተቱ አምስት ክፍለከተማዎች ዉስጥ ያሉ የቤት ለቤት ደረቅ ቆሻሻ ሰብሳቢዎች መህበራት ስምና የየመህበራቱ አባላት ብዛት።					
	ክ.ከ	ወረዳ	የማህበሩ ስም	የ አባላት ብዛት	
1	ቂርቆስ	2	ኤልሻዳይ	12	
2		2	ሳድር	11	
3		2	ህዳሴ	11	
4		2	ጥበቡ ፅዱና አረንዴ	14	
5		2	ሠላም	12	
6		2	ራዕይ	9	
7		10	ህብረት ይዳብር	11	
8		10	ጉልበት ተስፋ	13	
9		10	ጥበቡ ፅዱና አረንዴ	14	
10		9	ብቃት	13	
11		9	ሮኬት	11	
12		9	ፍርቱና	12	
13		9	ብርሃን	6	
14		7	ወርቃማው ወጣት	11	
15		7	እድገት በአንድነት	10	
16		7	ዳግም አዲስ ተስፋ	10	
17		7	ውሳኔ	18	
18		11	"ሐ" ዕድገት በህብረት	9	
19		11	በእምነት	8	
20		11	አዲስ ፍሬ	8	
21		11	አንበሳ	8	
22		3	ግሪንቪው	10	
23		3	አፍሪካ መዲና	10	
24		3	ኢትዮጵያ	10	
25		10	ጥበብ ፅዱና አረንጓዴ	14	
26		10	ህብረት ይዳብር	11	
27		10	ጉልበት ተስፋ	13	
28		5	በሙሉ ልብ	9	
29		5	መልካም	10	
30		5	ይሻላል	10	
31		5	ውበት	11	
32		5	ሠላም ለስራ	10	
33		8	ህዳሴ	7	
34		8	ፅዳት ለጤና	13	
35		8	ፍቅር	11	
36		8	ህብረት	13	
37		8	እድገት በአንድነት	10	
38		1	ውበትነ ፍለጋ	6	
39		1	እንሰራ	7	
40		1	ብርሃን	7	

41		1	አለ-ገነት	9	
42		4	ፍቅር በአንድነት	10	
43		4	ህዳሴ	10	
44		4	አዲስ ውበት	11	
45		4	ዲቦራ	10	
46		4	ራስ አገዝ	11	
47		6	ሮህበት	10	
48		6	አዲስ ተስፋ	10	
49		6	አንድነት	10	
50		6	ቡናና ሻይ	10	
በጥናቱላይ በተካተቱ አምስት ክፍለከተማዎች ዉስጥ ያሉ የቤት ለቤት ደረቅ ቆሻሻ ሰብሳቢዎች መህበራት ስምና የየመህበራቱ አባላት ብዛት።					
	ክ.ከ	ወረዳ	የማህበሩ ስም	የ አባላት ብዛት	
1	ልደታ	4	አዲስ ፋና	10	
2		4	ጎህ	10	
3		4	ጤና ለሁሉም	8	
4		4	ሪች	8	
5		4	ጥበብ ፅዱና አረግንዴ	12	
6		4	ዕድገት	10	
7		9	አዲሰ ህይወት	10	
8		9	ጥበብ	14	
9		2	ታማኝ	11	
10		2	ብናድግ	11	
11		10	ንብ	12	
12		10	ትግል ለፍሬ	12	
13		10	ድል በትግል	14	
14		3	ዕድገት	12	
15		3	ጥረት	12	
16		3	ተባብረን ዕንደግ	9	
17		3	የኋላው ይመር	12	
18		3	ሰርቶ ማደግ	13	
19		5	ብሩ ተስፋ	10	
20		5	ጥበብ ቁጥር	9	
21		5	ሰላም በስራ	10	
22		5	ስራ ለልማት	7	
23		5	ድል በትግል	10	
24		5	እድገት በስራ	10	
25		5	ጥበብ ቁጥር	9	
26		7	ጥበብ	15	
27		7	አንድነት	15	
28		7	ነፃነት	15	
29		7	ለምለም	15	
30		6	ፍቅር ለስራ	11	
31		6	አንድነት ለእድገት	12	

32		6	ሀገሬ	11	
33		1	ህይወት	10	
34		1	ፅ/ለጤና	10	
35		1	ጠንክር	10	
36		1	አዲስ ተስፋ	10	
37		8	ተስፋ ኮከብ	10	
38		8	እንደግ	9	
39		8	ኒው	7	

በጥናቱላይ በተካተቱ አምስት ክፍለከተማዎች ዉስጥ ያሉ የቤት ለቤት ደረቅ ቆሻሻ ሰብሳቢዎች መሀበራት ስምና የየመሀበራቱ አባላት ብዛት።					
	ክ.ከ	ወረዳ	የማህበሩ ስም	የ አባላት ብዛት	
1	ኮልፌ	1	አቡነ አረጋዊ	18	
2		1	ጹኒኤል	14	
3		1	ከብት እርበታ	9	
4		1	ሳሚ ካፌ	5	
5		1	ቻይና ካኘ	7	
6		2	ታምራት	9	
7		2	የነገው ፍሬ	9	
8		2	ክብር ለስራ	10	
9		3	አበበች	8	
10		3	እናኑ	5	
11		3	ንስር	3	
12		3	ሰርቶ አደር	5	
13		3	ሰላም	3	
14		3	ወርቁ	10	
15		4	ደብር አባይ	7	
16		4	ህብረት	10	
17		4	ፋሪስ	10	
18		4	ሻሎም	10	
19		4	አደይ አበባ	7	
20		5	ዋርካ	17	
21		5	ለምለም	10	
22		5	ገብስ እሸት	10	
23		5	አየር ጤና	7	
24		5	ንቃት	10	
25		6	ሚሊንየም	15	
26		6	ፅዱአረንጓዴ	9	
27		6	ፅዱ ወይራ	11	
28		6	እድገት በፅናት	10	
29		6	ሰላም	9	
30		7	ሚኒስቲ	9	
31		7	ንጋት/ሀ/	9	
32		7	ንጋት /ለ/	9	

33		7	ህብረት	9	
34		7	ትግል ለለውጥ	9	
35		8	እንደግ በስራ /ሀ-ለ/	17	
36		8	ሰርተን እንለወጥ	10	
37		8	ሰላም ለወጣቶች	8	
38		9	ለውጥ	10	
39		9	ዘመን	11	
40		9	ትንሳኤ	10	
41		9	ብሩህ ተስፋ	10	
42		9	አዲስ ህይወት	10	
43		10	ሰላም	10	
44		10	እድገት	13	
45		11	እድገት በስራ	7	
46		11	ህብረት	5	
47		11	ፍቅርና ሰላም	6	
48		12	አስደናቂው	9	
49		12	በትግል	10	
50		12	ታጠቅ	8	
51		13	ፅናት የወጣቶች	10	
52		13	ነፃነት	10	
53		13	ሮቦት	10	
54		13	ህብረት ፊደራ	10	
55		13	ወርቃማው	12	
56		13	እድገት ተስፋ	8	
57		13	ይሰራሽ	8	
58		13	ምስጋና	10	
59		14	አዲስ ልማት	11	
60		14	በለጡ	10	
61		14	ትብለፅ	10	
62		14	ስራ በኛ	10	
63		15	ፍቅር አወልጠ	10	
64		15	ምኞት	9	
65		15	ይደነቁ	9	

በጥናቱላይ በተካተቱ አምስት ክፍለከተማዎች ዉስጥ ያሉ የቤት ለቤት ደረቅ ቆሻሻ ሰብሳቢዎች መሀበራት ስምና የየመሀበራቱ አባላት ብዛት።					
	ክ.ከ	ወረዳ	የማህበሩ ስም	የ አባላት ብዛት	
1	ንፋስ ስልክ	1	ለምለም	6	
2		1	እድገት	8	
3		1	ሰላም	10	
4		1	ኮከብ	10	
5		1	የተባበሩት	11	
6		2	ጊዮርጊስ	10	
7		2	ድል በትግል	10	

8		2	ሰላም በትግል	10	
9		2	ተስፋ ህይወት	13	
10		2	አቦጊዳ	10	
11		2	ትጋት	10	
12		2	ልማት ለሀገር	10	
13		2	አዲስ ህይወት	21	
14		2	ተስፋ	10	
15		2	ኮከብ	10	
16		3	ፈጣን	11	
17		3	ፅዳት በህብረት	10	
18		3	ይስረሽ	10	
19		3	ሠፈረ ገነት	11	
20		3	እንበርታ	10	
21		3	አቤነዘር	12	
22		3	የነገው ሰው	11	
23		3	አንድነት	11	
24		3	ዩኒየን	10	
25		4	ዕድገት በህብረት	9	
26		4	ሠርቶ ማሣየት	6	
27		4	ሙለ አካባቢ	11	
28		5	ፅናት	10	
29		5	እድገት በአንድነት	8	
30		5	ጎዳናው አንድነት	7	
31		5	መተባበር	9	
32		5	ሰላም	7	
33		7	አዲስ ኮከብ	11	
34		7	ማለዳ	11	
35		11	ብሩህ ተስፋ	11	
36		11	የነገው ተስፋ	13	
37		11	ጎህ	8	
38		11	ኢትዮጵያ ትቅደም	9	
39		11	ወገን	7	
40		9	አብራስ	9	
41		9	አድማስ	8	
42		9	ዩሐና	10	
43		9	ውብ	11	
44		9	ተስፋ ለዕድገት	11	
45		9	ዕድገት በቡድን	11	
46		6	ድል በትግል	19	
47		6	ግሪንቪው	10	
48		6	አንለይ	15	
49		6	ጎዳናው እንድነት	10	
50		6	ዕድገት ፍሬ	10	
51		6	አንድነት	10	
52		6	ሰላም	8	

53		6	ህብረት አንድነት	10	
54		8	ድንቅነሽ	4	
55		8	ኮከብ	10	
56		8	ወንድማማች	6	
57		8	ጥረት በህብረት	8	
58		10	የነገ ተስፋ	11	
59		10	አዲስ ብርሃን	11	
60		10	አዲስ ራዕይ	12	
61		10	ድል በተግል	12	
62		12	ቀና	10	
63		12	ኢትዮ ገነት	17	
64		12	ቅ/ሚካኤል	10	
65		12	እድገት	10	
66		12	ጎህና ህብረት	10	
67		12	ከፍያለው	10	
68		12	ስራ ህይወት	7	
69		12	በስራ አንለወጣለን	8	
70		12	ኮከብ	10	
71		12	አዞን	10	

ናቱላይ በተካተቱ አምስት ክፍለከተማዎች ዉስጥ ያሉ የቤት ለቤት ደረቅ ቆሻሻ ሰብሳቢዎች መሀበራት ስምና የየመሀበራቱ አባላት ብዛት።

	ክ.ከ	ወረዳ	የማህበሩ ስም	የ አባላት ብዛት	
1	አዲስ ከተማ	1	ፀደይ	19	
2		1	አንድነት	12	
3		1	ራዕይ	18	
4		1	ህብረት	12	
5		1	ጥረት	17	
6		1	ሻማ	10	
7		1	ፍቅር በንድነት	10	
8		1	አዲስ ህይወት	12	
9		1	ንፁህ	10	
10		2	የነገው ፍሬ	9	
11		2	በሱ ፈቃድ	9	
12		2	ጥበበ ፅዱ	12	
13		2	መተባበር	9	
14		2	ፅናት	6	
15		3	አዲስ ህይወት	14	
16		3	ፋና ወጊ	9	
17		3	እንኩራበት	9	
18		3	ብበብ ለስራ	13	
19		3	ንብ	11	
20		4	ጠንክረን እንስራ	10	
21		4	እንቡጥ አበባ	13	

22		4	ቢልልኝ	10	
23		4	ብሩህ ተስፋ	16	
24		4	እኛ ጤና	15	
25		5	ራስ አገዝ	17	
26		5	እድገት በስራ	8	
27		5	ፈጣን	19	
28		6	ፅጌረዳ	11	
29		6	እሸት አበባ	10	
30		6	ሰላምና ፍቅር	13	
31		6	ቦጋለች	11	
32		7	ፅጌረዳ	11	
33		7	ውበት ቁጥር 1	10	
34		7	ውበት ቁጥር 2	10	
35		7	እድገት በስራ	10	
36		7	አንድነት	17	
37		8	አዲስ ራእይ	12	
38		8	የተዋቡ አበቦች	10	
39		8	ቨጀን ቪው	10	
40		8	እድገት በህብረት	13	
41		8	ህብር	13	
42		8	ህብረት	13	
43		8	ንግስት ሣባ	11	
44		8	ሴቴራስ አገዝ	15	
45		8	አዲስ ብርሀን	11	
46		8	ህይወት ተስፋ	12	
47		8	አብረን እንደግ	10	
48		9	የተንቢ	10	
49		9	የተባበሩት	12	
50		9	ሴቴ	10	
51		9	ቀስተዳመና	9	
52		9	ውበትሮራ	6	
53		10	ተባበሩት	5	
54		10	ጥረት በትግል	10	
55		10	አርያ	9	

Figure7. Addis Ababa city map source: Addis Ababa city Municipality

Declaration

I, the undersigned, declare that this thesis is my original work in partial fulfillment of the requirement for the Degree of Masters of Public Health and has not been presented for a degree in this or any other university. All source of materials used for this thesis have been duly acknowledged.

Name: Daniel Bogale

Signature: _____

Place: Addis Ababa, Ethiopia

Date of submission: 23 May, 2012

This thesis has been submitted for examination with our approval as the university advisors.

Name of the advisors	Signature
Dr. Abera Kumie	_____
Mr. Worku Tefera	_____