

**OCCUPATIONAL RESPIRATORY HEALTH SYMPTOMS AND
ASSOCIATED FACTORS AMONG STREET SWEEPERS IN ILALA
MUNICIPALITY**

Prisca Stambuli, BSC

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**OCCUPATIONAL RESPIRATORY HEALTH SYMPTOMS AND
ASSOCIATED FACTORS AMONG STREET SWEEPERS IN ILALA
MUNICIPALITY**

By

Prisca Stambuli

**A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree
of Master of Public Health of Muhimbili University of the Health and Allied
Sciences**

Muhimbili University of Health and Allied Sciences

November 2012

CERTIFICATION

The undersigned certify that they have read and hereby recommended for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled *Occupational Respiratory Health Symptoms and Associated Factors among Street Sweepers in Ilala Municipality*, in Partial fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

Dr. Simon H. Mamuya

(Supervisor)

Date: _____

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ABSTRACT

Background: Street working environment condition particularly exposed to organic and inorganic dust and chronic inhalation of dust during street sweeping may associated with increases in respiratory health symptoms among street sweepers. However the street sweepers rarely used PPEs while exposed to high level of dust which may contribute to increases the prevalence's of respiratory health symptoms. Few published studies have showed the chronic and lung function among street sweepers, but in Tanzania no published study about occupational respiratory health symptoms and associated factors among street sweepers.

Objective: The objective of this study was to determine prevalence of respiratory health symptoms and associated factors among street sweepers in Ilala Municipality.

Materials and Methods: Cross-sectional analytical study was designed 102 street sweepers as exposed group and 85 street vegetable sellers as unexposed group means less exposed to street sweeping dust from Ilala Municipality who worked one year and above and none smoker habit were studied, the respondent rate was 57.7%. Respiratory health symptoms and socio-demographic information were collected by using a modified American Thoracic Society respiratory symptoms questionnaire and level of utilization of PPEs were assessed by closed ended questions. Frequency distribution, Chi square test and logistic regression were used in data analysis.

Results: The prevalence of respiratory health symptoms was higher among exposed than unexposed group and the difference was statistically significant, for cough (54.9% vs 12.9%) phlegm (39.2 vs 7.1%), wheezing (32.4% vs 14.1%), nose irritating (35.8% vs 4.7%) and sneezing (63.7% vs 8.2). Street sweeping dust was the main associated factor to cough, phlegm, wheezing, nose irritating and wheezing outcomes, while age associated with cough and phlegm outcomes and duration of employment associated with cough outcomes among street sweepers, and the association was statistically significant $p < 0.05$. Availability and wearing of mouth/nose mask was reported 70.6% and 61.8%. General availability of PPEs 41.2% responded once after three months and wearing of PPEs 47.1% responded did not wear frequently because not available at any

time which did not make them motivation of frequently wearing of PPEs during street sweeping.

Conclusion: Respiratory health symptoms are associated with street sweeping dust exposure and the prevalence of respiratory health symptoms are higher among exposed group than unexposed group.

Recommendations: The study has recommended that the appropriate and quality PPEs to be available and frequently wearing of PPE during street sweeping and medical intervention to be implemented for further diagnostic like sputum testing, chest x-ray and chest ultrasound for street sweepers.

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LIST OF ABBREVIATIONS

| | |
|-------|---|
| BSI | British Standard Institute |
| CBOs | Community Based Organization |
| DHS | Demographic Health Survey |
| ILO | International labor Organization |
| ISO | International Standards Organization |
| LGAs | local government authorities |
| NCDs | Non Communicable Diseases |
| NGOs | Non government Organizations |
| NIOSH | National Institute for Occupational Safety and Health |
| PPEs | Personal Protective Equipments |
| PPPs | Public-Private Partnerships |

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OPERATIONAL DEFINITIONS OF TERMS

Personal protective equipment

Is anything used or worn by a person to minimize risk to the person's health or safety and include a wide range of clothing and safety equipment.

Hazards

Mean source of exposure to danger (OSHA, 2003).

Occupational diseases

Is any disease arising out of or in the course of employment (OSHA, 2003).

Occupational hazards

A working condition that can lead to illness or death.

Occupational accident

Is an accident is occurring at the workplace and during working time, giving rise directly or indirectly to a physical injury, functional disorder or disease leading to death or a partial or total loss of working or earning capacity.

Occupational health

The effect of work on health and the effect of health on work, it plays a vital role in helping employers care for and understand the needs of their employees, enabling businesses to reduce sickness absence levels and optimize staff performance and productivity.

Associated factors:

These are conditions which contribute in the occupational respiratory health symptoms. Including: smoking behavior, socio-economic (individual income, level of education), age, past dust exposures, duration of exposure/employment and past respiratory diseases.

Utilization of PPE

Means wearing and availability of PPE

CHAPTER 1: INTRODUCTION

1.1: Background information

Dar es Salaam is among fastest growing cities in Sub Sahara countries to which people from different parts of Tanzania move in view of socio-economic, cultural and political activities. Population growth rate is to approximately 7% per annum. The constantly increasing population has led to the production of large amount of solid waste which cause serious problem in urban environment [1]. In developing countries including Tanzania, solid waste management including waste collection, street sweeping, recycling and composition [2] is a serious problem due to lack of resources, technologies, low standard of living, low level of education and poor planning.

Road dust has been acknowledged as an important source of urban suspended smallest particles in many parts of the world and its contribution can also be significant in the suspended large size range [3]. High road dust concentrations are usually a problem of urban areas and the effects of the dust on people exposed to it are a major source of concern while contributing to biological materials capable of causing allergenic disease in humans, such as a runny nose, watery eyes, and sneezing for larger sized particles, as well as swelling of lung tissue and asthma for fine particles [4]. Long-term exposure can directly contribute to the development of disease and subjects living in cities with higher long-term average die earlier than subjects living in cities with low air pollution while short-term exposure has been linked to increased daily mortality and number of hospitalization due to respiratory and cardiovascular diseases [5].

However, NIOSH, 2008 estimated that deaths from work-related respiratory diseases and cancers account for about 70% of all occupational diseases death worldwide. Chronic obstructive pulmonary disease is a growing and leading cause of mortality, handicap and healthcare costs worldwide but remains largely under-diagnosed [6]. Street sweeping is to sweep waste materials thrown at public streets and it is considered unhealthy due to the close contact that exposes workers to agents present in the urban waste and they are submitted to different types of problems. [7] Sweepers play an

important role in maintaining the health and hygiene in the cities. This job exposes street sweepers to a variety of risk factors such as dust, bioaerosol, volatile organic matter and mechanical stress, which make them susceptible to certain occupational diseases. The important morbidity conditions detected in these workers include the diseases of the respiratory system and eye, accidents, injuries, cuts and wounds, skin infections, animal bites [8].

ILO, March, 2000, outlined other working environment related factors to include exposure to traffic accidents, diesel exhaust, dust, sun heat and glare, smell, noise, harassment and street crime. Primary route of exposure to airborne particulates, gases and vapours through inhalation can gain access to the respiratory system. Chronic inhalation of dust during street sweeping lead to impairs lung function and may cause respiratory health symptoms [9]. ILO, March, 2007, street sweepers' illnesses they have experienced included occasional flue and cough, and eye irritation, rash or skin irritation and other reported illnesses among street sweepers included diarrhoea and stomach upset as well as chronic coughing and eye disease, street sweepers have more than one incidence of illness.

In India study,[8] study morbidities detected among street sweepers were anemia (20.5%), hypertension (9.5%), upper respiratory tract infections (7.3%) and chronic bronchitis (5.9%). Globalization has facilitated a rapid increase in informal employment, and has been associated with the generation of employment that is often flexible, unstable and insecure. ILO, March, 2007, street sweepers work under a large number of privately owned small and micro enterprises or, many are older women and men where the main job tasks are sweeping streets using brooms, cleaning clogged drainage canals, cleaning streets from construction related wastes such as construction debris, soil, sand and stone, where by indirectly or directly cause potential injuries and respiratory illnesses. ILO Sept, 2000, observed that working conditions tends to be unsafe for those handling the wastes, the collectors, street sweepers and truck loaders. Besides the danger of cuts and infections from the waste itself, they are also exposed to fumes, violence and speeding traffic. ILO March, 2007 also effective performance of the above mentioned tasks

generally depends on the existing working conditions that relate to, among others the working method, the technology, working time, transport services and basic facilities for storing equipment, getting access to toilets, washing hands, taking shower, changing clothes, eating food and taking rest. OSHA act 4, 2003, the employer shall ensure the adequate supply of drinking water, sanitary facilities, washing facilities, accommodation and room for changing cloth, first aid and sitting facilities.

Street sweeping in Dar es Salaam is done manually with brooms and debris, and loaded into handcarts; women cleaners are mainly doing the street sweeping jobs. Sweeping is mostly done in the early morning while busy streets are done at night-time [10].

Similarly, very few studies have been carried out in India (2008) and Nigeria (2005) they found the morbidity profile of these workers included, inhalation of dust impaired lung function caused increased respiratory health symptoms.

With this background, and fortified by the fact that no such study or any intervention has been published in Tanzania and the prevalence of respiratory health symptoms among street sweepers was not identified. Therefore the study was carried to study the respiratory health symptoms and associated factors among street sweepers in Ilala Municipality.

1.2: Problem statement

The street sweepers play an important role in maintaining the health and hygiene in the city. ILO, Sept, 2000, working conditions tend to be unsafe for those who are directly handling the waste, the street sweepers besides the dangers of cuts and infections from the waste itself, they are exposed to dust and fume, speeding traffic and violence.

This job exposes road street sweepers to such as organic and inorganic dust, bioaerosol, volatile organic matter, fumes, which make them to be susceptible to various occupational diseases, they are at risk of asthma, chronic bronchitis, and other respiratory symptoms [11]. Road dust found on the surface of streets in consisted of a complex mixture of soil dust, deposited motor vehicle exhaust particles, tyre dust, brake

lining wear dust, plant fragments and other biological materials [9]. The that can be confounding factors to the respiratory health symptoms were noted to be smoking behavior, level of education, poor housing conditions and duration of past dust exposure and other past dust exposure.

Street sweeping and drain cleaning are very labor intensive activities, in most cases the work is done by the poor [1]. Street sweeping depend on manual labours particularly, women were more likely to participate in this job. Often have low occupational skills and belong to the less advantaged educational and socioeconomic groups. In many countries this work is predominantly done by women, with a relatively high proportion of older women [11].

NIOSH, 2008, estimated that, deaths from work-related respiratory diseases and cancers account for about 70% of all occupational diseases death worldwide 5-15% of new cases of asthma in working adults are caused by occupational exposure [12]. ILO, Geneva 2003 addresses diseases due to worked related, cancer 32%, circulatory 23%, respiratory 7% and accident and violence, 19%. The prevalence of respiratory symptoms among street sweepers in Nigeria were reported to be cough 25.5%, chest pain 13.0% and sneezing 6.0% [9], but the Nigerian study noted that the knowledge about the type of dust that can cause respiratory problems was uncertain. Street sweeping, without precautionary measures may predispose to respiratory and non-respiratory symptoms [9]. Whereby in India, 2008, [13] study done on street sweepers and important morbidities were detected, and prevalence of respiratory morbidity was 5.9% while prevalence of chronic respiratory morbidity was 8.1%.

In any workplace which is in connected with any process carried on, there are given off any dust or fumes or any other impurities all practicable measures are be taken to protect the person employed from inhalation of the dust or fume or impurities [14]. ILO, Geneva, 2003, noted in developing countries small informal sectors are not yet properly covered by safety and health legislation. The street sweepers rarely used PPEs while

exposed to high level of dust which contribute to increases the prevalence's of respiratory health symptoms [9].

However in Tanzania no research survey has been published regarding the respiratory health symptoms and associated factors among street sweepers. Therefore the cross-sectional analytical study was designed to answer the main research question ‘what is the prevalence of respiratory health symptoms and associated factors among street sweepers in Ilala Municipality.

Conceptual framework for respiratory health symptoms among street sweepers in Ilala Municipality

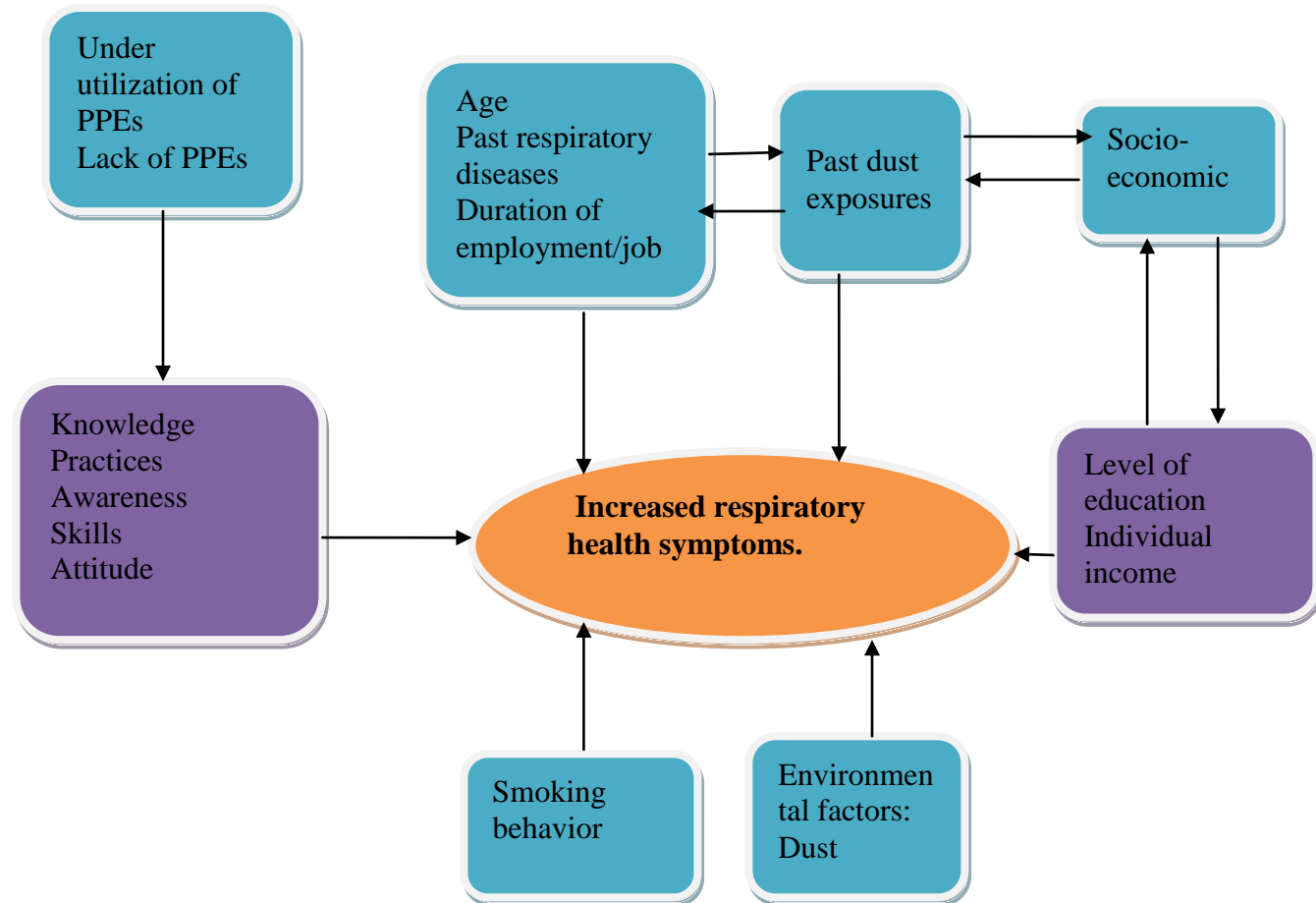


Figure 1: Conceptual framework (author: Prisca Stambuli).

Figure 1, shows the respiratory health symptoms occur due to individual and environmental factors which can be direct or indirect. Direct factors through, higher exposure to dust and associated aerosols, duration of exposure, lack of PPE, low utilization of PPE individual may contribute. Indirect factors can contribute to the developing occupational respiratory health symptoms through smoking, age, past dust exposure, past respiratory diseases and socio-economic (individual income and level of education).

Environmental contribute to occupational respiratory health symptoms by dust and others contaminants/particulate matters likes bioaerosol, fumes, mist which can pass through air pass way to lower part of lung and their effects put worker at high risk of developing occupational respiratory health symptoms. (See figure 1)

1.3: Rationale of study

Main purpose of this study was to determine prevalence of respiratory health symptoms and associated factors among street sweepers in Ilala Municipality. This group of workers has not been studied due to various misconception that dust on road contain mainly nuisance particulate matters with little respiration effects. Most workers facing challenges from this job by full or partial exposed in high occupational hazards conditions, which late bring them adverse health effects and increases utilization of health services and poor quality of life.

The findings from this study will benefit street sweeper themselves to know their working hazards conditions, create awareness to know the importance of use and consequently demand of PPEs, how to protect themselves from other factors which contribute in risk of getting disease. Also government, non government; faiths based organizations, industries, municipal, contractors, agency, authorities and policy makers may use the recommendation from this study in developing strategies and enforce legislation for further improvement.

Findings from this research can contribute to the body of knowledge and formulating the basis for other research on street sweeping as occupational and other health effects to human and environment.

This study is also important as it is necessary for dissertation submission as part of fulfillment for the master degree of Public Health.

1.4: Research questions.

1.4.1: Main research question

What is the prevalence of respiratory health symptoms and associated factors among street sweepers in Ilala municipal - Dar es Salaam city?

1.4.2: Specific research questions

1. What is the prevalence of respiratory health symptoms among street sweepers?
2. What is the level of utilization of PPEs among street sweepers?
3. What are the factors associated with respiratory health symptoms and street sweeping among street sweepers?

1.5: Objectives

1.5.1: Broad objective

To determine prevalence of respiratory health problem and associated factors among street sweepers in Ilala Municipality.

1.5.2: Specific objectives

1. To determine prevalence of respiratory health symptoms (phlegm, cough, wheezing, nose irritating, sneezing, shortness of breath) among street sweepers.
2. To assess the level of utilization of PPEs among street sweepers.
3. To determine factors associated (individual income, level of education, age, past exposures to dusts, duration of exposure) with respiratory health symptoms and street sweeping among street sweepers.

CHAPTER 2: LITERATURE REVIEW

2.1: Introduction

In some case informal waste workers belong to religious, caste or ethnic minorities and social discrimination as a factor which obliges them to work under completely unhygienic conditions as well as waste collector or sweepers, also their family is subjected to economic insecurity, health hazards, lack of access to normal social services such as health care, schooling for children, and absence of any form of social security (UNDP/UNC, August 1996).

In developing countries including Tanzania where a wide range of insecure jobs, in which the worker does not have any formalized relationship with an employer. Some of the tasks are inherently hazardous, for example, the manual collection and recycling of waste. More generally, informal workers tend to have a poor working environment and very unsatisfactory welfare facilities (ILO, Geneva, 2003). Almost all street sweepers are women, while the collection of waste from households and enterprises is done by men as well as women (ILO, Sept 2000). Respiratory and non-respiratory symptoms among street sweepers associated with street sweeping have also not been documented [9].

2.2: Predictors of Respiratory Health Symptoms among Street Sweepers.

2.2.1: Dust and Respiratory Health Symptoms

Dust is considered as the solid matter that is produced by any processes during mineral working, rock disintegrations and any construction activities which is borne by air. According ISO and BSI, 1994, it is defined to be small solid particles ranging from 1- 75 μm . Particles smaller than 1 μm are referred to be fumes or smoke [15]. Dust can be subdivided into respirable and non-respirable dust with the boundary of 10 μm . Dust as an occupational hazard (ISO 4225 - ISO, 1994) dust is small solid particles, conventionally taken as those particles below 75 μm in diameter, which settle out under their own weight but which may remain suspended for some time.

Dust effects on people have been identified as arising, from increases in airborne dust concentrations and deposition levels. The amount of dust retained in the lung depends on chemical and physical properties of the dust particle size, and where in the respiratory tract the particles are deposited [16]. Respiratory morbidity, such as admissions for asthma and chronic obstructive pulmonary diseases, was more strongly related to coarse particles that more often are of crustal origin [17]. The work of street sweepers is to sweep waste materials thrown at public streets. It is considered unhealthy due to the close contact that exposes workers to agents present in the urban waste. As street orderlies perform their duties in an open environment, they are subjected to different types of problems [7].

The street sweepers are not given appropriate and efficient /equipments/tools to perform their duties effectively, while citizens continue to throw waste on the streets throughout the day, even after cleaning of streets [18]. Apart from dust also road traffic produce volatile organic compounds, suspended particulate matter, oxides of sulphur oxides of nitrogen and carbon monoxide which makes adverse health effects on the exposed population [19]. Waste management procedures in developing countries are associated with occupational safety and health risks. Gastro-intestinal infections, respiratory and skin diseases as well as muscular-skeletal problems and cutting injuries are commonly found among waste workers around the globe. Respiratory ill-health is a result of multiple etiological factors and this gives rise difficulty when disentangling the influence of the various factors on the diseases [20].

Silicosis is caused by the inhalation of crystalline silicon dioxide or silica, and is one of most important occupational diseases worldwide. Also continuous vehicular exhaust inhalation can lead in the symptoms of lower respiratory tract such as cough, shortness of breath and pain with inspiration [20]. Although prevention efforts have been made for many decades, silicosis is a problem worldwide. The disorder occurs everywhere, but is especially prevalent in countries of low and middle income, where the burden is often under-reported because of poor surveillance [21].

2.2.2: Use of Personal Protective Equipments and Respiratory Health symptoms

Personal protective equipment is anything used or worn by a person to minimize risk to the person's health or safety and include a wide range of clothing and safety equipment. Where in any factory or workplace, workers are employed in any process involving exposure to any injurious or offensive substance or environment, effective protective equipment shall be provided and maintained by employer for the use of the persons employed [14]. Street sweepers play an important role in maintaining the health and hygiene in the cities. This job exposes street sweepers to a variety of risks factors such as dust, bioaerosol, volatile organic matters and mechanical stress which make them susceptible to certain occupational diseases [8].

Airborne from activities such as construction, commercial, mining, driving, demolition, paved road and wind erosion under certain conditions and certain quantities dust can be harmful to human health [22]. High levels of particle pollution have found to cause or are likely to cause many serious health effect including death from respiratory and cardiovascular, high risk of heart attack, stroke increased hospital admission and emergency room visits for cardiovascular and respiratory diseases (American Lung Association State of Lung Disease in Diverse Communities 2010). The acute respiratory health effects can presumably be reduced by proper dust control measures such as personal protective devices respirators, training and education and maintaining machines at the workplace [23].

2.2.3: Socio-economic status and Respiratory Health Symptoms

Education is a key determinant of lifestyle and status an individual enjoy in a society and provide people with the skill and knowledge that can lead to a better quality of life (DHS, 2010). Also level of education influences the type of occupation and income which can determine the home living condition [24]. It has strong effect in attitude and awareness related to family health and hygiene. The low awareness of health and safety would make more vulnerable to illness [25]. Respiratory health symptoms of both conditions were more prevalent among persons above 40 years of age and those with low levels of schooling [26].

People who live close to major road for long time and have low education are more likely to suffer from respiratory symptoms and reduce lung function [24]. Many workers are unaware of potential hazards present in their working environment, which let them to be more vulnerable to injury [25] and other work-related diseases. Workers do not wearing proper protective equipment causing serious health problems [27]. The fact that the street sweepers rarely used any protective devices such as face masks and were exposed to a high dust level generated at the test sites may have contributed to increase in the prevalence of respiratory symptoms and lung function problems [9].

Socio-economic status is a determinant of health and is well known to play an important role in the development of several diseases, respiratory diseases among them. Socio-economic status, smoking exposure increases level of environmental air pollution which associated with adverse effect on respiratory health and death [24], with lower socio-economic status being associated with higher rates of morbidity and mortality from several chronic diseases, including cardiovascular disease, chronic obstructive pulmonary disease, and diabetes [28].

2.2.4: Smoking and Respiratory Health Symptoms

Smoking is a known risk factor causing chronic bronchitis that is an important morbidity condition among street sweepers. [8] Shown that percentage of smokers was higher among street sweepers than that among subjects in the comparison group, (17.90%) (10.46%) are respectively. Tobacco uses also increases and leading to cardiovascular diseases and chronic obstructive pulmonary diseases. Nearly 1.25 billion people in the world uses tobacco regularly and every year 5.4% people die of it. A population goes through transition; more poor and uneducated are affected by the use of tobacco [29].

Smokers who is currently smoking at least one cigarette per day, ex-smokers who had smoked previously and stopped more than one year ago and those who had never smoked any kind of tobacco is non smoker [30]. Smokers and, mainly, ex-smokers indicated more symptoms of chronic respiratory disease. The group with highest tobacco consumption, above 182 packs year showed increased respiratory symptoms [26].

Number of cigarettes smoked per day was associated with risk of overall lung cancers [31].

2.2.5: Age and Respiratory Health Symptoms

Increased sensitivity with elderly people may be caused by diseases as a consequence of age and not the age itself. Characteristics that have been shown to influence susceptibility include [32] pre-existing respiratory or cardiovascular disease, diabetes, medication use, age, gender, race, socioeconomic status and health care availability, educational attainment, housing characteristics and genetic differences, but still there are gaps in the knowledge about who is most at risk or susceptible to smallest dust particles?.The prevalence of respiratory symptoms in some cases is assumed to increase with age [33]. An intensity of exposure, young children, pregnant women, the elderly, and individuals with chronic cardiopulmonary disease are particularly susceptible [34]. Asthma in the highest age is due to aging rather than housing condition [35], age induced asthma.

2.2.6: Duration of exposure/employment and Respiratory Health Symptoms

Particulate matters increases with increasing intensity and duration of exposure and suggest that the effect of duration decreases with increasing time since last exposure and age at first exposure [36]. Occupational exposures to dust, fumes, and gases are associated with increased prevalence of respiratory symptoms and impairment of lung function [37] which was found to have direct relationship with the dust concentration and duration of exposure [19].Study done on China to assess quality of life for Silicosis by using St George Respiratory Questionnaire, patients with longer duration of exposure had higher total scores which indicating worse quality of life [38].

2.3: Conclusion

The predictor that causes respiratory health symptoms has been discussed well in this chapter which might be the same predictors for respiratory health symptoms/problems among street sweepers in Ilala Municipality.

CHAPTER 3: METHODOLOGY

3.1: Introduction

The chapter presents the research design to be used in the study, sample size and selection method, study population, data collection and data analysis to be used.

3.2: Study area

The study area was Ilala Municipality. Ilala Municipal Council is among the three Municipalities of Dar-es-salaam region established in the year 2000 from the former Dar es Salaam City Council. It covers an area of 210 km square with population of 637,573, male 321,903 and female 315,670 as per 2002 National population and housing provisional census results but now it is expecting to be around one million.(National Census,2002).

Ilala Municipality was selected for study because no previous study had carried out at it to determine prevalence of respiratory health symptoms and associated factors among street sweepers. Also in Ilala Municipality is area where much of commerce, banking, national offices, small scale business include street vendor, shop sales, craft men, demolition and construction of big building are located, which indicates high movement of people from different parts of the world, rural and peripheral areas for looking socio-economic. Due to more movement of people and car traffic, both associated with much production of wastes and more car traffic which results to fumes, aerosol, bioaerosol and dust which may contributing to increases prevalence of respiratory health symptoms among street sweepers who exposed more than seven hours per day for whole week without proper and appropriate PPEs and well informed about risks associated with street sweeping dust and health effects.

3.3: Study design

The study design was cross-sectional analytical study which considering the respiratory health symptoms and associated factors among street sweepers [20]. The study design was adopted because of resources, it is less expensive, fairly quick, easy to perform and involve street sweepers and street vegetable sellers at a single point of time.

3.4: Study population

The target populations for this cross-sectional analytical study were street sweepers as exposed group and vegetable street sellers as unexposed group working in the Ilala Municipality.

3.4.1: Street sweepers

Total of 102 street sweepers who exposed in the street sweeping dust for one year and above and aged 18 years above and non smoker habit have studied as exposed group. The street sweeper using brush, hand loader and spade to remove the sand from the street ways which contain lot of dust and other contaminants. Street sweepers exposed in the street for 5 hours and above for seven days. They work without frequently utilization of mouth/nose mask which help them from prevention of chronic inhalation street sweeping dust.

3.4.2: Street vegetable sellers

Total of 85 health street vegetable sellers were used as unexposed group who not engaged in street sweeping occupation for current and previous. All were non smoker and aged 18 years and above and who worked in that occupation for one year and above. The socio-demographic were similar to the exposed group both experienced less education, informal employment, past dust exposure, past respiratory disease history, height and duration of employment. They matched in smoking habit and year of employed one year and above.

3.5: Sampling and sample size

3.5.1: Sample size estimation

Sample size for this study was estimated by calculated with Epi Info 3.5.1 version.

Where by

$z =$ Confidence Interval (95% or 1.96)

$p =$ Prevalence: 8.1% (**Yogesh SD. et al, 2008 from India**).

$\epsilon =$ Marginal error, 5%

Because the sampling technique was cluster the sample size estimation, design effect was introduced to get the number of exposed and unexposed needed to participate in the study. (Chosen design effect was 1.5)

$$97 * 1.5 = 145.5$$

10% was added for non-respondent for exposed and unexposed group.

Sample size estimation for exposed 162 and 162 for unexposed.

Total sample size estimation was 324.

3.5.2: Sampling technique

Cluster randomly sampling technique with Simple two-stage cluster sampling was used. Ilala Municipality contains 22 wards; only 6 wards were selected for study. The framework of wards was obtained from Ilala Municipality and then selection was done random. After well informed by one person from the ward executive officer, frame work of street sweepers were obtained from day attendee registration and selection was done by simple random sampling, after excluded all cigarette, tobacco user, not working at least one year, then pieces of paper were written number and the rest not written anything closed properly, mixed in the box; each street sweeper picked one piece of paper, opened and got the assigned number they had participated in study. Unexposed group were obtained from the Buguruni, River Msimbazi, Kipawa, Njia panda Segerea, Pugu – Majohe sold junction.

3.6: Inclusion and exclusion Criteria

3.6.1: Criterion for inclusion in the study

Street sweepers were employed in street sweeping with one year and above in the job and the same to street vegetable sellers who engaged in that occupational one year and above.

3.6.2: Criterion for exclusion in the study

Exposed and unexposed group who are smoking and tobacco using (recent and past used) were excluded from the study. (Smokers - who is currently smoking at least one cigarette per day)

3.7: Recruitment and training of research assistant

One research assistant well experienced on social work was recruited, because high needed to understanding and familiar with people worker under stress. The researcher assistant was given one day of orientation and trained on study objectives and familiarization with data collection tools, together with work plan, informed consent, ethical issues and other study logistics.

3.8: Pre-testing

Pretesting of data collection tools respiratory health symptom questionnaire and utilization of PPEs were done by selecting six street sweepers who were not part of the sample to respond to the data collection at Tabata ward in Ilala Municipality. This was done to find how well were understood by study population purpose to enhance reliability in data collection.

3.9: Data collection techniques and tools

A quantitative method was used for data collection. Data were collected using data plan schedule when all interviews were conducted face to face by trained researcher assistant and principal investigator for exposed and unexposed group.

3.9.1: Respiratory health symptoms

Respiratory health symptoms were determined by modified American Thoracic respiratory questionnaire [39] which pre-tested and administered by trained researcher assistant and investigator. The questionnaire planned to capture cough, phlegm, sneezing, wheezing, breathlessness, nose irritating, and duration of exposure, past respiratory illness and past dust exposure. In this study cough refer to cough usually on most three consecutive months or more during the year. Phlegm refers to have phlegm

like this on most days for three consecutive months during the year. Wheezing refer to chest ever sound occasionally apart from colds.

Questions based on whether they have usually cough and phlegm yes =1 no = 0, while for wheezing if ever chest sound yes = 1, no = 0 and for how long, for nose irritate do have nose irritate yes =1 no = 0, sneezing asked do you sneezing once you start street sweeping yes =1, no = 0 and for breathlessness asked have you trouble by shortness of breath when hurrying the level or walking up as slight hill yes =1, no = 0. For past dust exposure the question asked if have ever worked for any other dust job or exposed to gas or chemical fumes yes =1, no = 0 and specify job. Past respiratory disease history the question ask was either of your past life ever told by a doctor that you had a chronic lung condition (chronic bronchitis, emphysema, asthma, heart attack, lung cancer and tuberculosis) the respond were yes =1, no = 0 and don't know = 2.

3.9.2: Socio-demographic information

Socio-demographic variables also were obtained through questionnaire where information, like sex was obtained through observation but marital status, level of education, and level of income, duration of employment and duration of employment were captured for exposed and unexposed group by asked and got answer from respondent. Weight and height also were recorded; weight was measured by using mechanical bathroom scale and height by using tape measure both obtained when respondent with light clothes and with bare foot. Body mass index was obtained through simple calculation ($BMI = \text{mass in kilogram}/\text{height}^2 \text{ in meter}$ $BMI = \text{kg}/\text{m}^2$).

3.9.3: Level of utilization of PPEs

The closed-ended questions were designed to assess level of wearing and availability of PPEs during working among exposed group, trained research assistant and principal investigator interviewed respondent by asking to answer yes or no on list of PPEs, gloves, eye protection, foot protection, overall, helmet, mouth and nose protection, reflector coat and respirator, and explanations why don't wear PPEs and how PPEs are available during working.

3.10: Variables

3.10.1: Dependent variable

Occupational respiratory health symptoms

3.10.2: Independent variables

1. Utilization of PPE
2. Duration of job/employment (length of exposure)
3. Past dust exposures
4. Age
5. Past respiratory diseases
6. Socio-economic status (level of income and level of education).

3.11: Ethical considerations

The research proposal was accorded an approval for ethical clearance for research by MUHAS Ethical Research Committee. A written prior the consent letter was sent to Executive Director to Ilala- Municipal requesting permission to conduct research study, the written permission was approved and distributed to six selected ward for information and cooperation. The study methods and aims were explained to each individual and were free to participate or not. Those who meet the criteria for study and agreed to participate gave Kiswahili written consent and signed before data collection begun. Issues of rights, privacy and confidentiality were taken into consideration when asking questions, weight and height measurements. For those who were found affected by dust and developed respiratory health symptoms were advice to seek more clinical diagnosis to Ilala Municipality Hospital or health facilities.

3.12: Data processing and analysis

3.12.1: Data processing

Collected responses of different variable were coded and error checked before enter in the computer. Coded variable were entered to SPSS version 15.statistical software for data analysis.

3.12.2: Data analysis

Data were edited and coded then analyses by using the Statistical Package for the Social Sciences (SPSS) Version. 15 and significance level was set $p < 0.05$.

3.12.2.1: Socio-demographic variables

Continuous variable for exposed and unexposed, frequency distribution, means (SD) and independent t-test were used.

3.12.2.2: Prevalence of respiratory health symptoms

Prevalence of respiratory health symptoms among exposed and unexposed group were computed.

3.12.2.3: Associated factors with respiratory health symptoms

Logistic regression analysis was used to determine the associated factors each contributing of the respiratory health symptoms. Where independent variables used were street sweeping dust exposure yes=1, no=0, past dust exposure yes=1, no=0, past respiratory illness yes =1, no = 0, age and duration of employment and dependent variable/outcome variable were cough, phlegm, wheezing, sneezing, nose irritating and breathlessness.

3.12.2.4: Level of utilization of PPEs

Level of utilization of PPEs was analyses by frequency distribution, bar and pie charts were used to illustrated the percentages of respondents.

3.13: Conclusion

The study design and methodology were clearly defined in this chapter, the study area, study population, data collection tools and sampling techniques were discussed as well as ethical consideration.

CHAPTER 4: RESULTS

4.1: Introduction

In this chapter data was gathered and analyzed, from 102 street sweepers as exposed group and 85 street vegetable sellers as unexposed group. Data analysis will thus be done on 187 respondents that were considered for the study.

4.2: Socio-demographic characteristics

The sex frequency distribution for male was 31 (30.4%), female 71 (69.6%) for exposed and male 15 (17.6%), female 70 (82.4%) for unexposed group. Study subject age range 18 – 70 years, the mean (SD) age for exposed 46.95(11.84) while for unexposed 38.66(8.89), t-test -4.768 which showed that the exposed group was some extent older than unexposed group, and difference was statistically significance, $p < 0.05$. Duration of job/ duration of job exposure range 1 – 42 year, mean (SD) duration of job exposure for exposed group 7.98(6.42), unexposed 7.33(3.93), $t = -0.818$, showed difference was not statistically significantly $p > 0.05$. Working days and working hours between exposed and unexposed showed difference and was statistically significant $p < 0.05$. Socio-economic status based on level of income (Tshs) more than 50% responded 40,000 to 80,000 while for unexposed more than 80% responded from 81,000 and above. See table 1 & 2

Table 1: Comparison socio-demographic variables for exposed and non exposed group

| Variable | Exposed Mean(SD) | Unexposed Mean(SD) | p value |
|-------------------------|-----------------------------|-------------------------------|----------------|
| Age (year) | 46.95(11.84) (n=102) | 38.67(8.89) (n=85) | 0.0001* |
| Duration of job (year) | 7.98(6.42) (n=100) | 7.33(3.93) (n=85) | 0.414 |
| Height (cm) | 157.24(6.96) (n=92) | 155.17(7.14) (n=84) | 0.053 |
| Weight(kg) | 54.41(7.46) (n=93) | 55.90(7.77) (n=84) | 0.031* |
| BMI(kg/m ²) | 21.53(2.71) (n=92) | 23.20(2.76) (n=84) | 0.0001* |
| Working hour (hour) | 7.83(0.93) (n=100) | 5.83(1.29) (n=85) | 0.0001* |
| Working days/week | 6.79(0.47) (n=102) | 6.16(0.51) (n=85) | 0.0001* |

*Independent t-test, mean value (standard deviation), p<0.05, number of respondent (n)

Table 2: Frequency table for socio-demographic variables for exposed and unexposed group

| Variable | Exposed (n=102)(%) | Unexposed (n=85)(%) |
|-------------------------------------|---------------------------|----------------------------|
| Sex | | |
| Male | 31(30.4) | 15(17.6) |
| Female | 71(69.6) | 70(82.4) |
| Marital Status | | |
| Single | 10(9.8) | 9(10.6) |
| Married | 32(31.4) | 47(55.3) |
| Cohabited | 11(10.8) | 8(9.4) |
| Separated | 24(23.5) | 13(15.3) |
| Widowed | 25(24.5) | 8(9.4) |
| Level of education | | |
| Not attended school | 49(48.0) | 26(30.6) |
| Attended school | 53(52.0) | 59(69.4) |
| Level of income (Tshs) | | |
| 40,000 – 80,000 | 55(53.9) | 9(10.6) |
| >80,000 | 47(46.1) | 76(89.4) |
| Duration of employment(year) | | |
| 1 – 5 | 48(47.1) | 35(41.2) |
| >5 | 54(52.9) | 50(58.8) |

4.3: Prevalence of respiratory health symptoms among exposed and unexposed group

The prevalence of respiratory health symptoms among exposed and unexposed group and statistic significant was set $p < 0.05$. Cough, phlegm, wheezing, sneezing, breathlessness and nose irritating were calculated through cross tabulation where in row study subjects exposed and unexposed variable and respiratory health symptoms variables set on column like cough, phlegm, sneezing, wheezing, nose irritating and breathlessness symptoms.

Prevalence of respiratory symptoms for exposed and unexposed, cough 56 (54.9%) and 11(12.9%); phlegm 40(39.2%) and 6(7.1%); wheezing 33(32.4%) and 12(14.1%); sneezing 65(63.7%) and 7(8.2%) (7); nose irritating 37(36.3%) and 4(4.7%) were reported higher in exposed group compared with unexposed group and the difference were statistically significant $p < 0.05$ while breathlessness symptom was reported high in unexposed 33(38.8%) than exposed 32(31.4%) and difference was not statistically significant $p > 0.05$. (Table 3)

Table 3: Prevalence of respiratory health symptoms among exposed and unexposed group

| Symptoms | Total (n=187) | Exposed (n=102) | Unexposed n=85) | p value |
|----------------|------------------|--------------------|--------------------|---------|
| Cough | 67(35.8) | 56(54.9) | 11(12.9) | 0.0001* |
| Phlegm | 46(24.6) | 40(39.2) | 6(7.1) | 0.0001* |
| Wheezing | 45(24.1) | 33(32.4) | 12(14.1) | 0.003* |
| Sneezing | 72(38.5) | 65(63.7) | 7(8.2) | 0.0001* |
| Nose irritate | 41(21.9) | 37(36.3) | 4(4.7) | 0.0001* |
| Breathlessness | 65(34.8) | 32(31.4) | 33(38.8) | 0.287 |

*Chi-square test, $p < 0.05$

4.4: Relationship between respiratory health symptoms and other factors among street sweepers.

4.4.1: Duration of job

Street sweepers were reported more cough 34(63.0%), phlegm 24(44.4%), wheezing 24(40.7%), nose irritating 34(42.6%), sneezing 36(66.7%) and breathlessness 20(37.0%) symptom who worked more than 5 years compared with who worked 1 –5 years, but difference was not statistically significant $p>0.05$. See Table 4

Table 4: Relationship between respiratory health symptoms and duration of job among street sweepers

| Respiratory symptoms | Duration of job (year) | | χ^2 | p value |
|----------------------|------------------------|-----------------|----------|---------|
| | 1 -5 (n=48)(%) | >5 (n=54)(%) | | |
| Cough | | | 3.012 | 0.083 |
| Yes | 22(45.8) | 34(63.0) | | |
| No | 26(54.2) | 20(37.0) | | |
| Phlegm | | | 1.316 | 0.251 |
| Yes | 16(33.3) | 24(44.4) | | |
| No | 32(66.7) | 30(55.6) | | |
| Wheezing | | | 0.421 | 0.517 |
| Yes | 14(29.2) | 19(40.7) | | |
| No | 34(70.8) | 35(64.8) | | |
| Nose irritate | | | 2.572 | 0.276 |
| Yes | 14(29.2) | 23(42.6) | | |
| No | 34(70.8) | 31(57.4) | | |
| Sneezing | | | 0.429 | 0.512 |
| Yes | 29(60.4) | 36(66.7) | | |
| No | 19(39.6) | 18(33.3) | | |
| Breathlessness | | | 7.169 | 0.068 |
| Yes | 12(25.0) | 20(37.0) | | |
| No | 36(75.0) | 34(63.0) | | |

Chi-square test, $p<0.05$

4.4.2: Age

Street sweepers age above 61 years 7 (63.6%) were more reported phlegm due to age group as compared to other age group 18 – 35 years 10 (50.0%), 36 -50 years 7(19.4%) and 51 – 60 years 7(45.7%) and difference was statistically significant $p < 0.05$. But more reported cough 23(65.7%) 51 – 60 years, wheezing 10(50.0%) and sneezing 15(75.0%) at 18 – 35 years, nose irritating 17(47.2%) at 36 – 50 years, and breathlessness 4(36.4%) symptoms at 61 years and above but difference with other duration of employment (years) and difference was not statistically significant $p > 0.05$. See table 5

Table 5: Relationship between occupational respiratory health symptoms and age among street sweepers

| Respiratory symptoms | Age group (year) | | | | χ^2 | p value |
|----------------------|---------------------|----------------------|---------------------|------------------|----------|---------|
| | 18 -35 (n=20)(%) | 36 – 50 (n=36)(%) | 51 -60 (n=35)(%) | >60 (n=11)(%) | | |
| Cough | | | | | 4.539 | 0.209 |
| Yes | 11(55.0) | 15(41.7) | 23(65.7) | 7(63.7) | | |
| No | 9(45.0) | 21(58.3) | 12(34.3) | 4(36.4) | | |
| Phlegm | | | | | 12.252 | 0.015* |
| Yes | 10(50.0) | 7(19.4) | 16(45.7) | 7(63.6) | | |
| No | 10(50.0) | 29(80.6) | 19(54.3) | 4(36.4) | | |
| Wheezing | | | | | 4.629 | 0.015* |
| Yes | 10(50.0) | 8(22.2) | 11(31.4) | 4(36.4) | | |
| No | 10(50.0) | 28(67.8)) | 24(68.6) | 7(63.6) | | |
| Nose irritate | | | | | 5.156 | 0.515 |
| Yes | 6(30.0) | 17(47.2) | 12(34.3) | 2(18.2) | | |
| No | 14(70.0) | 19(52.8) | 23(65.7) | 9(81.8) | | |
| Sneezing | | | | | 2.014 | 0.500 |
| Yes | 15(75.0) | 21(58.3) | 23(65.7) | 6(54.5) | | |
| No | 5(25.0) | 15(41.7) | 12(34.3) | 5(45.5) | | |
| Breathlessness | | | | | 0.156 | p>0.05 |
| Yes | 6(30.0) | 11(30.6) | 11(31.4) | 4(36.4) | | |
| No | 14(70.0) | 25(69.4) | 24(68.6) | 11(63.6) | | |

*Chi-square test, p<0.05

4.4.3: Working hours

Street sweepers who working for 5 – 8 hours per day were more reported nose irritating symptoms 34(39.5%) and sneezing symptoms 59(68.6%) compared to the working 9 hours and above and difference was statistically significant p< 0.05. The two symptoms represent acute respiratory conditions and should occur within short time of exposure.

Other being cough, phlegm, wheezing and breathlessness representing chronic respiratory symptoms and may occur later after development of respiratory diseases could not show working hourly differences between the exposed. See table 6

Table 6: Relationship between respiratory health symptoms and working hours among street sweepers

| Respiratory symptoms | Working hours | | χ^2 | p value |
|----------------------|--------------------|-----------------|----------|---------|
| | 5 – 8 (n=86)(%) | >8 (n=16)(%) | | |
| Cough | | | 4.288 | 0.055 |
| Yes | 51(59.3) | 5(31.3) | | |
| No | 35(40.7) | 11(68.8) | | |
| Phlegm | | | 0.926 | 0.407 |
| Yes | 32(37.2) | 8(50.0) | | |
| No | 54(64.8) | 8(50.0) | | |
| Wheezing | | | 0.011 | p>0.05 |
| Yes | 28(32.6) | 5(31.2) | | |
| No | 58(67.4) | 11(68.8) | | |
| Nose irritate | | | 9.083 | 0.017* |
| Yes | 34(39.5) | 3(18.7) | | |
| No | 52(60.5) | 13(81.3) | | |
| Sneezing | | | 5.646 | 0.024* |
| Yes | 59(68.6) | 6(37.5) | | |
| No | 27(31.4) | 10(62.5) | | |
| Breathlessness | | | 1.350 | 0.379 |
| Yes | 25(29.1) | 7(43.8) | | |
| No | 61(70.9) | 9(56.3) | | |

*Chi-square test, p<0.05

4.4.4: Level of education

Street sweepers who had not attended school were more reported, cough 34(64.4%) and phlegm 25(51.0%) symptoms, compared to who were attended school and difference was statistically significant $p < 0.05$. Other reported wheezing 20(40.8%), nose irritating 20(40.8%), sneezing 36(73.5%) and breathlessness 19(38.8%) symptoms were reported and difference was not statistically significant $p > 0.05$. See table 7

Table 7: Relationship between respiratory health symptoms and level of education among street sweepers

| Respiratory symptoms | Level of education | | χ^2 | p value |
|----------------------|--------------------|------------------------|----------|---------|
| | Attended (n=49)(%) | Not attended (n=53)(%) | | |
| Cough | | | 7.992 | 0.006* |
| Yes | 34(64.4) | 22(41.5) | | |
| No | 15(30.6) | 31(58.5) | | |
| Phlegm | | | 5.153 | 0.026* |
| Yes | 25(51.0) | 15(28.3) | | |
| No | 24(49.0) | 38(71.7) | | |
| Wheezing | | | 3.086 | 0.093 |
| Yes | 20(40.8) | 13(24.5) | | |
| No | 29(59.2) | 40(75.5) | | |
| Nose irritate | | | 3.086 | 0.309 |
| Yes | 20(40.8) | 17(31.1) | | |
| No | 29(59.2) | 36(67.9) | | |
| Sneezing | | | 3.873 | 0.064 |
| Yes | 36(73.5) | 29(54.7) | | |
| No | 13(26.5) | 24(45.3) | | |
| Breathlessness | | | 2.400 | 0.139 |
| Yes | 19(38.8) | 13(24.5) | | |
| No | 30(61.2) | 40(75.5) | | |

*Chi-square test, $p < 0.05$

4.4.5: Past dust exposure

Respiratory health symptoms among street sweepers which reported more at duration of < 5 years past dust exposure were cough 30(61.2%), phlegm 20(40.8%), nose irritating 19(38.7%) and sneezing 33(67.3%), while wheezing 12(38.7%) and breathlessness 13(41.9%) more reported at duration of > 5 years, but difference was not statistically significant $p>0.05$. See table 8

Table 8: Relationship between respiratory health symptoms and past dust exposure among street sweepers

| Respiratory symptoms | Past dust exposure(year) | | χ^2 | p value |
|----------------------|--------------------------|-----------------|----------|----------|
| | <5 (n=49)(%) | >5 (n=31)(%) | | |
| Cough | | | 2.046 | 0.412 |
| Yes | 30(61.2) | 16(51.6) | | |
| No | 19(38.8) | 15(48.4) | | |
| Phlegm | | | 0.856 | 0.785 |
| Yes | 20(40.8) | 11(35.5) | | |
| No | 29(59.2) | 20(64.5) | | |
| Wheezing | | | 0.698 | 0.881 |
| Yes | 17(34.7) | 12(38.7) | | |
| No | 32(65.3) | 19(61.3) | | |
| Nose irritate | | | 1.277 | $p>0.05$ |
| Yes | 19(38.7) | 11(35.5) | | |
| No | 30(61.3) | 20(64.5) | | |
| Sneezing | | | 2.119 | 0.375 |
| Yes | 33(67.3) | 19(61.3) | | |
| No | 16(32.7) | 12(38.7) | | |
| Breathlessness | | | 2.032 | 0.418 |
| Yes | 14(28.6) | 13(41.9) | | |
| No | 35(71.4) | 40(58.1) | | |

Chi-square test, $p<0.05$

4.4.6: Past respiratory illness

Street sweepers who reported past respiratory disease experiences had more reported to have cough symptoms 8(57.1%) vs 6(42.9%) but difference was no statistically significant $p>0.05$. See table 9

Table 9: Relationship between respiratory health symptoms and past respiratory disease history among street sweepers

| Respiratory symptoms | Past respiratory diseases | | χ^2 | p value |
|----------------------|---------------------------|--------------|----------|---------|
| | yes (n=14)(%) | no (n=87)(%) | | |
| Cough | | | 0.010 | 0.890 |
| Yes | 8(57.1) | 48(55.2) | | |
| No | 6(42.9) | 39(44.8) | | |
| Phlegm | | | 0.072 | 0.789 |
| Yes | 6(42.9) | 34(39.1) | | |
| No | 8(57.1) | 53(60.9) | | |
| Wheezing | | | 2.218 | 0.136 |
| Yes | 7(50.0) | 26(29.9) | | |
| No | 7(50.0) | 61(70.1) | | |
| Nose irritate | | | 1.675 | 0.433 |
| Yes | 3(21.4) | 34(39.0) | | |
| No | 11(78.6) | 53(61.0) | | |
| Sneezing | | | 3.275 | 0.070 |
| Yes | 6(42.9) | 59(67.8) | | |
| No | 8(57.1) | 28(32.2) | | |
| Breathlessness | | | 0.073 | 0.787 |
| Yes | 4(28.6) | 28(32.2) | | |
| No | 10(71.4) | 59(67.8) | | |

Chi-square test, $p<0.05$

4.4.7: Wearing of nose/mouth mask

Street sweepers who responded yes on wearing nose/mouth masks showed no significant difference in all respiratory health symptoms by either wearing or not wearing nose/mouth mask $p > 0.05$. See table 10

Table 10: Relationship between respiratory health symptoms wearing of nose/mouth masks PPE among street sweepers

| Respiratory symptoms | Wearing of nose/mouth masks | | χ^2 | p value |
|----------------------|-----------------------------|--------------|----------|------------|
| | yes (n=63)(%) | no (n=39)(%) | | |
| Cough | | | 0.028 | $p > 0.05$ |
| Yes | 35(55.6) | 21(53.8) | | |
| No | 28(44.4) | 18(46.2) | | |
| Phlegm | | | 0.087 | 0.836 |
| Yes | 24(38.1) | 16(41.0) | | |
| No | 39(61.9) | 23(59.0) | | |
| Wheezing | | | 3.643 | 0.081 |
| Yes | 16(25.4) | 17(43.6) | | |
| No | 47(74.6) | 22(56.4) | | |
| Nose irritate | | | 1.669 | 0.556 |
| Yes | 22(34.9) | 15(38.5) | | |
| No | 41(65.1) | 24(61.5) | | |
| Sneezing | | | 4.230 | 0.056 |
| Yes | 45(71.4) | 20(51.3) | | |
| No | 18(18.6) | 19(48.7) | | |
| Breathlessness | | | 1.474 | 0.274 |
| Yes | 17(27.0) | 15(38.5) | | |
| No | 46(73.0) | 24(61.5) | | |

Chi-square test, $p < 0.05$

4.5: Associated factors with respiratory health symptoms among street sweepers

4.5.1: Predictors of respiratory health symptoms

Logistic regression modal showed that exposure to street sweeping dust is the most predictor of cough (OR = 8.19, 95%CI (3.89 – 17.23)), phlegm (OR = 8.49, 95%CI (3.38 – 21. 23)), nose irritating (OR = 0.09, 95%CI (0.03 – 0.26)), wheezing (OR = 2.91, 95%CI (1.39 – 6.09)) and sneezing (OR = 19.58, 95%CI (8.18 – 46.83)), while controlling for age, duration of employment and all were nonsmokers, past dust exposure and past respiratory diseases. (Table 11)

Table 11: Predictors for respiratory health symptoms among street sweepers

| Variable | β | SE | OR(95%CI) | p value |
|--------------------------|---------------------------|-----------|--------------------|----------------|
| Cough | | | | |
| Street dust | 2.10 | 0.38 | 8.19(3.89 – 17.23) | 0.0001* |
| Age | -0.74 | 0.19 | 0.48(0.33 – 0.70) | 0.0001* |
| Duration of job | 0.65 | 0.32 | 1.91(1.03 – 3.55) | 0.040* |
| Past dust exposure | 0.66 | 0.37 | 1.93(0.94 – 3.94) | 0.074 |
| Past respiratory illness | 0.87 | 0.46 | 2.38(0.97 – 5.85) | 0.059 |
| Phlegm | | | | |
| Street dust | 2.14 | 0.48 | 8.49(3.38 – 21.23) | 0.0001* |
| Age | -0.62 | 0.20 | 0.54(0.36 – 0.82) | 0.002* |
| Duration of job | 0.41 | 0.35 | 1.50(0.76 – 2.98) | 0.244 |
| Past dust exposure | 0.40 | 0.40 | 1.48(0.67 – 3.25) | 0.334 |
| Past respiratory illness | 0.64 | 0.48 | 1.90(0.74 – 4.86) | 0.183 |
| Wheezing | | | | |
| Street dust | 1.07 | 0.38 | 2.91(1.39 – 6.09) | 0.049* |
| Age | -0.15 | 0.20 | 0.86(0.58 – 1.26) | 0.434 |
| Duration of job | 0.36 | 0.35 | 1.43(0.72 – 2.84) | 0.307 |
| Past dust exposure | 0.70 | 0.43 | 2.01(0.86 – 4.67) | 0.105 |
| Past respiratory illness | 0.90 | 0.47 | 2.46(0.97 – 6.22) | 0.057 |
| Nose irritate | | | | |
| Street dust | -2.45 | 0.55 | 0.09(0.03 – 0.26) | 0.0001* |
| Age | 0.23 | 0.20 | 1.25(0.84 – 1.87) | 0.270 |
| Duration of job | -0.41 | 0.36 | 0.66(0.32 – 1.35) | 0.257 |
| Past dust exposure | 0.74 | 0.45 | 2.10(0.86 – 5.09) | 0.102 |
| Past respiratory illness | -0.65 | 0.65 | 0.52(0.15 – 1.87) | 0.318 |
| Sneezing | | | | |
| Street dust | 2.97 | 0.45 | 19.58(8.18- 46.83) | 0.0001* |
| Age | -0.33 | 0.18 | 0.72(0.51 – 1.01) | 0.059 |
| Duration of job | 0.09 | 0.30 | 1.09(0.60 – 1.98) | 0.772 |
| Past dust exposure | 0.55 | 0.353 | 1.73(0.87 – 3.46) | 0.120 |
| Past respiratory illness | -0.59 | 0.51 | 0.56(0.21 – 1.50) | 0.246 |

*Logistic regression, odds ratio, 95% Confidence Interval, p<0.05

4.5.2: Association between exposure to street sweeping dust and respiratory health symptoms among street sweepers

Binary logistic and statistical significant were used to suggest association between street sweeping dust and respiratory health symptoms outcomes after adjusting for important confounders age, past dust exposure, duration of employment and past respiratory diseases whereby cough (OR = 7.32, 95%CI (3.33 – 16.10)), phlegm (OR = 7.87, 95%CI (3.00 – 20.59)), nose irritating (OR = 13.27, 95%CI (4.31 – 40.88)), wheezing (OR = 3.64, 95%CI (1.70 – 7.79)) and sneezing (OR = 25.63, 95%CI (9.90 – 66.38)) and association was statistically significant $p < 0.05$. See table 12

Table 12: Association between exposure to street sweeping dust and respiratory health symptoms outcomes among street sweepers

| Outcomes | β | OR(95%CI) | p value |
|-----------------|---------|---------------------|---------|
| Cough | 1.99 | 7.32(3.33 – 16.10) | 0.0001* |
| Phlegm | 2.06 | 7.87(3.00 – 20.59) | 0.013* |
| Nose irritating | 1.29 | 13.27(4.31 – 40.88) | 0.001* |
| Wheezing | 1.29 | 3.64(1.70 – 7.79) | 0.001* |
| Sneezing | 3.24 | 25.63(9.90 – 66.38) | 0.0001* |

*Binary regression, odds ratio, 95% confident interval, $p < 0.05$

4.6: Utilization of PPEs among street sweepers

4.6.1: Availability and wearing of PPEs

Descriptive statistic – frequency was used to obtain the number of respondent who said ‘‘YES’’ means available and wearing of PPEs and ‘‘NO’’ means not available and not wearing, bar chart were used to illustrates in percentage(%). Most PPEs which available were reflector coat for 88 (86.3%) and wearing 82 (80.4%), followed by foot ware available 70 (68.6%), wearing 66 (64.7%), mouth/nose masks availability 72 (70.6%) wearing 63 (61.8%) and hand gloves availability 53 (52%) wearing 49 (48%) and least available and wearing of PPEs were overall 17 (16.7%), 14 (13.7%), helmet available 6

(5.9%) wearing 4 (3.9%), eye protection/goggle availability 1 (1.0%) wearing 1 (1.0%) and respirator was not available. See figure 2 & 3

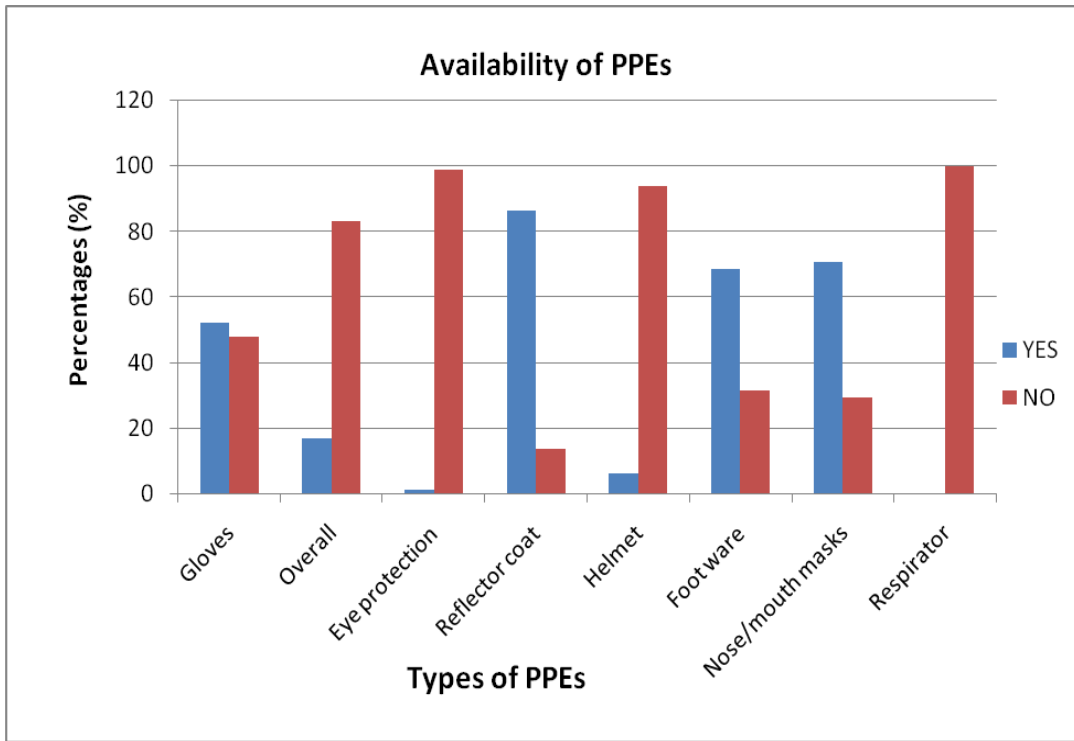


Figure: 2. Proportion of availability of PPEs among street sweepers in Ilala Municipal

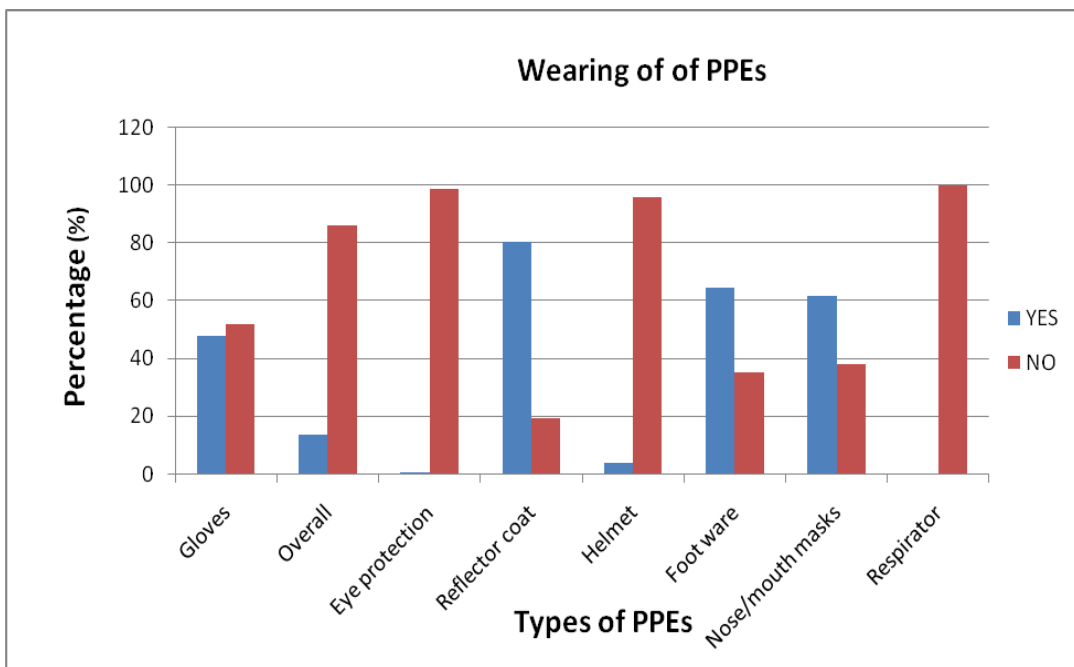


Figure: 3. Proportion of street sweepers wear PPEs during working.

4.6.2: General responds on availability of PPEs

Street sweepers (94) responded differently on availability of PPEs during working. Respondent showed that PPEs may available once when employed 10(9.8%), once after 3 months 42(41.2%), once after 6 months 14(13.7%), once a year 8(7.8%), once when damaged 19(18.6%), not available 1(1.0%) and not responded 8(7.8%). See figure 4

4.6.3: General responds on wearing of PPEs during working.

General wearing of PPE, (100) street sweepers responded differently, 6(5.9%) wear PPEs only during worked in drainage and dirt places, 6(5.9%) wear PPE once available from employer, 17(16.7%) wear frequently during working, 15(14.7%) did not wear because they feel uncomfortable especial during hot time, 8(7.8%) did not wear PPE frequently because type of PPEs used not durable, 48(47.1%) did not wear frequently because not available at any time and 2(2.0%) non responded. (Figure 5)

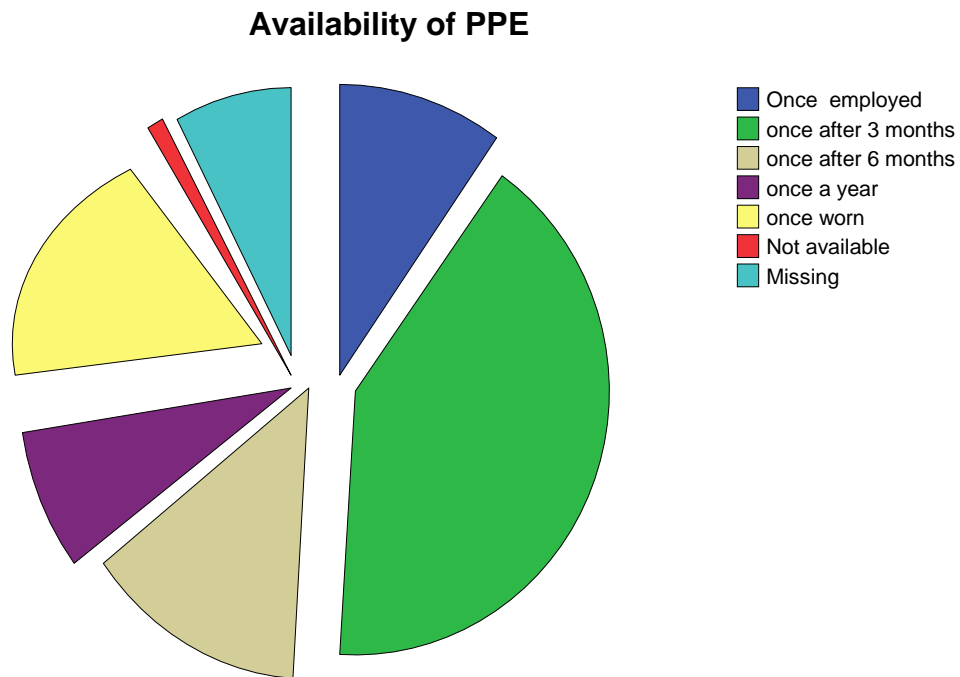


Figure 4: Availability of PPEs responds from street sweepers.

Wearing of PPE during working

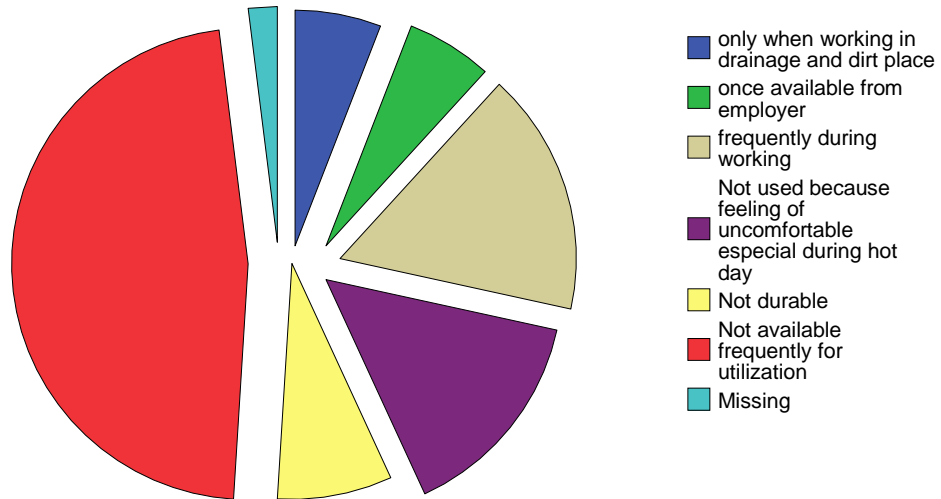


Figure 5: Wearing of PPEs responds from street sweepers.

4.7: Conclusion

This chapter presented the research findings about occupational respiratory health symptoms and associated factors among street sweepers in Ilala Municipality. It was evident from the study finding that there are association between respiratory health symptoms and street sweeping dust among street sweepers in Ilala municipality.

CHAPTER 5: DISCUSSION

5.1: Introduction

The aim of this study was to determine prevalence of respiratory health symptoms (phlegm, cough, wheezing, nose irritating, sneezing, and shortness of breath) and associated factors among street sweepers in Ilala Municipality. Street sweeping dust is becoming the most factor in the contribution of respiratory health symptoms among street sweepers without using appropriate PPEs. Street sweeping dust consists of organic and inorganic particles which may cause adverse health effects.

5.2: Socio-demographic characteristics

The study population were street sweepers as exposed group (n= 102) and street vegetable sellers as unexposed group (n= 85) total of 187 both non smoking habit. Unexposed samples are taken from whose lifestyle is nearly similar to that of street sweepers and also less exposed to the street sweeping dust and other street traffic pollutions.

The respondents' sex were male and female for both study subjects, exposed male 31(30.4%), female 71(69.6%) and unexposed male 15(17.6%) female 70(82.4%). Both study groups female were more than 50%. Age range from 18 – 70 mean (SD) age for exposed 47.0(11.8), unexposed 38.7(8.9) which shows that the exposed group is older than unexposed group.

5.3: The prevalence of respiratory health symptoms among exposed and unexposed group.

The prevalence of respiratory health symptoms of exposed was significantly higher than that of unexposed group. The major symptoms presented higher are cough 56(54.9%) vs 11(12.9%), phlegm 40(39.2%) vs 6(7.1%), sneezing 65(63.7%) vs 79(8.2%), nose irritating 37(36.3%) vs 4(4.7%) and wheezing 33(32.4%) vs 12(14.1%), this may be due to exposed group being exposed directly to street sweeping dust than unexposed group. Composed of organic and inorganic dust particles together with other pollutants from the

street, car traffics, exhaust engine fuel which results fumes and gases contributing to increases of respiratory health symptoms. Similar findings have been reported high prevalence of cough and sneezing symptoms were observed in street sweepers than control group [9]. Others findings from cement workers reported high cough and phlegm for non smoker workers [42]. Study in India showed that the prevalence of respiratory symptoms of subject is higher than control group [8].

From this study more cough symptom reported to exposed group age > 61 years this may presenting that more aged people the body immunity start to go down and less fighting for diseases, other study reported respiratory symptoms of both conditions were more among person above 40 years of age [35]. More respiratory health symptoms were reported for exposed group who worked for more than >5, this might be due to frequently high dust level exposure without proper preventive mechanisms, others have reported the same [43] [9]. This study finding that street sweepers who attended school had less reported respiratory symptoms than who did no attended school, other reported respiratory symptoms associated with low level of education [24].

In this study more sneezing and nose irritating symptoms have reported more for those who exposed 5 – 8 hours, these symptoms noted as symptoms which occur in short duration of time and disappeared after short period of time. The findings might explaining the 5 – 8 hours is most busy working time and more car traffic and also street sweeping dust varies due to time and locations, while at > 9 hours is respond from workers at that time they finalized work which less street sweeping dust and less car traffic.

5.4: Associated factors with respiratory health symptoms among street sweepers

This study street sweeping dust variable was the most predictor of cough, phlegm wheezing and sneezing symptoms, the similar results reported cement dust is predictor of wheezing, breathlessness, cough and phlegm [42], in this study age variable was also predictor of cough and phlegm symptoms, while duration of employment variable only for cough and breathlessness symptoms, same findings [20].

The street sweeping dust was major associated factors with respiratory health symptoms among street sweepers and associations was statistically significant $p < 0.05$, after adjusting these important confounders/predictors age, past respiratory disease history, past dust exposure and duration of employment, the binary logistic regression analysis showed the associated symptoms are cough (OR = 7.32, 95%CI (3.33 – 16.10)), phlegm (OR = 7.87, 95%CI (3.00 – 20.59)), wheezing (OR = 3.64, 95%CI (1.70 – 7.79)), nose irritating (OR = 13.27, 95%CI (4.31 – 40.88)) and sneezing (OR = 25.63, 95%CI (9.90 – 66.36)). The adjusted odds ratios for wheezing, nose irritating and sneezing are higher and also found that increases level for exposed as compared to unexposed for outcome variables. Other study has reported similar association between wheezing, cough and phlegm to black carbon dust exposure [40], the same reported to mineral and organic dust [26] respiratory health symptoms might be associated with coffee dust exposure [41], cough and phlegm may associated with cement dust exposure [42], the same to aerosol and sisal fibre dust exposure [44], quartz and coal mine dust exposure [45]. Both ages, duration of job and dust became the main predictor of respiratory health symptoms for street sweepers, similar to steelworkers in Taiwan [20].

5.5: Level of utilization of PPEs among street sweepers

Most Ilala Municipality streets had high accumulation of waste from business, markets, constructions and other thrown by pedestrian, which end-up producing much dust and other contaminations. The availability of PPEs is moderate, mouth/nose mask and it available after certain duration of period while respirator totally not available may aggravate to the situation of high prevalence of respiratory health symptoms among exposed group. But wearing depends on attitude, knowledge and awareness on risk and health effect adverse.

In this study general respond on availability of PPEs more responded once after three months 42(41.2%), the same study reported from India street sweepers did not using PPE because of irregular supply of PPEs[8], while study reported general wearing of PPEs only 17(16.7%) wear PPEs frequently during working. But street sweepers who

reported using nose/mouth mask showed no significant different in all respiratory health symptoms, this might be due to inappropriate and not durable masks which do not prevent from dust, same reported [42]. In this study noted that respirator (100%) not available while is the most PPE recommended for dust area, other studies observed that dust factories in developing countries where little or no utilization of PPEs [41] the same as found in this study.

5.6: Limitations of the study

The study design was cross-sectional analytical study which could not establish causal-relationship effect. Selection bias was dominated in this type of study design as those available during my study were the only included in the sample population, the healthy workers effect like in most of other occupational studies might affect the study since the already sick ones have already left the job and time could not enable follow-up of their health status. Only healthy workers who were available during the data collection were enrolled in the study, which may contribute to underestimate the effect of interest.

The sample size calculated could not be reached due to the start of fasting in Ramadan month, which the respondent rate was 57.7% for exposed group 62.9% and unexposed group 52.2%, but the collected sample size facilitated all analyses required for the study.

Report bias might have influenced the results for reported duration of employment, age, past dust exposure and past respiratory disease. This might lacking association between street sweeping and those factors for respiratory outcomes.

5.7: Conclusion

Despite of the above biases the systematic way of data collection and stratified analysis manage the researcher to come up with important findings for the street sweeper which is the vulnerable group of population. The study manages to show the clear relationship between working as street sweepers and the respiratory health symptoms. There is need to enforce on the use of PPE and medical urge for routine medical surveillance for workers.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1: Conclusion

Findings from this study indicate that the respiratory health symptoms which are cough, phlegm, sneezing, wheezing and nose irritating outcomes are associated with street sweeping dust exposure and the prevalence of respiratory health symptoms was higher among exposed group than unexposed group. Availability of PPEs was moderate and wearing of PPEs was low. Also study conclude for those who did not develop respiratory health symptoms while working/exposed on street sweeping dust they are at risk of developing respiratory health symptoms.

6.2: Recommendations

The future use of cohort study designed will be able to establish causal-effect relationship between street sweeping dust exposure and occurrences of occupational respiratory health symptoms.

Pre medical examination to be done before employment to street sweeping job to identify age, past respiratory diseases, past dust exposure and level of education, because study showed there was relationship between reported developing respiratory health symptoms and these factors.

Workplace risk assessment to be done periodically to identifying level of dust which produce during street sweeping because street sweeping dust was observed as the most predictor for respiratory symptoms outcomes.

Appropriate and quality PPEs should be provided consistent and motivate street sweepers to wear during street sweeping.

Research to be conducted to identify and quantify how the institutional factors can contribute to street sweepers to develop respiratory symptoms, in this study could not be done.

Another research to be design to explore how socio-economic factors (level of education and income), past dust exposure, age, duration of employment and past respiratory diseases history can contribute to developing respiratory health symptoms among street sweeper due to street sweeping occupational.

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Appendixes

Appendix i: Questionnaires in English version

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

SCHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES

P.O.BOX 65015, DAR ES SALAAM, TANZANIA,

Telephone: +255-22-2153371, E-mail: dsphss@muhas.ac.tz

Date of interview..... Questionnaires number

Name of interviewer.....

Please, put check (✓) in front of the correct question number which to indicate number and write a correct number example age put in a years.

A: SOCIO-DEMOGRAPHIC

| S/N | Question | Coding classification | Respond |
|-----|--------------------------|-------------------------|---------|
| 1 | Sex: (by observation) | 0 = Male | |
| | | 1 = female | |
| 2 | Age years | | |
| 3 | Marital status: Marriage | 1 = Single | |
| | | 2 = Married | |
| | | 3 = Cohabiting | |
| | | 4 = Separated | |
| | | 5 = Widow | |
| 4 | Level of education | 1 = No education | |
| | | 2 = Primary school | |
| | | 3 = Secondary school | |
| | | 3 = Technical education | |
| | | 5 = Diploma | |

| | |
|----|--|
| 5 | When did you start this job?years. |
| 6 | How long in this job?years. |
| 7 | How many working hours per day? hours. |
| 8 | How many working hours' per a week?hours. |
| 9 | What is your working time?to hours. |
| 10 | What is your income per month?Tshs. |
| 11 | Weightkg |
| 12 | Heightcm |

B: RESPIRATORY SYMPTOMS

COUGH

| S/N | Questions | Coding classification | Respond |
|-----|---|-----------------------|---------|
| 1 | Do you usually have a cough? If NO Skip to 3 | 0 = No | |
| | | 1= Yes | |
| 2 | Do you usually cough as much as 4 to 6 times per a day or 4 days more out of a week? | 0 = No | |
| | | 1= Yes | |
| 3 | Do you usually cough at all | 0 = No | |

| | | | |
|---|---|--------|--|
| | on getting up in the morning? | 1= Yes | |
| 4 | Do you usually cough at all during the rest of the day or at night? | 0 = No | |
| | | 1= Yes | |
| | <i>If yes to any above (1, 2, 3, 4). Answer the following. If not to all Check does not apply and skip to next section.....</i> | | |
| 5 | Do you usually cough like this for 3 consecutive months or more during the year? | 0 = No | |
| | | 1= Yes | |
| 6 | For how long you had this cough?years | | |

PHLEGM

| S/N | Questions | Coding classification | Respond |
|-----|---|-----------------------|---------|
| 1 | Do you usually bring up phlegm from your chest? | 0 = No | |
| | | 1= Yes | |
| | <i>If NO skip to question no 3.....</i> | | |
| 2 | Do you usually bring up phlegm like this as much as twice a day, or four days more out of the week? | 0 = No | |
| | | 1= Yes | |
| 3 | Do you usually bring up phlegm at the all during the rest of the day or at right? | 0 = No | |
| | | 1= Yes | |
| | <i>If yes to any above (1, 2, 3,). Answer the question 4 and 5.....</i> | | |
| 4 | Do you bring up phlegm like | 0 = No | |

| | | | |
|---|--|--------|--|
| | this on most days for 3 consecutive months during the year? | 1= Yes | |
| 5 | For how many years have you had trouble with phlegm?years | | |

WHEEZING, NOSE IRRITATING AND EYE DISCOMFORTABLE

| S/N | Questions | Coding classification | Respond |
|-----|--|-----------------------|---------|
| 1 | Does your chest ever sound wheezy or whistling? 1. When you have a cold | 0 = No | |
| | | 1= Yes | |
| | 2. Occasionally apart from colds | 0 = No | |
| | | 1= Yes | |
| | 3. Most days or night | 0 = No | |
| | | 1= Yes | |
| | <i>If YES part 1, 2 or 3 in question 1 go to question 2</i> | | |
| 2 | For how many years has this been sound wheezy present?years | | |
| 3 | Do you have nose irritate? | 0 = No | |
| | | 1= Yes | |
| 4 | For how many years has this been nose irritating present?years | | |
| 5 | Do you have eye discomfort? | 0 = No | |
| | | 1= Yes | |

| | | | |
|---|--|--------|--|
| 6 | For how many years has this been eye discomfort present?years | | |
| 7 | Do you sneezing once you start street sweeping? | 0 = No | |
| | | 1= Yes | |
| 8 | For how many years has this been sneezing present?years | | |

BREATHLESSNESS

| S/N | Question | Coding classification | Respond |
|-----|--|-----------------------|---------|
| 1 | Have you trouble by shortness of breath when hurrying the level or walking up a slight hill? | 0 = No | |
| | | 1= Yes | |
| 2 | For how many years have you had trouble for shortness of breath?years | | |

OCCUPATIONAL HISTORY

| S/N | Questions | Coding classification | Respond |
|-----|--|-----------------------|---------|
| 1 | Have you ever worked for any other dusty job? | 0 = No | |
| | | 1= Yes | |
| 2 | Specify job, industry/area..... | | |
| 3 | For how long?years | | |
| 4 | What perceived level of dust has been exposed in that job? | Mild = 1 | |
| | | Moderate = 2 | |

| | | | |
|---|--|--------------|--|
| | | Severe = 3 | |
| 5 | Have you ever been exposed to gas or chemical fumes in any other work? | 0 = No | |
| | | 1 = Yes | |
| 6 | Specify job, industry/area..... | | |
| 7 | For how long exposed? years | | |
| 8 | What perceived level of fume has been exposure in that job? | Mild = 1 | |
| | | Moderate = 2 | |
| | | Severe = 3 | |

PAST RESPIRATORY DISEASES HISTORY

| Questions | Respond | | |
|--|---------|---|---|
| | 0 | 1 | 2 |
| Was either of your past life ever told by a doctor that you had a chronic lung condition as mentioned below? | | | |
| 1. Chronic bronchitis | | | |
| 2. Emphysema | | | |
| 3. Asthma | | | |
| 4. Heart attack. | | | |
| 5. Lung cancer. | | | |
| 6. Tuberculosis (TB) | | | |

NOTE: 0 = No, 1 = Yes, 2 = Don't now

Adopted from: (Recommended Respiratory Disease Questionnaires for Use with Adults and Children in Epidemiological Research, 1976) [39].

C: UTILIZATION OF PPEs

| S/N | Type of PPEs | Availability of PPEs | | |
|-----|-------------------------|----------------------|---------|--------------|
| | | Answer | | |
| | | No = 0 | Yes = 1 | Explanations |
| 1 | Respirator | | | |
| 2 | Hand gloves | | | |
| 3 | Eye protection /goggles | | | |
| 4 | Foot wear (boots) | | | |
| 5 | Clothing/apron/overall | | | |
| 6 | Reflectors | | | |
| 7 | Helmet | | | |
| 8 | Nose/mouth masks | | | |

| S/N | Type of PPEs | Wearing of PPEs during working. | | |
|-----|-------------------------|---------------------------------|--------|--------------|
| | | Answer | | |
| | | No = 0 | Yes= 1 | Explanations |
| 1 | Respirator | | | |
| 2 | Hand gloves | | | |
| 3 | Eye protection /goggles | | | |
| 4 | Foot wear (boots) | | | |
| 5 | Clothing/apron/overall | | | |
| 6 | Reflectors | | | |
| 7 | Helmet | | | |
| 8 | Nose/mouth masks | | | |

Appendix ii: Questionnaires in Kiswahili version

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
SCHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES
P.O.BOX 65015, DAR ES SALAAM, TANZANIA,
Telephone: +255-22-2153371, E-mail: dsphss@muhas.ac.tz

MASWALI YA UTAFITI KWA WAFAGIZI BARABARA NA WAUZA/WATEMBEZA MBOGA

Tarehe ya usaili Nambari ya dodoso

Jina la mhoji maswali.....

Weka alama ya vema mbele ya jibu sahihi, na andika numbari/jibu kwenye nafasi husika.

SEHEMU A: UTAMBULISHO

| Na. | Swali | Chagua | Jibu |
|-----|--|--|------|
| 1 | Taja umri wakomiaka Ulizaliwa lini taja tarehe/mwezi/mwaka | | |
| 2 | Jinsia: | 0 = Mume 1 = Mke | |
| 3 | Hali ya ndoa | 1 = Sijaoa/ olewa 2 = Nimeoa/olewa 3 = Naishi na mwenza bila ndoa 4= imetengana/achana 5 = Mjane | |
| 4 | Kiwango cha elimu uliyonayo | 1 = Sijasoma 2 = Elimu ya msingi | |

| | | | |
|----|---|-----------------------|--|
| | | 3= Elimu ya sekondari | |
| | | 4 = Elimu ya ufundi | |
| | | 5 = Diploma | |
| 5 | Ulianza kazi lini? Taja mwaka | | |
| 6 | Una muda gani tangu uanze kufanya kazi hii? Taja miaka..... | | |
| 7 | Unafanya kazi hii kwa masaa mangapi kwa siku? Taja masaa | | |
| 8 | Unafanya kazi hii siku ngapi kwa wiki? Taja idadi ya sikusiku. | | |
| 9 | Unafanya kazi kuanzia saa ngapi mpaka saa ngapi? Taja muda unaoanza kazi na kumaliza kazi-saa. je umefanya muda gani kwa hii shiftimiaka. | | |
| 10 | Kipato chako kwa mwezi shilingi ngapi? Taja kiasi Tshs..... | | |
| 11 | Uzito wakokg | | |
| 12 | Urefu wakocm | | |

SEHEMU B: DALILI ZA MARADHI YA MFUMO WA UPUMUAJI:**KIKOHOZI:**

| Na. | Swali | Chagua | Jibu |
|--|--|-----------|------|
| 1 | Je unakuwa na kikohozi cha mara kwa mara? | 0= Hapana | |
| | | 1 = Ndio | |
| <i>Kama jibu hapana jibu swali la 3</i> | | | |
| 2 | Je unakohoha mara 4 hadi 6 kwa siku au zaidi ya siku 4 kwa wiki? | 0= Hapana | |
| | | 1 = Ndio | |
| 3 | Je unakuwa na kikohozi kila uamkapo asubuhi? | 0= Hapana | |
| | | 1 = Ndio | |
| 4 | Je unakuwa na kikohozi kwa muda wa mchana au usiku? | 0= Hapana | |
| | | 1 = Ndio | |
| <i>Kama umesema ndio swali 1,2,3,4 jibu swali la 5 na 6.</i> | | | |
| 5 | Je unakohoa kwa kasi hii kwa muda wa miezi mitatu mfululizo kwa mwaka? | 0= Hapana | |
| | | 1 = Ndio | |
| 6 | Je ni kwa miaka mingapi umekohoha kwa mfululizo? Taja miaka | | |

KUKOHOHA KOHOZI

| Na | Swali | Chagua | Jibu |
|------------------------------------|---|-----------|------|
| 1 | Je upokohoa unatoaa kohozi kutoka ndani ya kifua? Chagua jibu | 0= Hapana | |
| | | 1 = Ndio | |
| <i>Kama hapana jibu swali la 3</i> | | | |
| 2 | Je unapokohoha ni kawaida | 0= Hapana | |

| | | | |
|---|---|-----------|--|
| | yako kutoa kohozi mara mbili kwa siku au zaidi ya mara nne kwa wiki? Chagua jibu | 1 = Ndio | |
| 3 | Je ni kawaida yako kukohoha na kutoa kohozi kwa siku nzima au usiku mzima? Chagua jibu. | 0= Hapana | |
| | | 1 = Ndio | |
| | <i>Kama ni ndio kwa swali numberi 1,2,3,, jibu swali la 4 na 5.</i> | | |
| 4 | Je ulipoanza kukohoha ulitoa kohozi kwa muda wa miezi mitatu mfululizo kwa mwaka? Chagua jibu | 0= Hapana | |
| | | 1 = Ndio | |
| 5 | Je hili latizo ulililionalo la kutoa kohozi limesumu kwa muda gani? Taja miaka..... | | |

KIFUA KUTOA SAUTI, KUWASHWA PUA, MACHO KUUMA NA KUPIGA CHAFYA.

| Na | Swali | Chagua | Jibu |
|----|--|-----------|------|
| 1 | Je unapopumua unasikia sauti kutoka ndani ya kifua chako? Chagua jibu. | | |
| | 1. Ni wakati unahisi baridi? | 0= Hapana | |
| | | 1 = Ndio | |
| | 2. Je mbali na baridi? | 0= Hapana | |
| | | 1 = Ndio | |
| | 3. Je, au wakati wote wa mchana na usiku? | 0= Hapana | |
| | | 1 = Ndio | |
| | <i>Kama ndio kipengele cha 1, 2 au 3 jibu swali la 2.....</i> | | |
| 2 | Kwa miaka mingapi umekuwa na hii hali ya kutoa sauti kwenye | | |

| | | | |
|---|---|-----------|--|
| | kifua wakati wa kupumua? Taja miaka | | |
| 3 | Je una tatizo la kuwashwa pua? Chagua jibu. | 0= Hapana | |
| | | 1 = Ndio | |
| 4 | Kwa miaka mingapi umekuwa na hii hali ya kuwashwa pua? Taja miaka..... | | |
| 5 | Je una tatizo la macho kuuma, kutoa machozi au kuwasha? Chagua jibu. | 0= Hapana | |
| | | 1 = Ndio | |
| 6 | Kwa miaka mingapi umekuwa na hii hali ya macho kuuma, kutoa machozi au kuwasha? Taja miaka..... | | |
| 7 | Je unatatizo la kupiga chafya mara kwa mara unapokuwa unafanya kazi hii ya kufagia barabara/kuuza/kutembeza mboga? Chagua jibu. | 0= Hapana | |
| | | 1 = Ndio | |
| 8 | Kwa miaka mingapi umekuwa na hii hali kupiga chafya ? Taja miaka..... | | |

KUPUMUA KWA SHIDA

| Na | Swali | Chagua | Jibu |
|----|--|-----------|------|
| 1 | Je unakuwa na tatizo la upumuaji wakati unatembea haraka au kupanda kilima? Chagua jibu | 0= Hapana | |
| | | 1 = Ndio | |
| 2 | Umekuwa na hili tatizo kwa miaka mingapi? Taja miaka | | |

HISTORIA YA KAZI ULIZOKWISHA FANYA AWALI.

| Na | Swali | Chagua | Jibu |
|----|-------|--------|------|
| | | | |

| | | | |
|---|---|-------------|--|
| 1 | Je ulishafanya kazi nyingine zenye mazingira ya vumbi mbali na kufagia barabara/kuuza/kutembeza mboga? Chagua jibu. | 0= Hapana | |
| | | 1 = Ndio | |
| 2 | Taja kazi na mahali ulipokuwa unafanya kazi hiyo. Kazi....., Mahali..... | | |
| 3 | Taja miaka uliyofanya kazi hiyo..... | | |
| 4 | Je unahisi vumbi lilikuwa kiasi gani? Chagua jibu | Kidogo = | |
| | | 1 | |
| | | Wastani = 2 | |
| | | Jingi = 3 | |
| 5 | Je ulishawahi kufanya kazi katika mazingira ya uzalishaji gesi au kemikali yoyote inayotoa harufu? Chagua jibu. | 1 = Ndio | |
| | | 2 = Hapana | |
| 6 | Taja kazi na mahali ulipokuwa unafanya. Kazi mahali..... | | |
| 7 | Taja miaka uliyofanya kazi hiyo. | | |
| 8 | Je unahisi harufu ya gesi au kemikali lilikuwa kiasi gani? Chagua jibu | Kidogo = 1 | |
| | | Wastani = 2 | |
| | | Jingi = 3 | |

HISTORIA/TAARIFA YA MAGONJWA MFUMO WA UPUMUAJI NA KIFUA ULIYOWAHI UGUA AU UNAYOUMWA.

| Swali | Chagua Jibu | | |
|--|-------------|---|---|
| Je ulishawahi kuambiwa na daktari kuwa una mojawapo au kati ya magonjwa haya yaliyotajwa hapa chini? | 0 | 1 | 2 |

| | | | |
|--------------------------|--|--|--|
| 1. Kukohoa kusikokoma | | | |
| 2. Kikohozi cha kupaliwa | | | |
| 3. Pumu | | | |
| 4. Ugonjwa wa moyo. | | | |
| 5. Kansa ya mapafu. | | | |
| 6. Kifua kikuu (TB) | | | |

Kumbuka 0: Hapana, 1: Ndio 2: Sijui

Adopted from: (Recommended Respiratory Disease Questionnaires for Use with Adults and Children in Epidemiological Research, 1976) [39].

C: MATUMIZI NA UPATIKANAJI WA VIFAA VYA KINGA BINAFSI KWA WIKI

| Na | Jina la kifaa vya kinga binafsi | Upatikanaji wa Vifaa vya kinga binafsi kwenye ofisi yako. | | |
|----|---------------------------------|---|----------|---------|
| | | Jibu | | |
| | | Hapana = 0 | Ndio = 1 | Maelezo |
| 1 | Kipumulio | | | |
| 2 | Glovsi za mikononi | | | |
| 3 | Miwani ya macho/uso | | | |
| 4 | Viatu vya buti | | | |
| 5 | Overali | | | |
| 6 | Koti la kungaa | | | |
| 7 | Kofia ngumu ya kichwa | | | |
| 8 | Kiziba mdomo na pua | | | |

| Na | Jina la kifaa vya kinga binafsi | Vifaa vya kinga binafsi unavyovaa ukiwa unafanya kazi ya kufagia barabara. | | |
|----|---------------------------------|--|----------|---------|
| | | Jibu | | |
| | | Hapana = 0 | Ndio = 1 | Maelezo |
| 1 | Kipumulio | | | |
| 2 | Glovisi za mikononi | | | |
| 3 | Miwani ya macho/uso | | | |
| 4 | Viatu vya buti | | | |
| 5 | Overalli | | | |
| 6 | Koti la kungaa | | | |
| 7 | Kofia ngumu ya kichwa | | | |
| 8 | Kiziba mdomo na pua | | | |

Appendix iii: Informed consent English version

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
DIRECTORATE OF RESEARCH AND PUBLICATIONS.

INFORMED CONSENT

ID-NO

Title of research: Occupational Respiratory Health Symptoms and Associated Factors among Street Sweepers in Ilala Municipality.

Principal Investigator: Prisca Stambuli.

Name of institution and address:

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES.

P.O.BOX, 65001, DAR ES SALAAM, TANZANIA.

Introduction

This Consent form contains information about the research named above. In order to be sure that you are informed about being in this research, we are asking you to read (or have read to you) this consent form. You will also be asked to sign it (or make your mark in front of a witness). We will give you a copy of this form. This consent form might contain some words that are unfamiliar to you. Please ask us to explain anything you may not understand.

Reason for the Research

The objective of the research is to determine association between occupational respiratory health symptoms (phlegm, cough, wheezing, nose irritating, sneezing and shortness of breath) and street sweeping among street sweepers in Ilala Municipality.

What Participation Involves

If you agree to participate in this study the following will occur:

1. You will sit with a trained researcher assistant and answer questions on respiratory health symptoms with street sweepers and vegetable street sellers and utilization of PPEs should be answered only by street sweepers.
2. You will fill the questionnaire approximately 20 minutes.

Confidentiality

We will assure you that all the information collected from you will be kept confidential even your employer can not able to assess your information. Only people working in this research will be having access to the information. We will be compiling a report, which will contain responses from several participants without any reference to individuals. We will not put your name/group name or other identifying information on the records of the information you provide.

Transport fee

You will be paid Tshs 2000/= only as transport fee since you have to take full participation in this research. And payment will be paid once you finish answer respiratory symptoms questions for street sweepers and street vegetable seller and addition questions on utilization of PPE for street sweepers. Payment is not made if you withdraw from research participation.

Risks

You will be asked questions history of previous respiratory diseases, your socio-economic status (level of education, individual income, and height and weight measurements) occupational history and some questions could potentially make you feel

uncomfortable. You may refuse to answer any particular question and may stop to participate at anytime.

Rights to Withdraw and Alternatives

Taking part in this study is completely your choice. If you choose not to participate in the study or if you decide to stop participating in the study you will not get any harm. You can stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Benefits

The information you provide will help to create awareness and to determine the magnitude of occupational respiratory symptoms and street sweeping among street sweepers. Also the information will help to know the important of wearing PPEs during street sweeping.

In Case of Injury

We do not anticipate that any harm will occur to you or your family as a result of participation in this study.

Your rights as a Participant

This research has been reviewed and approved by the local Institutional Review Board (IRB) of Muhimbili University of Health and Allied Sciences. An IRB is a committee that reviews research studies in order to help protect participants. If you have any questions about your rights as a research participant you may contact Principal Investigator, Prisca Stambuli, Muhimbili University of Health and Allied Sciences (MUHAS), P.O. Box 65001, Dar es Salaam (Telephone number: 0655-646934, 0787-646934). Prof. M. Aboud Chairman of the Research and Publications Committee, P. O. Box 65001, Dar es Salaam. Tel: 2150302-6 and Dr. Simon H. Mamuya - supervisor of this research (Telephone number: 0787-721377).

Participant agreement

The above document describing the benefits, risks and procedures for the research titled (Occupational respiratory health symptoms and associated factors among street sweepers in Ilala Municipality) has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate.

Date..... Signature of participant.....

If participant cannot read the form themselves, a witness must sign here: I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the participant has agreed to take part in the research.

Date..... Signature of Witness.....

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Date signature of research assistant

Appendix iv: Informed consent Kiswahili version

(Fomu ya makubaliano)

**CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI - MUHIMBILI.
KURUGENZI YA UTAFITI NA MACHAPISHO**

FOMU YA RIDHAA.

Nambari ya utambulisho

Jina la Utafiti: Dalili za magonjwa ya mfumo wa upumuaji yatokanayo na madhara ya vumbi la ufagizi barabara za mitaa na vigezo vingine kwa wafagia barabara za mitaa wa Manispaa ya Ilala.

Jina la mtafiti: Prisca Stambuli.

Jina la taasisi na anwani yake:

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI - MUHIMBILI.

S.L.P 65001, DAR ES SALAAM, TANZANIA

Utangulizi

Fomu hii ina habari kuhusu jina la utafiti lililotajwa hapo awali. Ili uweze kujua habari muhimu zinazohusu huu utafiti na kushiriki inakubidi uisome hii fomu kwa makini na kuielewa kabla ya kuisaini. Utaisaini mbele ya mdamini na kupewa nakala yako. Hii fomu inaweze kuwa na maneno magumu au hujayafahamu vyema tuulize ili upate maelezo ya kujitosheleza kabla ya kuisaini.

Madhumuni ya Utafiti

Utafiti huu una lengo la kutoa taarifa za dalili za tatizo la upumuaji (kikohozi kikavu, kikohozi chenye kohozi, kifua kutoa sauti, kuwashwa pua, kupiga chafya na kupumua kwa shida) litotokanalo na ufagizi wa barabara za mitaa kwa wafagia barabara wa Manispaa ya Ilala.

Ushiriki.

Ukikubali kushiriki katika utafiti huu yafuatayo yatatokea:

1. Utakaa na mratibu utafiti msaidizi aliyepewa mafunzo na kukuelekeza kujibu maswali yahasuyo dalili za madhara ya mfumo wa upumuaji kwa wafagizi barabara za mitaa na wauza mboga mtaani. Mratibu msaidizi atakua atanukuu majibu yako katika dodoso au wewe mwenyewe unaweza kujaza majibu kwenye dodoso iwapo unajua kuandika.
2. Utajibu maswali kwa takriban dakika 20.

Usiri

Unahakikishiwa kwamba taarifa zote zitakazokusanywa kutoka kwako zitakua ni siri, hata mwajiri wako hataonyeshwa wala kuhusishwa kwenye taarifa za utafiti, ni watu wanaofanya kazi katika utafiti huu tu ndio wanaweza kuziona taarifa hizi. Hatutaweka jina lako/ jina la kikundi au taarifa yoyote ya utambulisho kwenye kumbukumbu za taarifa utakazotupa.

Nauli

Utalipwa Tsh 2000/= tu kama nauli ya kuja kushiriki kwenye utafiti, iwapo utashiriki na kujibu vipengele vyote vya maswali. Malipo yatafanywa mara umalizapo zoezi. Malipo hayatafanywa kwa atakaye katisha na kuacha kuendelea kujibu maswali.

Madhara

Utulizwa maswali yahasuyo historia yako wewe mwenyewe kuhusu dalili za magonjwa ya kifua, kipato chako, kiwango cha elimu, historia ya kazi nyinginezo ulizokwisha fanya kabla ya kuajiriwa kwenye ufagizi wa barabara na kupimwa uzito na

urefu. Baadhi ya maswali au kipimo yanaweza kukufanya usijiskie vizuri. Unaweza kukataa kujibu swali lolote na unaweza kusimamisha usaili wakati wowote.

Haki ya kujitoa kwenye utafiti

Kushiriki katika utafiti huu ni uchaguzi wako, kama utachagua kutokushiriki au utaamua kusimamisha kushiriki hutapata madhara yoyote. Unaweza kusimamisha kushiriki katika tafiti huu muda wowote hata kama ulisharidhia kushiriki. Kukataa kushiriki au kujitoa katika utafiti hakutasababisha adhabu yoyote.

Faida

Taarifa utakayotupatia itasaidia kuelewa na kujua ukubwa wa tatizo la dalili za madhara ya mfumo wa upumuaji yatokanaoyo na ufagizi wa barabara za mitaa kwa wafagizi wa barabara za mitaa hiyo. Pia itatusaidia kujua ni kwa kiasi gani uvaaji wa vifaa vyakinga binafsi unavyoweza kupunguza madhara yatokanayo na kazi ya kufagizi barabara za mitaa kwa wafagizi wa barabara za mitaa.

Endapo Utadhurika

Hatutegemei madhara yoyote kutokea kwako au ndani ya familia yako kutokana na kushiriki kwako katika utafiti huu.

Haki zako za kushiriki

Utafiti huu ulishapitiwa na kukubaliwa na bodi ya ndani ya mapitisho ya chuo kikuu cha Muhimbili. Lengo ni kulinda haki za mshiriki, iwapo una maswali kuhusu haki zako za ushiriki katika utafiti huu unaweza kuwasiliana na mratibu mkuu wa utafiti, Prisca Stambuli, Chuo Kikuu cha Muhimbili, S.L. P 65001, Dar es Salaam (Simu. Numbari 0655-646934 au 0787-646934), Prof.M. Aboud, ambaye ni Mwenyekiti wa kamati ya chuo ya utafiti na machapisho, S.L.P 65001, Dar es Salaam. Simu nambari: 2150302-6 na Dr. Simon H. Mamuya ambaye ni msimamizi wa utafiti huu (Simu nambari 0787-721377).

Mshiriki kuridhia kushiriki utafiti

Hii fomu imeelezea faida, madhara na taratibu zote kuhusu huu utafiti nimesomewa na kuelezewa vya kutosha. Hivyo nimeekubali kushiriki kwa ridhaa yangu mwenyewe.

Tarehe.....

Sahihi ya mshiriki.....

Iwapo mshiriki hajui kusoma hii fomu na kuelewa mwenyewe, hivyo basi mdamini ataisaini kwa niaba yake. Na atahitajika kuwepo wakati mshiriki anasomewa faida, madhara na taratibu za utafiti. Maswali yote yatajibiwa na hivyo kumtaka mshiriki kukubali kwa ridhaa yake kushiriki kwenye utafiti mbele ya mdamini.

Tarehe.....

Sahihi ya mdamini

Ninathibitisha uhalisi na umuhimu, faida muhimu, madhara yanayoweza kutokea kutokana nakushirikiki kwenye huu utafiti yameelezewa vya kutosha kwa washiriki wote.

Tarehe

Sahihi ya mratibu utafiti msaidizi

Appendix v: Approval of Ethical Clearance.

Appendix vi: Approval letter from Ilala Municipality