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Prevalence of Respiratory symptoms And Associated Factor Among street sweepers in Addis Ababa, Ethiopia

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Abstract

Background: Respiratory symptoms are manifestations of respiratory problems that are developed as the result of occupational exposures. Respiratory symptoms including cough, phlegm, wheezing, shortness of breath, and chest pain are manifestations of respiratory problems which are mainly evolved as the result of occupational exposures. They are more prevalent in developing countries, where occupational health and safety issues are less emphasized. In Ethiopia there are very few studies conducted on the respiratory health problems of road cleaners.

Objective: The study was conducted to assess the prevalence of respiratory symptoms and associated factors among street sweepers in Addis Abeba.

Methods: Community based Cross sectional study was conducted from March 15 –jun15, 2024. Systematic random sampling technique was used to select study participants. Data was collect through interviewer administered structured questionnaire adapted from British Medical Research Council. SPSS and Microsoft Excel applications was used for data entry, analysis and result presentation. Bivariate regression analysis was computed to select candidate variables for multivariate logistic regression analysis. Multivariate logistic regression model were fitted by using variables that had association ($p < 0.25$) with the dependent variable in bivariate analysis.

Result From the total 365 study participants 361 were included in this study which makes the response rate 98.9%. The respondents were assessed for the presence of one or more of respiratory symptoms: cough and/or phlegm

and/or wheezing and/or chest illnesses and/or shortness of breath. The study indicates the prevalence of respiratory symptom was 45.4%

Conclusion and recommendation This study found that respiratory symptom was prevalent among street sweepers in AA. Use of face mask, OHS training, work experience, history of age 35-44 and energy used at home was major contributing factors for respiratory symptom to occur. There was poor awareness on occupational health and safety among street sweepers. Face mask and occupational health and safety training should be provided by the health office.

Individuals who had history of past illness should get health information during enrollment.

Key words street sweepers, Respiratory symptom, personal protective equpement , occupational exposure to dust.

Abbreviation and Acronyms

AA ---------- Addis Abeba
AOR ---------- - ----- Adjusted odd ratio
BMRC---------- British medical research counsel
COPD ---------- Chronic obstructive pulmonary disease
FDRE..... Federal Democratic Republic of Ethiopians
MSW ---------- Mixed solid waste
ODTS ----------Organic dust toxic syndrome
OHS ---------- ...Occupational health safety
PPE.....Personal Protective Equipment
SPSS---------- Statical package of social science
SPHMMC----------St Paul's Hospital Millennium Medical College
URTI.....Upper respiratory tract infection
WHO ---------- World health organization

Introduction

1.1 Background

As the quality of life is an important element of their competitive advantage, cities have to ensure a clean and safe environment for residents. Dealing with pollution caused by improper management of solid wastes should therefore be given priority. In the early days of its establishment, the problem of sanitation in Addis Ababa might not have

been a significant problematical because the population was low at the time, and householders were in a position to dispose easily of their rubbish and other generated wastes. But later when the population increased, the problem became worse and the government started trying to minimize the problem by establishing a municipality in 1909, as a council of Addis Ababa to administer the city. Until 1994, solid waste management was the task of the Sanitation Division of the Department of

Environmental Health and Social Services under the City Council (municipality). The Sanitation Division was responsible for all aspects of solid waste management. From 1994 to 2003, the mandate for the management of solid waste was transferred to the Addis Ababa Health Bureau. First, it was organized as Sanitation Division and later established as Environmental Sanitation Department in the Health Bureau. In January 2003, the municipal solid waste service was shifted to the Sanitation, Beautification and Parks Development Agency with its decentralized power to sub-city levels having solid waste divisions in the 10 sub-cities. Then the agency was replaced by the current Cleaning Management Agency in 2011 (43).

Respiratory symptoms such as cough, phlegm, wheezing, shortness of breath, and chest pain are manifestations of respiratory problems that are mainly developed as the result of occupational exposures (1).

Waste management activities namely, collection, transport, sorting, processing and disposal are carried out according to procedures that can have various negative effects on the environment and, potentially, on human health by posing risks resulting from the emissions or release of hazardous chemical agents and biological agents, from the types of exposure to these agents, and from the susceptibility of the populations exposed to them (2).

In most public and private institutions wastes are collected by Cleaners who are employed for this purpose. These Cleaners face tremendous challenges while they are on duty. Lack of support and interest from their employers regarding health and protective measures put more load on them. Ways of disposal, isolation, separation, collection and disposal of the waste need to be addressed evaluated and managed properly by the institutions (5).

They suffered from different types of injuries, diseases and diseases like symptoms such as sore throat, cough, backache, diarrhea and bloody stool, shortness of breath, skin diseases, twisted ankle and a muscle tear (5). This occupation is physically strenuous, resulting in workers breathing through their mouths rather than their noses (2). Individuals who breathe through their mouths have higher pulmonary ventilation rates than those who breathe through their noses which aggravate the risk of respiratory problems (6). The risk of allergenic response to organic dusts can be greatly reduced if workers wear respiratory masks (7). Thus this study was intended to assess respiratory symptom and its associated factors among street sweeper Addis Abeba city .

1.2 Statement of the problem

Respiratory disease causes an immense worldwide health burden. It is estimated that 235 million people suffer from asthma, more than 200 million people have chronic obstructive pulmonary disease (COPD), and 65 million endure moderate-to-severe COPD (9).

In 2012 World Health Organization (WHO) reported that worldwide non-communicable diseases are the leading cause of mortality which accounts for 82 % of deaths and among those non communicable diseases chronic respiratory diseases, asthma and chronic obstructive pulmonary diseases accounted for 4 million or 10.7 % deaths (8).

Street sweepers are exposed to a variety of inhalable agents such as dust, toxins and traffic emissions, which make them vulnerable to develop occupational respiratory diseases. In a supplementary evaluation of data from a cross-sectional study on 273 street sweepers in India (42)

The prevalence of respiratory symptoms was higher than studies conducted in India (11.5%),7 and Egypt, 18.1%1 among street sweepers, and Philippines, 19%,22 among waste collectors..(41)

Waste collectors are prone to a number of hazards such as pathogens (bacteria, fungi, viruses, parasites and cysts), toxic substances (end toxins and beta-glucans), chemicals that come from the waste itself and from its decomposition, as well as vehicle exhaust fumes, noise, extreme temperature , ultraviolet radiation, large amounts of household and commercial wastes, which are comprised of decomposable organic materials which may all contribute to respiratory problems (11). The prevalence of respiratory symptoms as well as impaired lung functional capacities was more common among garbage collectors than in their control counterparts. This is likely to be attributed to the occupational exposure of this group to workplace contaminants, particularly, bio aerosols (12).

Comparable waste collectors have been shown to suffer from variety of health effects including mucous membrane irritation, rhinitis, asthma, bronchitis, conjunctivitis, hyper sensitivity, allergic bronco pulmonary mycosis, dermatitis and diarrhea (14). Moreover, waste collectors often lack training, tools and information in order to perform their work in the best healthy and safe manner. In addition to these, routine medical checkup program for all waste collectors is mandatory to keep them safe and secure (16).

Objectives

General Objectives

- To assess the prevalence of respiratory symptom and associated factors among street sweepers in Addis Abeba, Ethiopia 2023/24.

Specific Objectives

- To determine the prevalence of respiratory symptom among street sweepers in Addis Abeba.
- To identify factors associated with respiratory symptom among street sweepers in Addis Abeba.

Methods and Materials

Study area and period

The capital of the Federal Democratic Republic of Ethiopia (FDRE), a seat of the African Union and a variety of international organizations, Addis Ababa is the largest as well as the political, economic, cultural and historical city of the country. The city is located in the heart of Ethiopia. It has an area of 540 square kilometers. The elevation of the city lies between 2,000 and 2,800 meters above sea level and is located between 9 degrees latitude and 38 degrees longitude. The mean minimum and maximum temperature of the city are 100C and 250C respectively, and the mean annual rainfall is 1,200 mm. The city with its population of about 4.5 million is considered a metropolitan city by the standard of any developing country. Addis Abeba city is divided in 11 sub cities and 116 woredas. From those 11 sub city 3 sub cities is selected for study. Addis ketma, colfe and Gulele sub city is study area.(43)

Study design

Community based cross-sectional study was conducted from March 15- Jun 15 2024.

4.3 Population

4.3.1 Source population: The source population were all street sweepers working in AA city.

4.3.2 Study population: The study population were street sweepers selected in kolfe, Addis ketma and Gulele sub city in AA.

4.3.3 Inclusion criteria: street sweepers with a minimum of one year work experience were included in the study.

4.3.4 Exclusion criteria: The study was not including the street sweepers who are not on duty during the time of data collection. Street sweepers with part time engagement. Street sweepers who have a previous history of respiratory disease.

4.4 Sample size determination

Sample size was calculated by using single population proportion formula

$n= (z\alpha/2)2*pq/d2$

$n= (z\alpha /2)2*p (1-p)/d^2$

$n= (1.96)^2[0.689(1-0.689)]/0.0025$

n=330

Where, n=the required sample size

d=margin of error between the sample and population=5%=0.05

Z=standard normal distribution value at 95% confidence level

Z α/2=1.96 for 95% confidence interval

p=Prevalence of respiratory infection symptom (68.9%) from the previous study conducted in Addis Abeba , (44).

N.B: Then, by adding 10% of non-respondent rate, final desired sample size is 330+ 10% non - response rate, n=**363**.

❖ Then, the final sample size will **363**.

4.5 Sampling technique and procedure

Systematic random sampling was used; first by referring the name list of the road cleaners written on excel sheet was gain from the Central Human Resource office of each Keble. To calculate K, the summation of the name list of the cleaners written on excel sheet was calculated. Then K is calculated by dividing the total the name list of the cleaners written on excel sheet by the sample size. The first study participant was selected from one to K by lottery method. Then every K^{th} street sweepers was selected from the record.

4.6 Study variables

4.6.1 Dependent variable

- Respiratory symptoms
- Cough, phlegm, wheezing, chest illness, breathlessness

4.6.2 Independent variables

- **Socio-demographic factors**: age, sex, educational level, marital status, service years
- **Work environment factors:** working Keble, training on occupational health and safety (OHS), availability or provision of PPE//--
- **Behavioral and other factors:** smoking habit, sleeping problem, past illness, energy used at home

4.7 Operational definitions and definition of terms

Respiratory symptom: Respondent's report of the development of any one or more of the following Symptoms greater than two weeks in one year; cough, phlegm, breathlessness, wheezing, chest illness (39).

Cough: Respondent's report of experience of coughs as much as 4-6 times per day occurring for most days of the week (≥4 days) for at least three months in one year.

Phlegm: Respondent's report of sputum expectoration as much as twice a day for most days of the week (≥ 4 days) for at least three months in one year.

Wheezing: Respondent's report of a condition of causing a wheezy or whistling sound during inspiration/expiration at least three months in a year; occasionally, apart from that caused by a cough or acute upper respiratory infection in the chest at any time in the last 12months.

Chest illness: Respondent's report of chest pain that kept off work with phlegm occurring any time during the work shift and on any work day which last/s at least three months in one year.

Breathlessness: It is divided into 5 grades with the following definitions:

Grade 0: No breathlessness except with strenuous exercise.

Grade 1: Breathlessness when hurrying on the level ground or walking up a slight hill at least three months in a year.

Grade 2: Walking slower than people of the same age on the level because of breathlessness or need to stop for breath when walking at own pace or level at least three months in a year.

Grade 3: Stopping for breath after walking about a certain distance or a few minutes on the level ground at least three months in a year.

Grade 4: Too breathless to leave the house or breathless when dressing or undressing at least three months in a year.

So, that the study reported dyspnea grade 2 or more as outcome as of American thoracic society (1976) (40).

Smoking habit: Classified in to three: Never smokers: workers who used no cigarette.

Current smokers: workers who smoked at the time of the study or had stopped smoking less than one year before.

Ex-smokers: workers who had quit at least 1 year before the survey.

Sleeping problem: If the worker have trouble getting to sleep or sleeping through the night; walk up too early or have hard time waking up at all then classified as sleeping problem.

proper use of face mask: clean hands with soap and water or sanitizer before touching the mask; sure there are no tears in each side of the mask; touch only the bands or ties when putting on and take of; mask sure the mask is tightly fit to cover the mouth, nose and chin; make sure breath and talk comfortably thought your mask

Safety procurer: Wear PPE, Perform Walk-Around Inspections. Before starting a job, it is crucial to perform a walk-around inspection of the sweeper. Be Aware of Blind Spots, Use Caution When Dumping the Hopper; Be Aware of Load Limits. Communicate Prior to Starting the Sweeper.

4.8 Data collection tool and procedures

Data was collect by interviewer administered structured questionnaire. The questionnaire was adapted from British Medical Research Council's (BMRC) questionnaire on respiratory symptoms of 1986 (42) with required modification based on research objectives.

The questionnaire was prepared in English and translated to Amharic and translated back to English to ensure consistency. The questionnaire contains five major parts. Part one deals with socio-demographic characteristics of the respondents. Part two asks the questions related to working environments of the study participants. Part three contains the questions related to behavioral conditions. Part four contains other related factors. The last part contains questions which ask the presence of respiratory symptom.

4.9 Data quality control

To maintain the quality of the data, structured and pretested questionnaire were used to collect information. Pretest was conducted on (5% of sample size) prior to actual data collection for validation of data collection tool. One day orientation was give to data collectors on the data collection procedure and content of the questionnaire. One supervisor who can communicate with Amharic with bachelor degree in Nursing and above one year supervision experience will recruit to follow the data collection process. The collected information was checked on daily basis by the supervisor. Supervisor will check the collected data daily for its completeness and consistency then, corrections was made accordingly. Double data entry also was performed to see consistency in data entry. Overall supervision was carry out by the principal investigator .The collected data was checked for completeness and consistency every day at the time of data collection. Data cleansing also conducted any mistake or omission was corrected as on the same day of data collection.

4.10 Data processing and analysis

Filled questionnaires will checked for completeness and any incomplete information was
excluded from the entry. The variables were coded and entered into EpiData version 3.1
computer software packages. Cleaning was done to avoid missing values, outliers and other inconsistencies before analysis. Cleaned data was exported to SPSS version 25 software package for analysis. Descriptive statics such as frequencies, percentages, mean and medians were use to describe the variables of the study. Bivariate regression analysis were computed to candidate variable for multiple logistic regressions.

Variables that has association ($p < 0.25$) with the dependent variable in bivariate analysis were use as candidate variable. Multicollinearity among the candidate variables were checked. All candidate variables showed variance inflation factor of less than 2. The variables were entered in to the model by using Enter method. Finally the variables which have significant association was identify on the basis of Adjusted Odds Ratio (AOR) with 95 % CI and $p < 0.05$ by fitting multiple logistic regressions. The fitness of the model will checked by using Hosmer and Lemeshow test.

4.11 Ethical consideration

Ethical clearance was obtained from Institutional Review Board of Institute of Health, St Paul millennium medical college. The study objective was communicated in words to each respondent and verbal consent was secured.

An inconvenience for refusals was respected. Confidentiality was granted for the information collected from each study participants and privacy during interview was ensured.

4. 12 Plan for dissemination of result

The final report of the study was submitted and presented to department of intensive care medicine , St Paul millennium medical college and will be communicate to all concerned bodies including the city municipality .hard and soft copy will be available in the library of SPHMMC for graduate student as well as for other concerned readers.

Effort will be made to publish the study in one of the peer reviewed national or international journals and present the result in local or international held seminar, workshops, conference and meetings.

5. Result

5.1 socio demographic characteristics of street sweepers

From the total 365 study participants 361 were included in this study which makes the response rate 98.9%. The mean age of the study participants were 36.95 (±8.925) years. From 361 study participants 334(92.5%) were female while 278 (77%) were married. In other way the mean monthly income of the study participants were 3082.23 (±500.92) ETB while the mean work experience of the study participants were 4.46 (±2.017) years.

Table 1: Socio- demographic characteristics of Cleaners in AA (n=361), June 2024

	Variables	Frequency	Percentage
Sex	Male	27	7.5
	Female	334	92.5
Age	18-24	27	7.5
	25-34	141	39.1
	35-44	103	28.5
	≥ 45	100	27.7
Educational level	Able to read and write	57	15.8
	Primary	223	61.8
	Secondary	68	18.8
	Above 12	3	0.8
Marital status	Married	280	77.6
	Single	49	13.6
	Separated	2	0.6
	Divorced	28	7.8
	Widowed	2	0.6
Monthly income	≤ 2500	92	25.5
	> 2500	269	74.5
Family size	≤ 4	282	80.4
	> 4	79	19.6

5.2 Work environment characteristics

The study shows that 278(77%) of the study participants were had less than five years work experience while only 51(14.1%) study participants were not take OHS training. In other way 99.4% of the study

participants were working seven days a week. From the 220 study participants who were used face mask 91(25.2%) were used face mask more than five days a week. The study also indicates that 141(39.1%) of the study participants not used face mask during work time due to lack of supply while from 310 study participants who had get OHS training 176(56.7%) were get on job training, 107(34.5%) were get pre-employment training and 27(8.4%) were get on job training pre-employment. In other way from the total study participants 64(17.7%) were agree that there way positive incentive for following safety procedure during working time; from these positive incentives 34(9.4%) were recognition while 22(6.1%) were rewards of money with recognition. In this specific study 257 71.2%) of the study participants says that wastes managed finally by burying while 95 (26.3%) were saying by burning.

Table 2: Work environment characteristics of Cleaners in AA (n=361), June 2024

Variables		Frequency	Percent
Work experience	-5	278	77
	- 5	83	23
Use of face mask	Yes	220	60.9
	No	141	39.1
Source of face mask	AA health office	60	27.3
	NGO	160	72.7
OHS training	Yes	310	85.9
	No	51	14.1
Who give training	AA health office	255	82.2
	NGO	55	17.8
Use of established procedure	Yes	243	67.3
	No	118	32.7
Kind PPE used	Glove, boots, uniform	160	44.3
	Glove, goggle, uniform	1	0.002
	Uniform, glove	200	55.69
Laundry	Yes	7	1.9
	No	354	98.1
Other work	Yes	137	38
	No	224	62
Waste management	Burning	95	26.3
	Burying	257	71.2
	Recycling	9	2.96

	Reuse	.27
	Others	.27

5.3 Behavioral and other Characteristics

The study indicated that 333 (92.2%) respondents had no smoking history, whereas 18 (4.9%) were ex. smoker. According to respondent's report 37 (10.3%) of them had sleeping problem in which all were had developed the problem after they employed a sweepers. The study revealed that 299 (82.2 %) respondents used electricity as primary energy source in their home, 144 (39.8%) were satisfied on their current work position and 164 (45.4%) had history of one or more respiratory illnesses. Pneumonia was the most prevalent of all the past illnesses reported by the respondent.

Table 3:Behavioral and other Characteristics of Cleaners in AA (n=361), June 2024

Variables		Frequency	Percent
Smoking habit	Active smoker	.0	.9
	Ex. Smoker	.8	.9
	Never smoke	33	2.2

Sleeping problem	Yes	37	10.3
	No	324	89.7
njury or operation	Yes		1.27
	No	360	99.73
Medical follow up	Yes	55	15.2
	No	306	84.8
Known medical diseases	Yes	59	16.3
	No	302	83.7
Source of energy at home	Electricity	299	82.8
	Fuel gas	4	1.1
	Biogas	58	16.1

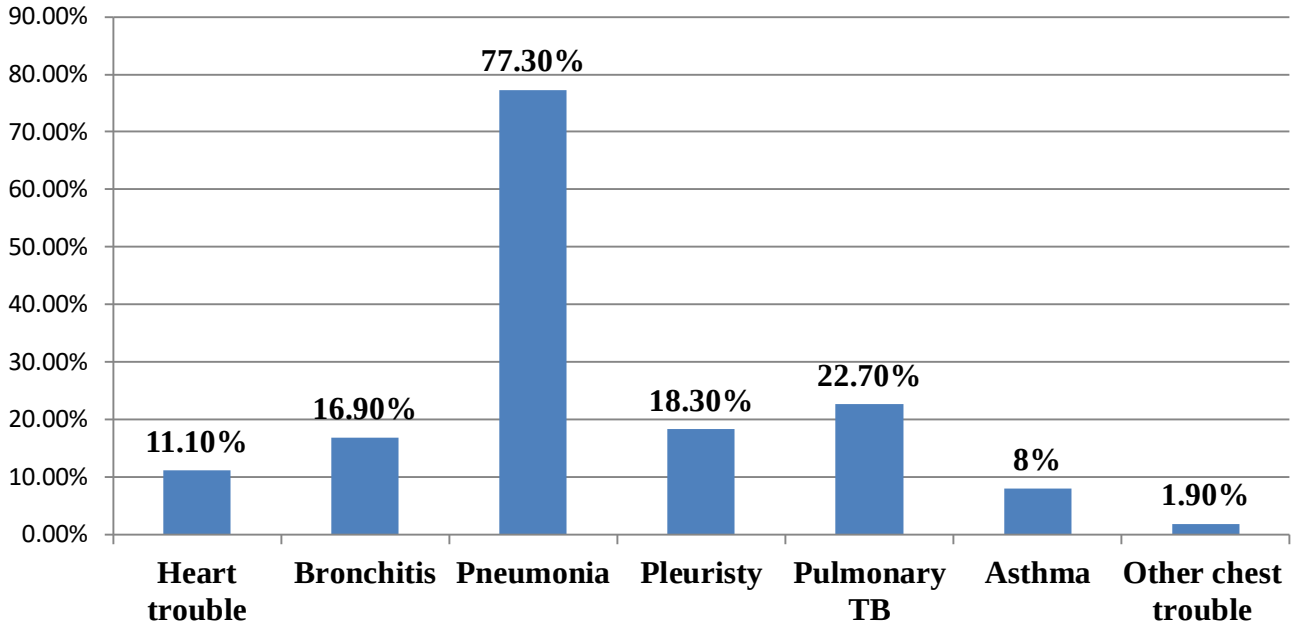

Figure 1: History of respiratory illness among Cleaners AA 2024

5.4 Prevalence of Respiratory Symptom

The respondents were assessed for the presence of one or more of respiratory symptoms: cough and/or phlegm and/or wheezing and/or chest illnesses and/or shortness of breath. The study indicates the prevalence of respiratory symptom was 45.4% (95% CI: (38%, 52%) and the prevalence of wheezing and breathlessness were lower than others.

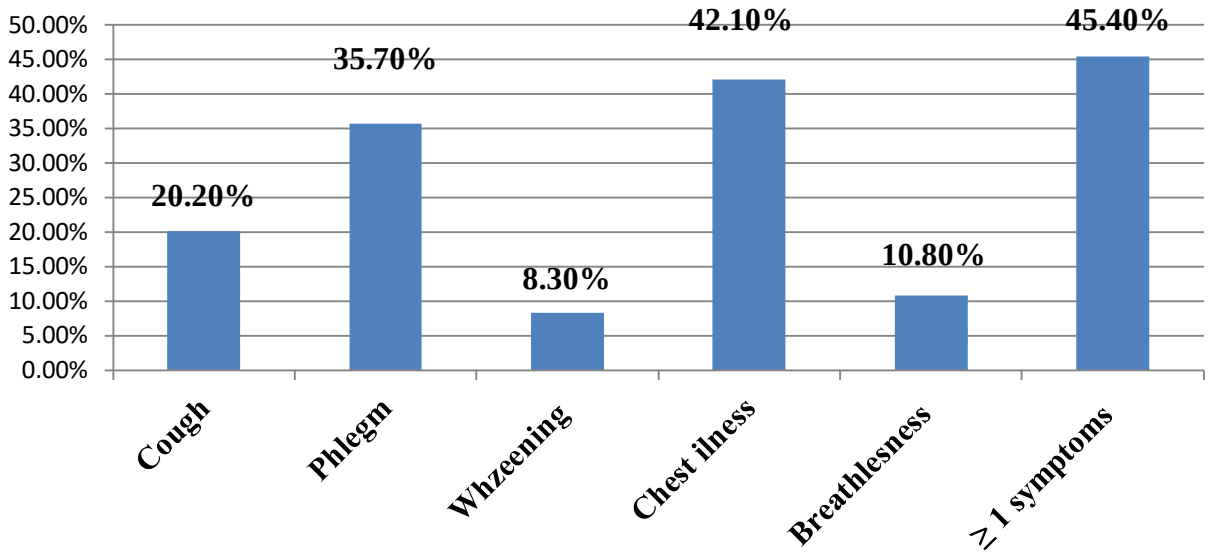

Figure 2:respiratory symptoms of road cleaners at AA 2024

5.5 Factors Associated with Respiratory Symptom

5.5.1 Bivariate Analysis

Bivariate logistic regression model was fitted to select candidate variables for multivariate

Logistic regression. Based on the bivariate analysis sex, age, use of face mask and training showed significant association with respiratory symptoms.

Table 4: Factors Associated with Respiratory Symptom among street sweepers in AA (n=361), June 2024

/ariable		Respiratory ymptoms		COR (95%CI)	' value
		Yes	No		
;ex	Male	6.7%	3.3%	).388(0.17,0.889)	).025
	Female	3.7%	6.3%	.	.
Age	8-24	)	.00%	).99(0.00,1.09)	).99
	5-34	0.6%	9.4%	).091(0.05,0.17)	).000
	5-44	9.2%	0.8%	).51(0.28,0.92)	).027
	: 45	4%	6%	.	.
Educational level	Read & write	8.7%	1.3%	.69(0.8,3.29)	).175
	Primary	5%	5%	).37(0.03,4.3)	).42
	Secondary	7.4%	2.6%	).4(0.23,0.69)	).001
	Above 12	3.3%	6.7%	.	.
)HS training	Yes	9.4%	0.6%	.19(3.38,15.3)	).00
	No	2.4%	.7.6%	.	.
;moking habit	Active smoker	0%	0%	.02(0.76,11.9)	).113
	Ex. Smoker	6.7%	3.3%	.59(1.41,7.07)	).006
	Never smoke	3.5%	6.5%	.	.
Energy source at	Electricity	5%	5%	.13(0.65,0.95)	).02
ome	Fuel gas	4.5%	5.5%	).4(0.73,2.34)	).121
	Biogas	9%	.1%	.	.
Use of face mask	Yes	0.9%	9.1%	).33(0.18,0.6)	).000
	No	4%	6%	.	.
Work experience	.-5	1.7%	8.3%	.91(1.16,3.14)	).01
	· 5	7.8%	2.2%	.	.

5.5.2Multi-variable Analysis

level in bivariate regression analysis were used as candidate variable to compute multivariate analysis. Based on the multivariate analysis working experience, use of face mask, OHS training, sleeping problem, past illness and energy used at home were remained significant at $p < 0.05$ after adjusting for other factors. The odds of having respiratory symptom for Sweepers in the age group of 35-44 were 99.9% times (AOR=0.001; 95% CI=0.00,.008**)** more likely to develop respiratory symptoms compared to who are in the age of >45. Sweepers who had not trained were 55% more likely (AOR=0.45; 95% CI=0.00, 0.58) to develop respiratory symptoms compared to those who had training. Sweepers who did not use face mask on duty had about 75% more likely (AOR=0.25; 95%CI=0.001, 0.52) to develop respiratory symptoms compared to those who had use face mask. Sweepers who had work experience less than five years were 5 times more likely(AOR=5;95%CI=3.14,8.09) to develop respiratory symptoms compared to those who were had more than five years work experience.

Table 5:Multi-variable Analysis among Cleaners in AA (n=361), June 2024

/ariable		Respiratory ymptoms		AOR (95% CI)	value
		Yes	No		
ex	Male	6.7%	3.3%	.59(0.001,3.55)	.176
	emale	3.7%	6.3%	.	.
ge	8-24		.00%	.00(0.00,1.84)	.999
	5-34	0.6%	9.4%	.027(0.00,3.01)	.133
	5-44	9.2%	0.8%	**.001(0.00,.008)**	**.009**
	45	4%	6%	.	.
ducational level	ead & write	8.7%	1.3%	.83(0.00,6.54)	.999
	rimary	5%	5%	.00(0.00,12.52)	.988
	econdary	7.4%	2.6%	.475(0.064,3.51)	.912
	bove 12	3.3%	6.7%	.	.
HS training	es	9.4%	0.6%	**.45(0.00,0.58)**	**.002**
	o	2.4%	.7.6%	.	.
moking habit	ctive smoker	0%	0%	.26(0.00,10.23)	.998
	x. Smoker	6.7%	3.3%	.0.65(0.76,14.89)	.079
	ever smoke	3.5%	6.5%	.	.
nergy source at home	lectricity	5%	5%	.5(0.64,4.77)	.079
	uel gas	4.5%	5.5%	.99(0.00,2.05)	.54
	iogas	9%	.1%	.	.

Use of face mask	Yes	20.9%	79.1%	**0.25(0.001,0.52)**	**0.017)**
	No	44%	56%		
Work experience	1-5	41.7%	58.3%	**(3.14,8.09)**	**0.006**
	> 5	57.8%	42.2%		

6. Discussion

This study showed that the prevalence of respiratory symptom among street sweeper's in Addis Abeba was 45.4%(95% CI=38%-52%,) which is lower than the report from Yeka sub city, Addis Ababa municipal waste collectors (30). The possible justification is sweeper had more trained on OHS training. The prevalence is found higher than that of study from Egypt, Mansoura among waste collectors (23) and Thailand among wood furniture manufacturers (18). This might be due to the type of industries and the advancement of safety practices used. More specifically, the prevalence of cough was 20.2% which is less than 63% in refuse handlers in Tanzania (29), 44.7% in domestic waste collectors in Palestine (22), 35.7 % in Yeka sub city waste collectors (30) but greater than 13.4% in coble stone workers in Jimma (20). The prevalence of Phlegm was 10.8%, which is less than 44% in Yeka sub city waste collectors (30). The prevalence of wheezing was 35.7%, which is greater than 21.2% in Yeka sub city waste collectors (30).

The possible justification will be exclusion criteria the previous study includes who have respiratory symptom.

The prevalence of chest illness was 42.1%. It was higher than that of Yeka sub city waste collectors which is 7.3% (30). The risen behind will be different exposure status .In this study the breathlessness higher or above grade 2 were considered. Based on this the prevalence of breathlessness was 10.8% which is less than 25% in domestic waste collectors in Palestine (22) and 29.2% in Yeka sub city waste collectors (30). The prevalence was less than that of waste collectors in Egypt Mansoura which is 21% (23) but greater than cobble stone workers in Jimma town which is 7% (20). The differences in respiratory symptoms might be due to different environmental study setups, variation in type and nature of wastes with different level of respiratory hazards and different level of awareness and access towards use of effective respiratory equipment.

In this study respondents who had work experience less than five years were 5 times more likely to develop respiratory symptoms compared to those who were had more than five years work experience. This is may due to having more work experience may give attention for the risk factors of respiratory symptoms. Sweepers who are in the age group of 35-44 were 99.9% times more likely to develop respiratory symptoms compared to who are in the age of >45. Sweepers who did not use face mask on duty had about 75% more likely to develop respiratory symptoms compared to those who had use face mask. This is consistent with the study conducted in Yeka sub city (30). The sweepers who had not trained were 55% more likely to develop respiratory symptoms compared to those who had training. This is consistent with the study in North Shoa which revealed that having trained in occupational health and safety was protective for respiratory symptoms (21)

6.1Strength and limitation of the study

6.11Strength of study

- The study used standardized tool to assess the respiratory symptom.

6.12Limitations of the study

- The healthy workers effect the study since waste collecting is highly demanding physical activity, workers with respiratory problems will tend to leave the job and shift to other job where physical activity demand is lower. Therefore, the sick ones have already left the job or shifted to other job before the study and many healthy workers who were available during the data collection were enrolled in the study, which may contribute to underestimate the effect of interest of study.
- As it is self-reported of health problem, there might be under estimation of the magnitude of the problem due to recall bias.
- Shortage of literature on specific study population to compare the results.

6.2Conclusion and Recommendation

6.21Conclusion

This study found that respiratory symptom was prevalent among street sweepers in AA. Use of face mask, OHS training, work experience, history of age 35-44 and energy used at home was major contributing factors for respiratory symptom to occur. There was poor awareness on occupational health and safety among street sweepers. Also there was lack of attention on the employer side to the street sweeper's health and safety. This was manifested through non provision of facemask and training for street sweeper's use of facemask; having trained on occupational safety, use of electric as energy source than using fuel gas were protective factors for respiratory symptom.

6.22Recommendations

- To Addis abeba health office- Face mask and occupational health and safety training should be provided by the health office.
- To city municipality- Individuals who had history of past illness should get health information during enrollment.
- To Addis abeba health office- Risk assessment has to be done periodically to identify behavioral problems because sleeping problem was observed as the predictor.
- To sweepers - Use of fuel gases such as kerosene should be avoided since fuel gas was observed as the most predictor for respiratory symptom.
- To researcher -s Further researches are recommended to study the cause effect relationship and the role of chemical detergents on respiratory symptom.

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