ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF PREVALENCE OF CHRONIC RESPIRATORY SYMPTOMS AND LUNG FUNCTION AMONG FUEL STATION WORKERS IN ADDIS ABABA, ETHIOPIA

BY

BEZAYIT GIRMA ABAY (BSc.)

ADVISORS:

ABERA KUMIE (MD, MSc, Ph.D.)

SAMSON WAKUMA (MPH, Ph.D.)

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OFADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES SCHOOL OF PUBLIC HEALTH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF PUBLIC HEALTH.

OCTOBER, 2019

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF PREVALENCE OF CHRONIC RESPIRATORY SYMPTOMS AND LUNG FUNCTION AMONG FUEL STATION WORKERS IN ADDIS ABABA, ETHIOPIA

By: Bezayit Girma (BSc.) **Signature ________ Date ______**

Approved by the examining board

	Signature	**Date**
Chair person, Department Graduate Committee		_________
Advisors;		
Dr. Abera Kumie (MD, MSc, Ph.D.)	__________	__________
Dr.Samson Wakuma (MPH, Ph.D.)	___________	__________
Internal examiner:		
1. _____________________	_____________	___________
External Examiner:		
1. ____________________	____________	___________

Acknowledgments

First of all, my heartfelt thanks to my Almighty God for giving me this opportunity and helping me all the way to be able to accomplish this work.

I would like to express my deepest gratitude to my advisors Dr. Abera Kumie and Dr. Samson Wakuma for their unreserved support, guidance, counseling, and encouragement in each step of this work.

I also acknowledge Addis Ababa Food Medicine, Health Administration and control Authority for giving me the opportunity to join Addis Ababa University, College of Health Sciences, and School of Public Health.

I would like to acknowledge Addis Ababa University College of health science and all staffs those capacitating me through my academic carrier.

I would like to thank data collectors and supervisors they played a great role in the completion of this work by tolerating the hardship situation. Also study participants and their supervisor's, fuel station owners and managers, "Assefana Guadenyochu"security agency manager were actively involved in the study. So, I would like to acknowledge them.

Sincere gratitude also goes to my beloved husband Mr Benti Mesfine, my kids and all my family member, colleagues and friends for their continuous encouragement and moral during the thesis work.

Mr. Molla from GEO Health staff was very cooperative and helped me a lot by giving training for data collectors on pulmonary function test and equipment handling so I want to say thank you.

I am grateful to NORAD/NORHED for funding this study through a research project "Reduction of the burden of injuries and occupational exposures through capacity building in low income countries (project number: 1300646-12)".

Last but not least, my sincere gratitude goes to GEO Health Hub for materials support for pulmonary function test.

TABLE OF CONTENTS

Contents

page numbers

TABLE OF CONTENTS iv

LIST OF TABLES vii

LIST OF FIGURES viii

ACRONYMS AND ABBREVIATIONS ix

ABSTRACT x

1. INTRODUCTION 1

1.1. Background 1

1.2. Statement of the problem 2

1.3. Rationale of the study 3

1.4. Significance of the study 3

2. LITERATURE REVIEW 4

2.1. Chronic respiratory symptom and lung function reduction 4

2.2. Fuel station work and chronic respiratory symptoms 4

2.3. Fuel station work and pulmonary function reduction 4

2.4. Socio-demographic factors and pulmonary function reduction 5

2.6. Behavioural and safety factors 6

2.6.1. RPE (respiratory protective equipment) utilization 6

2.7. Work related factors and lung function 7

2.7.1 Duration of employment and lung function 7

3. OBJECTIVES 9

3.1. General Objective 9

3.2. Specific objectives 9

4. METHODS 10

4.1. Study Area and period 10

4.2. Study design 10

4.3. Source and study Population 10

4.4. Inclusion and exclusion criteria 10

4.5. Sample size determination 11

4.6. Sampling procedure 14

4.7. Study variables 16

4.8. Data collection 16

4.9. Data management 17

4.10. Data quality assurance 18

4.11. Operational definitions 18

4.12. Ethical consideration 20

5. RESULTS 21

5.1. Socio-demographic characteristics of respondents 21

5.2. Work related factors 23

5.3. Behavioural factors 24

5.4. Prevalence of chronic respiratory symptoms 25

5.5. Chronic respiratory symptoms and associated factors 27

5.5.1. Bivariate analysis 27

5.5.2. Multivariable logistic regression analysis 31

5.6. Pulmonary function test 33

5.6.1. Distribution of pulmonary function test with duration of employment 33

6. Discussion 35

7. Strength and limitations of the study 38

7.1. Strength of the study 38

7.2. Limitations of the study 38

8. CONCLUSION 39

9. RECOMMEDATION 40

10. REFERENCES 41

11. ANNEXES 43

Annex I: participant Information sheet 43

Annex II. Informed consent form 44

Annex III English Version Questionnaire 45

Annex. IV Observational checklist for PPE usage and workplace environment 51

Annex V. Information sheet (Amharic version) 52

Annex VI. Informed consent (Amharic version) 53

Annex VII. Amharic version questionnaire 54

Annex IX: principal investigators curriculum vitae 60

LIST OF TABLES

Table 1: Summary of sample size calculation of the study in Addis Ababa, Ethiopia, 2018/2019 13
Table 2: Socio-demographic characteristics of fuel station and security service giving agency workers, Addis Ababa, Ethiopia 2019 22
Table 3: work related factors of fuel station and security service giving agency workers of Addis Ababa, Ethiopia 2019............24
Table4: Behavioural factors of fuel station and security service giving agency workers of Addis Ababa, Ethiopia 2019............25
Table 5 Prevalence of respiratory symptoms among fuel station and security service giving agency workers of Addis Ababa, Ethiopia, 2019 26
Table 6:Bivariate analysis of socio demographic factors and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019 (N = 394).........28
Table7:Bivariate analysis of working environment factors and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019 (N = 394) 29
Table 8: Bivariate analysis of behavioural factor and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019 (N = 394)................30
Table 9: multivariate analysis of associated factors and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019,(N = 394)...............32
Table 10: Comparison of pulmonary function parameters of fuel station and security service giving agency workers of Addis Ababa, Ethiopia 2019............33
Table 11: One Way ANOVA results distribution of pulmonary function tests in fifty (50) fuel station workers by duration of exposure, Addis Ababa, Ethiopia 2019............33

LIST OF FIGURES

Figure 1: Conceptual framework of the study 8
Figure 2: Schematic presentation of sampling procedure for fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2018/2019. 15
Figure 3: prevalence of chronic respiratory symptom among fuel station and security service giving agency workers 26

ACRONYMS AND ABBREVIATIONS

BMRC	British Medical Research Centre
FEV1	Forced Expiratory Volume at One Second
FMHACA	Food Medicine Health Administration Control Authority
FVC	Forced Vital Capacity
ILO	International Labour Organization
MOLSA	Ministry of Labour and Social Affairs
NGO	Non-Governmental Organization
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
RPE	Respiratory Protective Equipment
URTI	Upper Respiratory Tract Infection
VOC	Volatile Organic Compound
WHO	World Health Organization

ABSTRACT

Background: Fuel station workers are continuously exposed to organic and inorganic chemicals present in the petrol and diesel fuel. Occupational exposure of petroleum product and its exhaust are causing significant health damage to the airways and the lung tissue. Respiratory health study among exposed fuel station workers is not available in Ethiopia.

Objective: To assess prevalence of chronic respiratory symptoms and associated factors and determining the lung function status among fuel station and security service giving agency workers in Addis Ababa, Ethiopia.

Methods: Comparative cross-sectional study was conducted from February–April 2019. A total of 394 workers from fuel station and security service giving agency were interviewed using standard questionnaire to assess chronic respiratory symptoms. Spirometer test was performed for 100 workers. Four companies; National Oil Ethiopia, Total Ethiopia, Libiya Oil Ethiopia and Yetebaberut were identified to select study unit. The sample size of the study proportionally distributed to each of the company's based on their number of workers they had at the time of the data collection. Individual gas stations were selected randomly by each stratum of Oil Company. All workers, from the selected station, those fulfilled the inclusion criteria were included in the study population. For the comparison group; one security service giving agency was selected and study participant was selected by using systematic random sampling from the pay roll list. Data was entered using Epi info version 7.2. Data cleaning and analysis was performed by using SPSS version 23.

Result The mean age of fuel station and security service giving agency workers were 34.47±8.2 and 32.98 ±9.94 respectively. Fuel station workers had significantly higher prevalence rate of chronic respiratory symptoms than security service giving agency workers (48.7%; PR= 2.1, 95 % CI, 1.43-3.1). Chronic respiratory symptoms among study participant were associated significantly with past exposure to dust and petrol vapour (AOR= 2.4, 95 % CI = 1.24-4.7), history of past respiratory illness (AOR = 9.54, 95 % CI, 3.91-23.28) and passive smoking (AOR = 4.21, 95 %CI, 1.19-14.86). Significant reduction in the lung function parameter value of FEV1 and FVC were observed among fuel station workers compared to security service giving agency workers.

Conclusion and recommendation: prevalence of chronic respiratory symptom among fuel station workers was higher when compared with security service giving agency

workers. Past exposure to dust and petrol vapour, past respiratory illness and passive smoking significantly associated with development of at least one chronic respiratory symptom. Lung function parameters; forced vital capacity (FVC) and forced expiratory volume at one second (FEV1) also decrease significantly among fuel station workers relative to comparative group. The results suggest that there is need to improve health status and reduce the exposure level of the workers.

1. INTRODUCTION

1.1. Background

About 1.3 billion urban residents worldwide are exposed to air pollution level above recommended limits (1). Air quality in the developed countries has generally improved in the past two decades, but in many developing countries air quality has deteriorated. Epidemiological studies have shown that a sudden increase in air pollution has often been associated with immediate increase in morbidity and mortality (2).

Fuel station is station that sells fuel and engine lubricant for motor vehicles. The most common fuel sold in the gas stations are gasoline (petrol) and diesel fuel (3). In the crude oil distillation process these two products are produced at the primary stage of the process with low amount of temperature because they are volatile in nature. Petrol vapour contains 95% aliphatic, cyclic compound and volatile organic compounds (VOCs) like Benzene, and complex combination of hydrocarbon and 2% of aromatic compound that will be released into the atmosphere during vehicle refuelling. While diesel is a distillate of petroleum which contains paraffin, alkene and aromatics. In addition to generating pollutants, they are major contributor to particulate matter in most places of the world (4, 5).

Benzene occurs naturally in crude oil and is a constituent of petrol. It is a major monocyclic aromatic hydrocarbon which is largely used as a solvent in automobiles and solvent gasoline. In India, the percentage of benzene in automobile engines is about 3% (2).

Fuel station workers are persons who serve the fuel to engine to maintain world's speedy life. They are continuously exposed to organic and inorganic substances present in the petrol/diesel (6). Occupational exposure of petroleum product and its exhaust are causing significant health damage to the airways and the lungs and have symptoms including chronic cough, wheezing, breathlessness, alterations in the body defence systems against foreign materials and Lung function reduction (7). Spirometer gives an important clue in terms of respiratory chronic air way disorders and can predict early damage to pulmonary system (8). Study from different parts of the world revealed that there is significant reduction of lung function among fuel station workers (9-11). But lung function depend on ones socio economic status, BMI, age , sex, race and soon (12).

1.2. Statement of the problem

Globally, non-communicable diseases (NCDs) were the leading cause of mortality which accounted for 38 million (68%) of the world's 56 million deaths in 2012. Four major NCDs (cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes) were responsible for 82% of NCD deaths. Among those non transmittable diseases, chronic respiratory diseases such as asthma and chronic obstructive pulmonary diseases represented 4 million or 10.7% deaths (13).According to WHO report, death from non-communicable disease in Ethiopia accounts 30% of total death and chronic respiratory disease take 3% share from this (14).

Fuels sold at fuel stations include petrol, liquefied natural gas (LNG), diesel and kerosene. These fuels especially petrol contain volatile organic compounds like benzene which can give off vapour even at low temperature (3).

Studies have reported that inhalation of benzene in the environment causes mucous membrane irritation, heart attack, cancers of the lung, brain and stomach, leukaemia, dermatitis and bone marrow depression in addition; exposure to volatile organic compound also known causing chronic respiratory symptom (3, 15).

Many Study done in different county like India, Pakistan, Nigeria showed that chronic exposure to petrol and diesel vapours among petrol station pump attendants was associated with impairment in lung function and an increased susceptibility to lung infection compared with controls (7, 16, 17).

A cross sectional study conducted in Pakistan by the year 2016 revealed that the odds of developing cough among exposed group where 8.11 times higher than non-exposed group with 95% CI, (4.64-14.18) (15). A comparative study from India also revealed that lung function parameters (FVC, FEV1) measurement among exposed group showed significant reduction when compared to non-exposed group. (18)

In Ethiopia data is limited concerning respiratory symptoms and lung function parameters among fuel station works. Therefore this study aims to assess prevalence of chronic respiratory symptom and its associated factor and to measure lung function parameters (FEV, FVC and FEV1/FVC).

1.3. Rationale of the study

There is an increase in the number of morbidity and mortality from respiratory problem in the country from time to time. According to the Institute for Health Metrics and Evaluation (IHME) report of 2016, lower respiratory infection is the second most cause of death and the first most cause of premature death in Ethiopia and air pollution is the third most risk factor for the death and disability in the country (19). In Ethiopia there are more than 800,000 vehicles from this 70% of them concentrated in capital city Addis Ababa (20). Almost all this vehicle depends on petrol and gasoline source of energy but currently there are only 100 gas stations in the city which serves more than 4000 vehicles on average. The Ethiopia petroleum distribution enterprise also developed ambitious plan to expand fuel station service in the coming year and currently the country also announced new start on petrol production (20). Due to this reason there may be substantial number of working sector of the population will be involved in this sector. The respiratory illness resulting from fuel station fuels and associated factors were not studied in Ethiopia. This study intended to fill this gap by using appropriate study design.

1.4.Significance of the study

The main findings of this study will generate knowledge and give insight on prevalence of chronic respiratory symptom and lung function reduction of fuel station workers in Addis Ababa. It will help fuel station owners, workers and Ethiopia Petroleum Distribution Enterprise (EPDE) to take measure for the workers' health and safety based on the recommendations that will be given at the end of this study. In addition, it will be important for regulatory body like Ministry of Labour and Social Affairs (MoLSA), Food Medicine Health Administration and Control Authority (FMHACA), Ministry of Trade and different non-governmental organization (NGOs) on designing a plan to improve the occupational safety and health practice of fuel stationworkers. It will also serve as a base line for farther studies in this area.

2. LITERATURE REVIEW

2.1. Chronic respiratory symptom and lung function reduction

Respiratory health is a primary concern for the exposed population to organic chemicals serving gas stations .A study from Pakistan with the aim to determine the correlation of respiratory symptoms and spirometric lung function pattern among petrol pump workers showed that respiratory symptoms of a cough, shortness of breath, and breathlessness during walking are significantly correlated with reduced lung function and this trend was found consistently for all lung volumes (FVC, FEV1 andFEV1/FVC). This correlation suggests that the presence of respiratory symptoms is an important predictor of impaired lung function among petrol pump workers (15).

2.2.Fuel station work and chronic respiratory symptoms

A cross sectional study conducted in Algeria, 2012 revealed that prevalence of respiratory symptom among fuel station workers was higher than control group. According to this study prevalence of at least one respiratory symptom among exposed group where (n=92, 37%) relative to control group (n = 37, 15%) ($P < 0.01$) (21).

Study from Nigeria revealed that URTI among fuel station workers and control group where 13 (81.3%) and 8 (72.7%) respectively but this is not statistically significant(P=0.66) and it is also the same for chest pain which is 6 (6.1%) among exposed and 3 (3.2%) among control and statistically not significant (p=0.5) (7).

Another study from Karachi showed that there is increased prevalence of cough among exposed (78.6%) than non- exposed (21.4%) and it is statistically significant(p=0.028).shortness of breath among exposed also high which is (85%) than control(15%) and it is statistically highly significant(P=0.001) (17).

2.3.Fuel station work and pulmonary function reduction

Different study revealed that working at fuel station imposes different respiratory problem including reduction of pulmonary function measurement (3, 6, 17). Study conducted in India, 2016 showed that all the studied lung function parameters measurement among fuel station workers were reduced relative to the control group. FVC,FEV1 and FEV1/FVC measurements among exposed group were 3.43±0.35,

2.84±0.39 and 82.55±5.65 respectively and among non- exposed, control group also 3.76±0.19, 3.17±0.18 and 84.46±3.00 respectively there difference where statistically highly significant at P-value of 0.0001 except for the ratio of FEV1/FVC which is 0.06 (18).

2.4.Socio-demographic factors and pulmonary function reduction

Accumulating evidence suggests that gender impacts the incidence, susceptibility and severity of several lung diseases. It also influences lung development and physiology. Pulmonary structural and morphologic differences between genders include smaller vital capacity and maximal expiratory flow rates, reduced airway diameter, and a smaller diffusion surface than age- and height-matched men (22).study from Theni medical college India, with the aim of evaluating the pulmonary functions in petrol-pump workers and to comparing their Pulmonary function tests (PFTs) with that of age and sex matched controls revealed that FVC, FEV1, and FEV1/FVC% were significantly decreased ($p<0.01$) in female petrol-pump workers when compared to male work (16).

Study from India, in 2014 showed that pulmonary function parameters FVC and FEV1/FVC were affected with increasing BMI (23). In addition, study from Riyadh, Saudi Arabia, in 2014 showed that both weight and height is highly correlated with pulmonary function parameter of FEV1 but, height more correlated than weight (24). According to study conducted in Zambia body mass index of study participant have inverse relation with lung function impairment. participants who had body mass index of <18.5 were 2.87 (95% CI 1.18 - 6.99) times more likely to have lung function impairment than participants with body mass index of 25 or more (25).in contrary to this study Uzman etal observed significant linear relation between body mass index and year of exposer (26).

2.5.Socio-economic status and pulmonary function reduction

Socioeconomic status (SES) is defined as an individual's social or economic standing, and is a measure of an individual's or family's social or economic position or rank in a social group. It is a composite of several measures including income, education, and occupation, location of residence or housing.

Education contributes a great role in social and economic development. It enhances capabilities and is intensely connected with various socio-economic variables such as lifestyle and income for both individuals and societies. Also, level of education influences the type of occupation and income which can determine the home living condition. Education is an important factor influencing an individual's attitudes and awareness related to health and hygiene (27)

A study conducted by in Dejen cement factory workers showed that worker's education level grade 8 or below were more likely to developed chronic respiratory symptoms than workers whose education level was diploma and above (AOR = 4.07, 95 % CI = 1.86-8.92) (28).

Another study from Finland in 2004 found that low education and low household income associated with respiratory health problems. According to the study as educational level decreased the risk of asthma and Chronic Obstructive Pulmonary Disease (COPD) increased. It also shows low household income increased the risk of asthma and COPD (29).

2.6.Behavioural and safety factors

2.6.1. RPE (respiratory protective equipment) utilization

The environment of gas stations exposes fuel station attendants to numerous risks and health Hazards, which should be considered harmful to the health status of these workers. There are chemical products to which these workers are exposed, such as aromatic hydrocarbons, benzene, toluene and xylene (BTX), components of gasoline and chemical solvents. Among routes of entry for these chemicals inhalation is the one. According to International Labour Organization (ILO) when it is not reasonably practicable to eliminate or control the hazardous substance, protective equipment must be used (30).However, according to different study PPE utilization like RPE is low among fuel station workers. Study from brazil reviled that based on self-report 3.2% of workers reported use of RPE but only one worker from the total of 221 study subject observed using RPE (31). Study conducted in Nigeria, Calabara which contains sample size of fifty fuel station attendants showed that there is 100 % denial on ever use of face mask (32).

2.7.Work related factors and lung function

2.7.1 Duration of employment and lung function

Duration of employment is an important epidemiological factor that determines the occurrence of respiratory symptoms in workers. Study from Amritsar, India 2011 reviled that as the year of service increases the lung function of the worker is decreasing. the mean value of forced vital capacity (FVC) for the worker those have less than one year of service, between one and five year and above five year showed 3.05± 0.46, 2.77±0.42 and 2.38±0.61 respectively. The decline of forced vital capacity (FVC) among less than one year and between one and five year of service is statistically significant ($P<0.032$).it is also highly significant ($p<0.001$) between one and five year of service and more than five year of service. but this reduction statistically not significant($P>0.05$) for FEV1 parameters among less than one year and between one and five year of service (2).In 2014 study was conducted in Chittoor district, India by dividing study group in to two groups based on duration of exposure which is above five year and below five year then compared with control group. The study finding showed that the mean value of pulmonary function FVC 2.39± 0.87, 2 ± 0.93 and 3.42 ± 0.62 for study subject less than five year, greater than five year and control group respectively. There difference also statistically significant with control group ($p<0001$) (33).This finding also supported by other studies (6, 9, 34, 35).

Conceptual framework of the study

Conceptual framework for this study shows how the particular variables in study connect with each other and identifies the variables required in the research investigation. This was developed after reviewing different literature about factors that has been contributing for the occurrence of chronic respiratory symptoms and pulmonary function reduction among fuel station workers. It will serve as a road map in pursuing the investigation.

As shown below chronic respiratory symptoms and pulmonary function of fuel station workers can be associated directly with duration of employment, length of working hours and gasoline exposure. It is also associated with socio demographic factors (age, sex, education and income), anthropometric variables (weight, height and BMI) and behavioural factors like provision and usage of PPE, training, cooking and smoking habit.

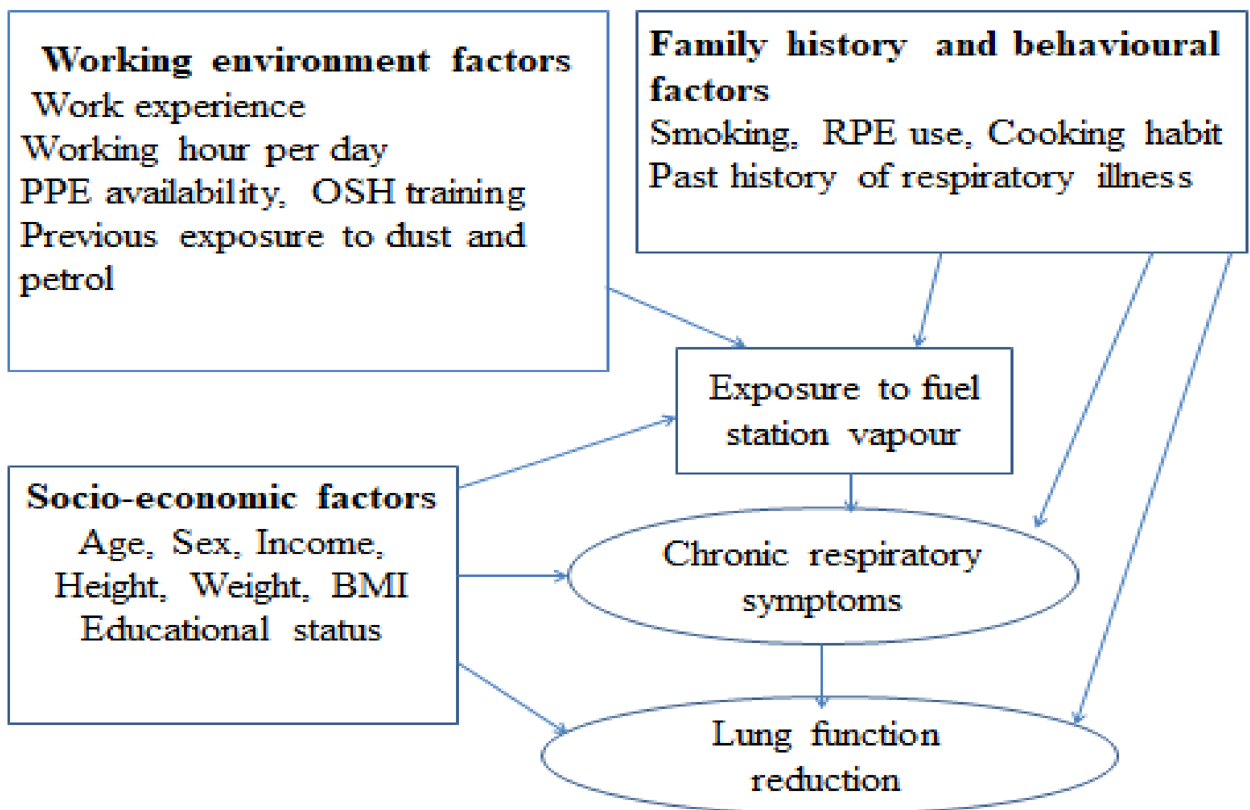


Figure 1: Conceptual framework of the study

3. OBJECTIVES

3.1. General Objective

To assess prevalence of chronic respiratory symptoms and associated factors and determining the lung function status among fuel station and security service giving agency workers in Addis Ababa, Ethiopia.

3.2. Specific objectives

1. To assess and compare the prevalence of chronic respiratory symptoms among fuel station and security service giving agency workers.
2. To assess associated factors of chronic respiratory health symptoms among fuel station and security service giving agency workers.
3. To assess and compare the status of pulmonary function among fuel station and security service giving agency workers (FVC, FEV1 and FEV/FVC).

4. METHODS

4.1. Study Area and period

The study was carried out on fuel station and security service giving agency workers which is found in Addis Ababa, Addis Ababa is the capital city of Ethiopia that geographically lays 9°1′48″N latitude and 38°44′24″E line of longitude. It covers an area of 540 square kilometers (54,000 hectares) with a total population of 2.7 million (36). The city has more than twenty petrol distributing company, under these companies there are more than one hundred (100) fuel station which involved large number of workers in fuel refueling activities. The study was conducted from February-April 2019.

4.2. Study design

A comparative cross-sectional study was conducted to assess prevalence of chronic respiratory symptoms and associated factors and measure lung function parameters among fuel station workers those exposed to gasoline and petrol vapour and compared with non-exposed workers from security service giving agency workers.

4.3. Source and study Population

All fuel stationworkers who are engaged in all types of fuel station and security service giving agency workers in Addis Ababa are the source population and all fuel stationworkers who are working in the selected fuel station for more than one year in refuelling activity and for the comparison group randomly selected security service giving agency workers are the study population.

Exposed group:-fuel station workers those involved directly in refueling activity.

Non-exposed group:-randomly selected worker from security service giving agency.

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria.

- Individuals had worked in a gas station, refuelling section more than one year.

4.4.2. Exclusion criteria

- Workers who recent had surgery of thorax, abdomen, and any acute illness.

4.5. Sample size determination

4.5.1. Sample size calculation for specific objective one (prevalence of chronic respiratory symptom).

According to study conducted in Kinondori Municipality, Dar Es Salaam Tanzania the prevalence of respiratory symptom among fuel station attendant is higher than control group. Prevalence of phlegm among fuel station attendant and control group (shop keeper) 55.8% and 20% respectively (37). Based on this finding the sample size calculated by using the following double proportion formula and checked by Epi. Data version 3.

$$n = \frac{Z\alpha/2 + Z\beta)^{2} * (P1(1-P1)+P2(1-P2))}{(P1-P2)^{2}}$$

Where,

n= Sample size to be determined

P1= 55.8% (proportion of respiratory symptom (phlegm) among fuel station workers)

P2= 20 %(proportion of respiratory symptoms (phlegm) among non-exposed shop keeper)

$Z\alpha/2$ = Level of statistical significance 1.96 at confidence level of 95% and

$Z\beta$ = Desired power of 80%

- The odds ratio of this data is 5.5, to get maximum sample size, it is calculated by taking odds ratio of 2 and power of 80% on Epi info and it gives 374 sample sizes.

4.5.2. Sample size determination for specific objective two(associated factor)

According to the literature reviewed chronic respiratory symptoms are associated with behavioral factor, environmental factor, socio demographic and economic factor and exposure to work place pollutant. Since there is limited study on fuel station workers, study conducted among pharmaceutical factory workers, where there is chemical exposure like solvents are there, where taken for sample size calculation.

According to these study workers who have greater than five year of work experience had odds of developing chronic respiratory symptoms about two times more likely than those workers with work experience of one to five year with prevalence of 56.3% and 43.7% respectively and (AOR=1.86,95%CI=1.5-3.43) (38).

Based on this data sample size is calculated using double proportion formula and Epi info.

$$n = \frac{(Z\alpha/2 + Z\beta)^2 * (P1(1-P1)+P2(1-P2))}{(P1-P2)^2}$$

n= Sample size to be determined

P1= 43.7% (proportion of chronic respiratory symptom among workers who have work experience more than five year)

P2= 56.3 %(proportion of chronic respiratory symptom among workers who have work experience of between one and five year.

$Z\alpha/2$ = Level of statistical significance 1.96 at confidence level of 95% and

$Z\beta$ = Desired power of 80%=0.84

OR =1.8(to maximize sample size)

The sample size is equal to 394

4.5.3. Sample size determination for specific objective three (Measurement of lung function reduction)

The sample size to measure pulmonary function reduction of fuel station and security service giving agency workers determined by using mean difference formula. According to study conducted in Agartala, India revealed the mean value of FVC (L/sec) among study group is significantly ($p=0.012$) lower than control group which were 3.070±0.558 and 3.418 ±0.523 respectively (39). Based on a study finding sample size calculated using the following mean difference formula and checked using open Epi version 3.

$$n = \frac{(Z\alpha/2 + Z\beta)^2(\delta_1^2 + \delta_2^2)}{(d)^2}$$

Where,

n = sample size

δ= standard deviation of the characteristics (δ_1=0.558(study group) and δ_2=0.523(control group)

$Z\alpha/2$ = Level of statistical significance 1.96 at confidence level of 95% and

$Z\beta$ = Desired power of 80 % =0.84

d = mean difference (Mean 1 = 3.070 and Mean 2 = 3.418) = 0.348

$$n= \frac{(1.96+0.84)^2(0.558^2+0.523^2)}{(0.348)2} =38$$

Adding 10% for non-response rate it becomes **42** for each study subject and **84** of total sample size

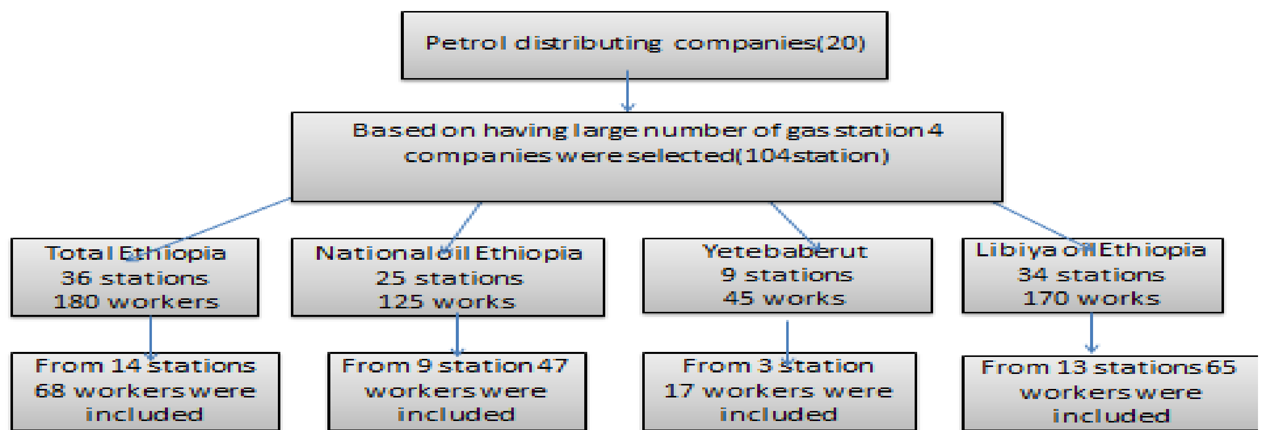
Table 1: Summary of sample size calculation of the study in Addis Ababa, Ethiopia, 2018/2019

<table>
<tr><td colspan="7">Specific objective1. To assess prevalence of chronic respiratory symptom</td></tr>
<tr><td>Variable</td><td colspan="2">Prevalence among exposed group</td><td colspan="2">Prevalence among non-exposed group</td><td>sample size</td><td>remark</td></tr>
<tr><td>Phlegm</td><td colspan="2">55.%</td><td colspan="2">20%</td><td>374</td><td>By assuming OR of 2</td></tr>
<tr><td colspan="6">Specific objective 2. Assessment of associated factors</td><td></td></tr>
<tr><td>Factor</td><td colspan="2">Proportion among exposed</td><td colspan="2">Proportion among non-exposed</td><td>Sample size</td><td>By assuming OR of 1.8</td></tr>
<tr><td>Work experience</td><td colspan="2">56%</td><td colspan="2">43.7</td><td>394</td><td></td></tr>
<tr><td colspan="6">Specific objective 3. Measurement of lung function reduction</td><td></td></tr>
<tr><td>Parameter</td><td>mean</td><td>SD</td><td>mean</td><td>SD</td><td rowspan="2">84</td><td rowspan="2"></td></tr>
<tr><td>FVC(L/se)</td><td>3.07</td><td>0.56</td><td>3.42</td><td>0.52</td></tr>
</table>

The sample size for the study variable work experience gives maximum sample size Therefore; the sample size for this study was three hundred ninety four(394);one hundred ninety seven (197) workers was selected from gas stations (exposed) and one hundred ninety seven (197) workers from security service giving agency. However, pulmonary function test was done for 100 workers due to a shortage of resource (50 from fuel station and 50 from security service giving agency workers).

4.6. Sampling procedure

In Addis Ababa city, more than twenty petrol distributing companies are there. Based on number of gas stations and market share they had four companies named; Libya Oil Ethiopia, Total Ethiopia, Yetababerut national petroleum and National Oil Company are selected. The sample size of the study proportionally distributed to each the company's based on their number of workers they had after that gas stations was selected randomly and all workers from the selected station those fulfill the inclusion criteria were assessed for chronic respiratory symptoms and associated factor. Measurement of lung function was made for fifty (50) workers from the selected stations. For the comparison group; one security service giving agency was selected purposively and study participant was selected by using systematic random sampling from the payroll list and assessed for chronic respiratory symptoms and lung function.



Note :- From each company 38% of gas stations were randomly selected and included in the study

- Each fuel station averagely has 5 petrol refueling workers.

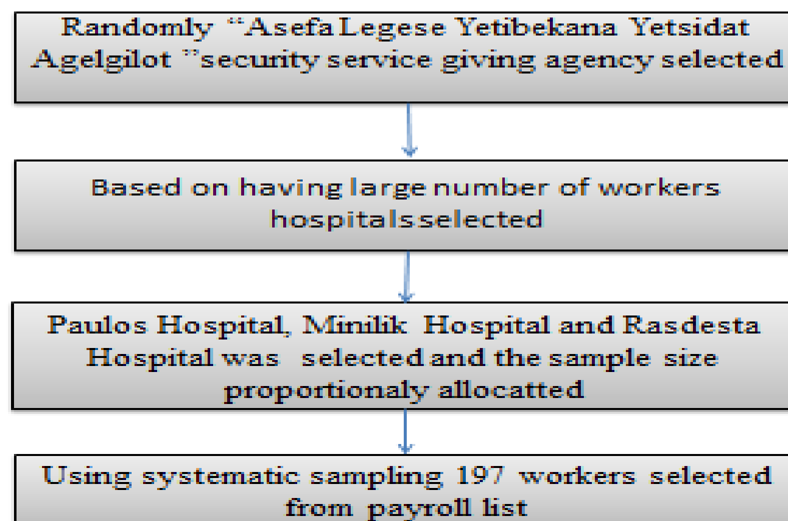


Figure 2: Schematic presentation of sampling procedure for fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2018/2019.

4.7. Study variables

4.7.1. Outcome variable

- Chronic respiratory symptoms (cough, cough with sputum, shortness of breath, wheeze, and chest pain)
- Pulmonary function parameters (FVC, FEV1and FEV1/FVC %)

4.7.2. Exposure variable

- Duration of exposure
- Length of Working hours
- Past exposure to dust and petrol vapor
- Age, Sex, BMI, income, educational status
- Smoking habit
- Past respiratory illness
- Availability and usage of RPE
- Family history of respiratory illness

4.8. Data collection

Data collection method for respiratory health and associated factors

Data was collected by using questionnaire modified from British Medical Research Council (BMRC) (40) . The questionnaire translated to Amharic, retranslated back to English to check its consistency with the original one. Three environmental health personnel were involved in the data collection and two days training was given to them. Brief explanation was given to the participant about the purpose of the study before the interview administered for selected fuel station and security agency workers.

Checklist

An observational checklist was used to assess the availability and usage of respiratory protective equipment's (RPE).

Measurement of pulmonary function

Spirometer was used for determining pulmonary function parameters (FVC, FEV1and FEV1/FVC %) in both fuel station and Security service giving agency workers. For data collection trained nurse from halleluiah hospital was involved.

Before performing the procedure the subjects was instructed to practice deep inspiration and complete forceful expiration. By putting a nose clip to prevent air leak through the nose, the subject was initially breathing for a few breaths normally, followed by deep inhalation and forceful expiration of the air as fast and forcefully as possible.

All measurements was performed in the sitting position and Testing was continue until three acceptable tests (all green in the quality code box) and reproducibility criteria are met (yellow values) or until the participant cannot or should not continue. While doing this maneuver, flow and volume curves was inspected on the screen for detecting whether subjects displayed enough effort during inspiration and expiration. Before starting measurement, spirometer was calibrated by single calibration procedure daily and double calibration weekly (41).

Anthropometric measurements

Weight was measured using a standardized electronic weighing machine, with the subjects standing and wearing lighted clothes and height of the subjects measured with portable field scales. Body mass index (BMI) of study subject was calculated on the ndd medical technologies software.

4.9. Data management

At the time of data collection, the principal investigator and supervisor were checked the questionnaire for completeness and consistencies. Preliminary editing by a field supervisor on the same day as the interview to catch technical omissions, check legibility of handwriting, and clarify responses that are logically or conceptually inconsistent.

Collected data was interred in to Epi info version 7.2.and exported to excel sheet for data cleaning frequency, sort and list were used for cleaning.

For lung function test needed variable from the soft-ware were manually sorted and recorded on excel sheet after cleaning is made the data was exported to SPSS version 23 for analysis. The original data was stored for back up in a computer and flash disk.

Data analysis

For objective one (prevalence of chronic respiratory symptom) Descriptive statistics was used to describe the study populations using frequency distribution, measure of

central tendency and dispersion that was presented using tables and figures. The two populations were compared by using student t-test and prevalence ratio.

For the second objective (associated factors) binary logistic regression was run to check whether exposure variable is associated with outcome variable by determining the COR and 95% CI . Variables which have an association with the outcome variable at $p < 0.2$ was entered into multivariate logistic regression to control the possible effect of confounders and variables with $p < 0.05$ and AOR $\neq 1$ at 95% CI was considered as significant exposure factors.

For the third objective (measurement of pulmonary function) Data of pulmonary function tests was presented as the Mean ± Standard deviation for each of the parameter. The two groups were compared by using student t test and multiple linear regressions on SPSS software version 23. Within group variability among study group was seen by One-Way ANOVA analysis.

4.10. Data quality assurance

To assure data quality standardized questionnaire and trained environmental health professional was involved in the data collection. Measuring instrument's software, observational check list and questionnaires was pre-tested and data collector's and respondent's gap was identified and addressed carefully.

For, pulmonary function test (PFT) orientation was given to the study subjects to prevent leak and early termination. Trained professional was involved from Hallelujah Hospital and orientation also given before the data collection started. The apparatus was calibrated daily before starting the procedure. Once the data collected, needed information was exported to Excel sheet then it was handled in computer and flash disk for safety. Analysis also performed by using SPSS version 23.

4.11. Operational definitions

Duration of exposure: -defined as the working hours of workers in their work place per day.

Duration of employment: defined as worker's work experience in the current work.

Chronic respiratory symptom: The development of one or more of the symptom/s of chronic cough, chronic phlegm, chronic wheezing, chronic shortness of breath and chronic chest tightness which last/s at least three months in one year (28) .

Chronic respiratory disease:- respiratory disease like TB, chronic bronchitis, lung cancer, and heart disease that could be developed before and identified by physicians (28).

Chronic Cough:-Experience of a cough for most days of the week (≥4 days) for at least three months in one year (28).

Chronic phlegm/Cough with sputum production: It is sputum expectoration as much as twice a day for most days of the week (≥4 days) for at least three months in one year (28).

Chronic Breathlessness:- Is defined as discomfort or difficult to breathe in different activities like walking up a slight hill, when undressing, walking at own pace (28).

Chronic wheezing:-a condition of causing a wheezy or whistling sound heard during inhalation or exhalation (at least three months in a year) (28).

Chronic chest pain: - In the past one year, chest pain that kept off work (28).

Current smokers:-Workers who were smoking at the time of the study or a person who smoke cigarettes every day or some days (42).

Ever smoker: -a person smoked at least 100 cigarettes in his entire life (42).

Passive smoker:-a person who never smoke cigarettes but live with smoker and exposed to environmental tobacco smoke.

FVC: - Is the maximum volume of air that can be breathed out as forcefully and rapidly as possible following a maximum inspiration (43).

Forced expiratory volume in 1 sec (FEV1):- The volume of air exhaled during the first second of the FVC maneuver (43).

FEV1/FVC: The percentage of the FVC expired in the first second of maximal forced expiration following full inspiration. Predicted values greater than 80% is usually considering as normal (43).

4.12. Ethical consideration

Ethical clearance was taken from the School of Public Health, ethical review committee and an official letter was written to Total Ethiopia, National Oil Company (NOC), Yetebaberut Biherawi Petrolium (YBP) and Libiya Oil Ethiopia head offices. Permission letter was obtained from the companies requesting facilitation to conduct a research study and this official letter was approved and distributed to selected gas stations managers and owners for information and co-operation. The aim and method of the study and importance of their participation was clearly explained to each study participant. The study participants who fulfill the criteria for the study and agreed to participate was given Amharic written consent and signed before data collection starts. Oral consent was obtained, if photo taking is needed.Issues of rights, privacy, and confidentiality was ensured during data collection period. Confidentiality was kept by assuring information will not be accessible to anyone except the research personnel. Privacy was maintained by arranging a silent and comfortable place to the interviewer and study participants. Participants had the right to participate or not and to withdraw at any time when they feel discomfort. They did not get a direct benefit like money but they become a beneficiary in the future from the policy development from such study. For those who were found abnormal lung function test were advised to seek more clinical diagnosis to health facilities.

Dissemination of results

The result of this study will be presented to Addis Ababa University, school of public health and the copies will be given to Ethiopia petroleum distribution enterprise (EPDE) as well as to the head office of the National Oil Company, Libya Oil Ethiopia, Total Ethiopia and Yetebaberut Biherawi Petroleum. It will be given to Addis Ababa Trade Biro, Biro of Labor and Social Affairs and Addis Ababa Food Medicine Health Administration and Control Authority. The findings will also be disseminated via publication.

5. RESULTS

5.1. Socio-demographic characteristics of respondents

Three hundred ninety four workers were selected from different gas stations (197) and "Asefa legesse" security service giving agency (197) workers to participate in the study. Out of this 394 study participants 354(89.8) were male and 40(10.2) were female.

Mean age of fuel station workers (exposed group) were 34.47 with ± 8.2 standard deviation and for security service giving agency workers (non-exposed group) were 32.33 with ±10.37 standard deviation and ranging from 19 to 60 years.

One hundred sixty (81.2%) of participants from fuel station had attained secondary and above level of education and about 37(18.2%) had attained primary level of education were as 67(34%) security service giving agency workers had attend secondary education and above , 107(54.3%) had attend primary level and 23(11.7%) were can not read and write. Fuel station workers had median monthly income of 1500 Birr were as security workers had 2000Birr.

Majority of study participant from fuel station and security service giving agency workers were married and orthodox with percentage of 61.4 and 59.9 and 87.3 and 51.8 respectively.

From three hundred ninety four study participant; 150 fuel station and 46 security workers were cook food at their home. As shown in the figure 2, 51% of fuel station and 60% security workers were used bio fuel (charcoal, firewood, LPG, and kerosene) as main source of energy.

There was a significant difference between fuel station and security service giving agency participants in terms of marital status, educational status and cooking habit ($p \leq 0.05$). However, in terms sex, age, income, energy use and religion there were no significant difference $P>0.05$ (Table 2).

Table 2: Socio-demographic characteristics of fuel station and security service giving agency workers, Addis Ababa, Ethiopia 2019

Variable	Gas station(n=197)	Security service giving agency worker(N=197)	P-value
	N (%)	N (%)	
Sex of respondent			
Male	178 (90.4)	177 (89.8)	0.87
Female	19 (9.6)	20 (10.2)	
Age			
19-29	67 (34)	102 (51.8)	0.06
30-39	75(38.1)	47(23.9)	
40-49	46(23.4)	32(16.2)	
51-60	9(4.5)	16(8.1)	
Mean ±SD	34.47±8.2	32.33±10.37	
Marital status			
Single	73(37.1)	70(35.5)	0.001
Married	121(61.4)	118(59.9)	
Divorced	3(1.5)	9(4.5)	
Religion			
Orthodox	172(87.3)	102(51.8)	0.25
Muslim	17(8.6)	39(19.8)	
Protestant	8(4.1)	56(28.4)	
Educational status			
Cannot read and write	0(0)	23(11.7)	0.001
Primary education	37(18.8)	107(54.3)	
Secondary	112(56.9)	54(27.4)	
education	48(24.3)	13(6.6)	
Diploma and above			
Monthly income			
<=1500	109(55.3)	55(27.9)	0.55
1500-2000	34(17.3)	56(28.4)	
>2000	54(27.4)	86(43.7)	
Median	1500	2000	
Energy use among home cooker			
Electric	73(48.7)	18(39.1)	0.26
Biofuel	77(51.3)	28(60.9)	

Biofuel (charcoal, firewood, kerosene, LPG)

5.2.Work related factors

From 394 fuel station and security service giving agency workers, 44.7% and 93.4% had work experience of less than or equal to five year and 23.9% and 3.6% greater than 10 year respectively.54.8% of fuel station workers had less than or equal to 8 (eight) working hour per day whereas majority of security service giving agency workers (90.4%) had greater than 8 (eight) working hour per day and there difference were statistically significant.

Majority of study participant both from fuel station and security service giving agency workers had greater than five working days per week which is 89.8% and 84.8% respectively and there difference were statistically not significant.

From fuel station workers there are 47(23.9%) workers who had past exposure to dust and petrol vapour whereas among security workers there are 7(3.6%) workers and their difference were statistically significant.

In terms of past respiratory illness there were 36 (18.3%) workers who had past respiratory illness and among security service giving agency workers there were 7 (3.6). there difference were statistically significant (Table 3).

Table 3: work related factors of fuel station and security service giving agency workers of Addis Ababa, Ethiopia 2019

Variable	Gas station	Security workers	P-value
Work experience			
<=5year	88(44.7)	184(93.4)	0.001
5.1-10	62(31.5)	6(3)	
>10.1	47(23.9)	7(3.6)	
Working hour per day			
<=8hr	108(54.8)	19(9.6)	0.001
>8hr	89(45.2)	178(90.4)	
Working day per week			
<=5day	20(10.2)	30(15.2)	0.13
>5day	177(89.8)	167(84.8)	
Past exposure to dust and petrol vapour	47(23.9)	6(3)	0.001
Past respiratory illness	36(18.3)	7(3.6)	0.001
OSH training	74(37.6		

5.3. Behavioural factors

Ever cigarette smoker among fuel station and security service giving agency workers were 30 (15.2%) and 17 (8.6%) respectively and the difference were statistically significant. Whereas current smoker were12 (6.1%) and 6 (3%) among fuel station and security service giving agency participants respectively. The difference was not statistically significant.

Large number of fuel station workers 150 (76.1) had Cooking habit than security service giving agency workers 46 (23.4) and there difference were statistically significant.

Using Respiratory protective devices were not common among fuel station workers. There were only 3 (1.5%) of fuel station workers used. The main reasons mentioned by the respondents for not using of RPE were not comfortable 118(59.9%), not available 46(23.4%), petrol vapour is not harmful 22(11.2%) and other reason like not allowed by

the company is 8(4.1%). In terms of occupational and safety training 74(37.6) workers were received the training through their respective companies (Table 4).

Table4: Behavioural factors of fuel station and security service giving agency workers of Addis Ababa, Ethiopia 2019

Variable	Gas station	Security workers	P-value
Ever smoker	30(15.2)	17(8.6)	0.043
Current smoker	12(6.1)	6(3)	0.75
Passive smoker	9(4.6)	5(2.5)	0.278
Cooking food at home			
Yes	150(76.1)	46(23.4)	0.001
No	47(23.9)	151(76.6)	
Family history of respiratory illness	22(11.2)	14(7.1)	0.163
PPE use	3(1.5)		
Reason for not using			
Not available	46(23.4)		
Not comfortable	118(59.9)		
Petrol is not harmful	22(11.2)		
Other	8(4.1)		

5.4.Prevalence of chronic respiratory symptoms

As shown in Table 5, the prevalence of at least one chronic respiratory symptom among fuel station workers and control group were 48.7% and 24.4% respectively. After adjusting factors that had significant difference between the two groups, the difference in prevalence ration of respiratory symptoms were statistically significant for wheezing, shortness of breath and at least one chronic respiratory symptom but it is not statistically significant for chest pain, cough and cough with sputum.

fuel station worker had 2.1 times higher risk of developing at least one respiratory symptom than security service giving agency worker and it is statistically significant at p value of <0.001.

Table 5 Prevalence of respiratory symptoms among fuel station and security service giving agency workers of Addis Ababa, Ethiopia, 2019

Variable	Gas station(n=197)	Security worker(n=197)	Prevalence ratio at 95%CI	p-value
Cough	39(19.8)	18(9.1)	1.54(0.73-3.27)	0.258
Cough with sputum	25(12.7)	11(5.6)	1.58(0.6-4.143)	0.354
Wheezing	39(19.8)	16(8.1)	2.37(1.14-4.91)	**0.021**
Chest pain	15(7.6)	10(5.1)	1.16(0.45-2.97)	0.763
Shortness of breath	58(29.4)	35(17.8)	2.02(1.2-3.5)	**0.01**
At least one chronic respiratory symptom	96(48.7)	48(24.4)	2.1(1.43-3.1)	**0.0001**

CI (confidence interval), while adjusting for marital status, educational level, cooking habit, work experience, working hour per day, past exposure to dust and petrol vapour, past respiratory illness, and ever smoker.

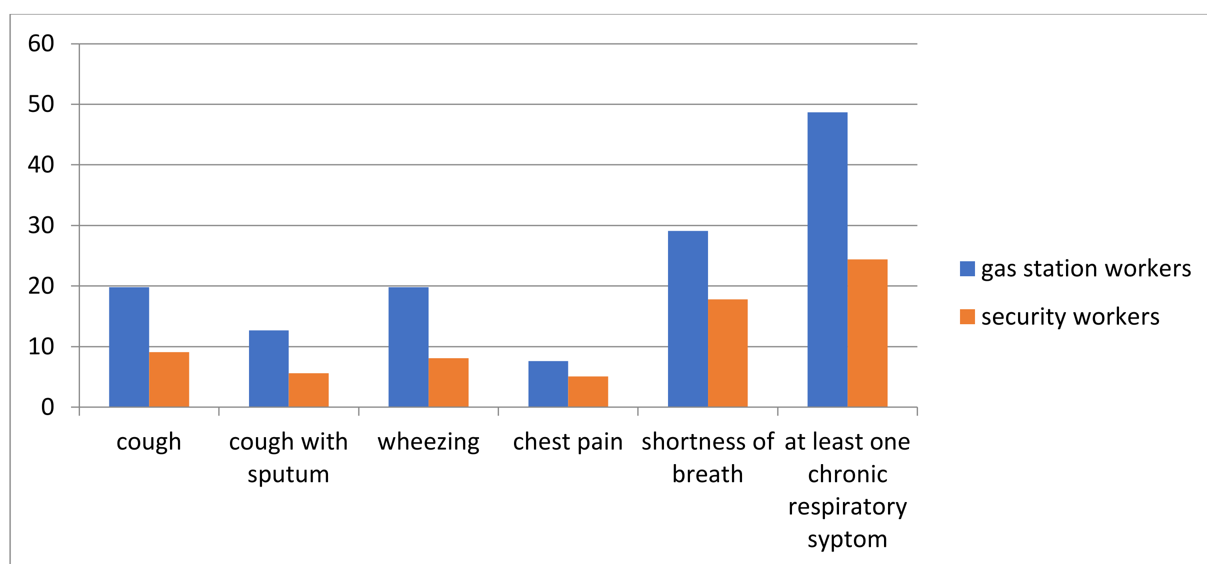


Figure 3: prevalence of chronic respiratory symptoms among fuel station and security service giving agency workers

5.5. Chronic respiratory symptoms and associated factors

5.5.1. Bivariate analysis

Age of participants, work experience, marital status, income, past history of respiratory diseases, OSH training, cooking habit, ever smoker passive smoker, past exposure to petrol vapour and dust and family history of chronic respiratory illness were associated with chronic respiratory health symptoms in bivariate analysis ($p < 0.2$) (Table 6,7,8).

Variables which have an association with the outcome variable at $p < 0.2$ were entered into multivariate logistic regression to control the possible effect of confounders.

Table 6: Bivariate analysis of socio demographic factors and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019 (N = 394)

Variable	A least one chronic respiratory symptom		COR(95%CI)	p-value
	yes	no		
Age:- 19-27	31	95	1	
28-37	49	81	1.085(1.082-3.177)	0.025*
38-60	64	74	2.65(1.567- 4.483)	0.0001*
Sex				
Male	132	223	1.33(0.653-2.718)	0.431
Female	12	27	1	
Marital status				
Married	97	142	1	
Single	40	103	0.569(0.64-.889)	0.232
Divorced	7	5	2.049(0.632-6.645)	0.013
Educational status				
Can't read and write	7	16	1.212(0.479-3.067)	0.685
Primary	44	100	0.829(0.33-2.065)	0.687
Secondary	64	102	0.672(0.248-1.818)	0.433
Diploma and above	27	34	1	
Religion				
Orthodox	106	168	0.548(0.299-1.003)	0.051*
Muslim	18	38	0.826(0.347-1.680)	0.503
protestant	18	46	1	
Income				
<=1500	71	93	2.224(1.263-3.915)	0.108
1500-2000	23	67	1.528(1.827-2.650)	0.006*
>2000	50	90	1	
Energy use				
Electric	38	53	1	
Biofuel	48	57	1.175(0.667-2.07)	0.578

Note: 1.00= reference, CI- confidence interval, COR- crude odds ratio, hr.-hour, resp.-respiratory, * -Variables which were included in the multivariable analysis, Biofuel (coal, wood, and gas), $p < 0.05$

Table7: Bivariate analysis of working environmental factors and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019 (N = 394)

Variable	**A least one chronic respiratory symptom**		**COR(95%CI)**	**p-value**
	Yes	**No**		
Work experience				
<5	99	206	1	
>5	45	44	2.128(1.317-3.438)	0.002*
Working hr. per day				
<=8hr	58	69	1	
>8hr	86	181	1.74(1.26-685)	0.013*
Past exposure				
Yes	30	23	2.597(1.443-4.676)	0.001*
No	114	227	1	
Past resp. illness				
Yes	36	6	11.5(4.992-26.824)	0.000*
No	108	243	1	
OSH training				
Yes	31	43	1	
No	113	207	1.321(0.789-2.212)	0.29

Table 8: Bivariate analysis of behavioural factor and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019 (N = 394)

Variable	**A least one chronic respiratory symptom**		**COR(95%CI)**	**p-value**
	yes	**No**		
Ever smoker				
Yes	22	25	1.623(0.878-2.998)	0.122*
No	122	225	1	1
Current smoker				
Yes	9	9	1.231(0.379-4.0)	0.73
No	13	16	1	
Passive smoker				
Yes	10	4	4.59(01.412-14.91)	0.011*
No	134	246	1	
RPE use				
Yes	2	1	1	
No	142	249	3.51(0.315-39.02)	0.307
Family history				
Yes	21	15	2.675(1.331-5.373)	0.004*
No	123	235	1	
Cooking habit				
Yes	86	110	1.887(1.245-2.861)	0.003*
No	58	140	1	

5.5.2. Multivariable logistic regression analysis

After controlling the possible effects of confounders, three variables; past exposure to dust and petrol vapour, past respiratory illness and passive smoker were became statistically significant in the final model ($p < 0.05$).

Past exposure status to dust and petrol vapour of respondents were significantly associated with development of at least one chronic respiratory symptom. The odds of developing at least one chronic respiratory symptom among Study participant who have past exposure to dust and petrol vapour were 2.41 times higher than study participants who didn't have past exposure(AOR = 2.41, 95% CI; 1.24 – 4.68, p = 0.01).

History of past respiratory disease among respondent also significantly associated with development of at least one chronic respiratory symptom. Study participants who had past respiratory illness have 9.5 times higher risk of developing chronic respiratory symptom than study participants who don't have history of past respiratory illness (AOR =9.54, 95% CI; (3.91-23.28), $p < 0.001$).

Study participants those are passive smokers (those who live with smokers) have higher risk of developing chronic respiratory disease. The odds of developing at least one chronic respiratory disease among passive smoker is 4.21 times higher than non-passive smokers of study participant (AOR=4.21, 95%CI (1.19-14.86), P=0.026 (Table 9).

Table 9: multivariate analysis of associated factors and chronic respiratory symptoms among fuel station and security service giving agency workers in Addis Ababa, Ethiopia, 2019,(N = 394)

variable	**A least one chronic respiratory symptom**		**COR(95%CI)**	**AOR(95%CI)**	**p-value**
	yes	**No**			
Age 19-27	31	95	1	**1**	
28-37	49	81	1.854(1.082-3.177)	1.055(0.55-2.021)	0.21
39-60	64	74	2.650(1.567-4.483)	1.552(0.78 -3.09)	0.87
Marital status					
Married	97	142	1	1	1
Single	40	103	0.57(0.64-0.889)	0.59(0.334 -1.04)	0.46
Divorced	7	5	2.049(0.632-695)	1.619(0.43 - 6.1)	0.07
Religion					
Orthodox	106	168	0.55(0.30-1.00)	0.96(0.48-1.93)	0.92
Muslim	18	38	0.83(0.35-1.68)	0.98(0.39-2.44)	0.96
protestant	18	46	1	1	
Income					
<=1500	69	95	2.224(1.263-3.915)	1.618(0.84-3.12)	0.21
1500-2000	24	66	1.528(1.827-2.650)	1.516(0.79-2.90)	0.15
>2000	49	91	1	1	
Work experience					
<5	99	206	1	1	
>5	45	44	2.128(1.317-3.438)1	1.97(0.668-2.147)	0.546
Working hr. per day					
<=8hr	58	69	1.74(1.13-2.69)	1.49(0.86-2.6)	0.156
>8hr	86	181	1	1	
Past exposure					
Yes	30	23	2.6(1.44-4.67)	**2.41(1.24 - 4.68)**	**0.010****
No	114	227	1	1	
Past resp. illness					
Yes	36	6	11.5(4.99-26.82)	**9.54(3.91-23.28)**	**0.0001****
No	108	243	1	1	
Ever smoker					
Yes	22	25	1.62(0.88-2.99)	1.24(0.6 -2.56)	0.57
No	122	225	1	1	
Passive smoker					
Yes	10	4	4.59(01.41-14.9)	**4.21(1.19-14.86)**	**0.026****
No	134	246	1	1	
Family history					
Yes	21	15	2.68(1.33-5.37)	1.78(0.766 -4.13)	0.18
No	123	235	1	1	

Note: 1.00= reference, CI- confidence interval, COR- crude odds ratio, AOR- adjusted odds ratio, hr.-hour, resp-respiratory, -Variables which were statistically significant in the final model (p < 0.05)**

5.6. Pulmonary function test

The independent sample t-test analysis showed that the mean score of pulmonary function Parameters (FVC, FEV1, FEV1/FVC) in the fuel station workers were lower than security service giving agency workers. By controlling age, weight, height and BMI in the multiple linear regression model, the differences observed in the values were statistically significant for FVC and FEV1 at $p \leq 0.05$. However, there was no significant difference for the ratio of FEV1/FVC (Table 7).

Table 10: Comparison of pulmonary function parameters of fuel station and security service giving agency workers of Addis Ababa, Ethiopia 2019

Parameters	Fuel station workers(n=50)	Security workers(n=50)	p-value
FVC	3.96±0.72	4.37±0.8	0.05
FEV1	3.3±0.64	3.69±0.77	0.032
FEV1/FVC	82.9±5.4	84.2±5.7	0.317

5.6.1. Distribution of pulmonary function test with duration of employment

One way ANOVA result showed that as the time of exposure increases the mean value of the lung function parameters (FVC, FEV1 and FEV1/FVC) decreases among fuel station workers. The reduction in FEV1 parameter (2.96±0.58) is statistically significant(P-value=0.028) among workers exposed for more than 10 year at p-value of less than 0.05 compared with less duration of exposure.

Table 11: One Way ANOVA results distribution of pulmonary function tests in fifty (50) fuel station workers by duration of exposure, Addis Ababa, Ethiopia 2019

parameter	Duration of employment			P -value
	1-5 year	6-10	>10	
	n=24	n=13	n=13	
FVC	4.16±0.54	3.19±0.91	3.61±0.69	0.077
FEV1	3.51±0.47	3.19±0.81	2.96±0.58	0.028*
FEV1/FVC%	84.33±5.2	81.21±6.1	81.82±5.4	0.176

Picture1: during performing of spirometer test at Bole NOC.

6. Discussion

By controlling variables that showed significant difference between the two groups this study identified at least one chronic respiratory symptom, wheezing and shortness of breath among fuel station workers were significantly higher than the comparison but there is no significant difference observed on prevalence of cough, cough with sputum and chest pain. Past respiratory disease, past exposure to dust and petrol vapour and passive smoking status were found associated factors for the development of at least one chronic respiratory symptom. By controlling age, height and weight during analysis of lung function parameters (FVC and FEV1) were found significantly reduced than security service giving agency workers but not for the ration of FEV1/FVC.

This study showed that prevalence ratio of at least one chronic respiratory symptom(P-0.0001), wheezing(P-0.021) and shortness of breath(P-0.01) were significantly higher among fuel station workers but cough, cough with sputum and chest pain were not significantly different compared to security service giving agency workers. This finding was partially consistent with studies done in Dares' Elam Tanzania which indicated significantly higher prevalence of chronic respiratory symptoms like cough(P-0.0001), cough with sputum(P-0.001), wheezing (0.0001) and shortness of breath(P-0.0001) compared with control (37). The discrepancy may be in this study factors that had significant difference between the two groups were controlled in the analysis. The higher prevalence among exposed group might be, since utilization of RPE is only 3 (1.5%), exposure to petrol vapour which is known by causing irritation to mucus membrane of the respiratory truck is high than security service giving agency workers.

In this study respondents those live with smokers (passive smokers) had significant association towards development of at list one chronic respiratory symptom with risk value of 4.21(95%CI: 1.19-14.86) it is consistent with the study conducted by international epidemiological association on development of symptoms of obstructive disease which showed exposure to environmental tobacco smoke have risk of 1.72(95%CI:1.31-2.23) (44). This may be passive smokers are exposed to environmental tobacco smoke which contain unfiltered smoke from end of cigarette and smoke exhaled from the smoker which consist of toxic substance that can affect respiratory truck and lead to development of chronic respiratory symptoms.

Past respiratory illness also significantly associated with development of at least one chronic respiratory symptom at p-value less than 0.05 and adjusted odds ratio of 9.54 (CI 3.91-23.28). It is consistent with study conducted in Dejen town among cement factory workers, workers who had previous chronic respiratory diseases experienced chronic respiratory symptoms more likely than workers who were free from previous chronic diseases (AOR = 7.79, 95 % CI = 2.02, 30.04) (28). This can be explained by the fact that the previous respiratory disease might affect the normal function of the respiratory system by causing airway obstruction and respiratory sensitization. This alteration may lead to the development of chronic respiratory symptoms. Pre-existing respiratory diseases may affect respiratory tract defence mechanism by causing increased susceptibility to the occurrence of the symptoms.

In this study past exposure to dust and petrol vapour also associated with development of at least one chronic respiratory symptom. Participants those had previous exposure to dust and petrol vapour had AOR 2.41(95%CI; 1.238-4.68) time higher risk than non-exposed group at p value of 0.01. This result is consistent with study finding among pharmaceutical workers of Addis Ababa which showed that study participants those had previous dust and chemical exposure have higher risk (COR 2.4 95% CI; 1.-4.68) and (COR 2.24 95% CI;1.42-3.53) of developing respiratory symptoms than noon exposed group respectively (38). This can be exposure to dust and petrol vapour may result in occupational asthma and chronic obstructive pulmonary disease that may aggravate the occurrence of respiratory symptoms.

The result of this study showed that, by controlling weight height and age, statistically significant reduction were seen in the mean values of FEV1 and FVC at P value of 0.032and 0.05 respectively among fuel station workers as compared with security service giving agency workers. However, the reduction in ratio of FEV1/ FVC were not statistically significant, $p>0.05$.This study results were consistent with study conducted in India among Kanchapuram population workers of fuel station (8). Also, the findings of this study were consistent with study conducted in Agarta, India in terms of FVC and FEV1 (39). However, in this study, FEV1/FVC were not significant, this might be due to respondent's bias specially some participants were not voluntary to tell their exact age and observer variation during height and weight measurements.

The result of this study showed that as the time of exposure increases the mean value of the lung function parameters (FVC FEV1and FEV1/FVC) decreases among fuel station workers. The reduction in FEV1 parameter (2.96±0.58) is statistically significant(P-value=0.028) among workers exposed for more than 10 year at p-value of less than 0.05 compared with less duration of exposure. this result is consistent with the study conducted in Amristar, India it shows statistical reduction of FEV1 when compared lung function status of works in terms of their work experience (2). This reduction may be due to increase exposure to petrol vapour as service year of fuel station works increase.

7. Strength and limitations of the study

7.1. Strength of the study

- This is the first study to assess the prevalence of chronic respiratory symptoms, associated factors and lung function among fuel station workers in Ethiopia.
- Spirometer measurement was conducted by trained professional. It gives an important clue in terms of lung function parameters and it is free form participant induced bias.
- Comparative study design is used.

7.2. Limitations of the study

- Participants recall bias on age, past respiratory illness and past dust and petrol vapour and data collector’s observation error on measurement of height and weight may under or overestimate the study result.
- It was difficult to get exact much of the study subject for comparative group.

8. CONCLUSION

Based on the finding of this study, it can be concluded that prevalence of chronic respiratory symptoms were higher among fuel station workers than security service giving agency workers. Past exposure to dust and petrol vapour, past respiratory illness and passive smoker status, are the determinant factors for occurrence of chronic respiratory symptoms.

The pulmonary function parameters FEV1 and FVC were decreased significantly among fuel station works than security service giving agency workers. Chronic exposure in petrol pump workers for more than 10 year revealed statistical significant reduction on lung function parameter of FEV1. In general, the results of this study concluded that fuel station workers have high risk of developing chronic respiratory symptoms and reduction of lung function parameters than security service giving agency workers.

9. RECOMMEDATION

Based on study findings, the following important measures are recommended to protect and improve the respiratory health of fuel station workers of Addis Ababa, Ethiopia.

For, petrol distributing company

- To minimize workers exposure to petrol vapour it will be better if the refuelling activity be self-serviced in the long run.

For fuel station owners

- Pulmonary function test should be pre-employment check up to measure the degree of lung function reduction.
- Appropriate PPE especially respiratory protective devise should be regularly availed and provided to the workers.
- Training on occupational health and safety should be provided regularly

For fuel station workers

- Workers should use provided RPE properly.

For Biro of Labour and Social Affairs and Addis Ababa Food, Medicine, Health Administration and Control Authority

- The City Bureau of Labour and Social Affairs should develop detailed rules and regulation especially on occupational health and safety jointly with Addis Ababa food medicine health administration and control authority.
- There should be regular monitoring to ensure the implementation of these rules and regulations.

For Ministry Of Trade

Before giving trade licence to the fuel station there should be prerequisite of certification by MOLSA/FMHACA on occupational health and safety.

Finally farther longitudinal study should be conducted for the future to show strong evidence on long term exposure of petrol and lung function reduction among fuel station workers.

10.REFERENCES

1. Rodney R. Building the ecological city cambridge england: woodhead publishing limmited; 2002. 101]. Available from: https://books.google.com.et/books?id=FzPKs9Rnx2QC&printsec.
2. Aparjita, Neeraj P, Sharma R. A Study on the Lung Function Tests in Petrol-Pump Workers. Journal of Clinical and Diagnostic Research. 2011;5(5):1046-10501.
3. Sangotola T, Fasanmade P, Ayanrinde W, Olatinwo I, Olaniran H. On the effects of petrol stations in Nigeria. International Journal of Science, Engineering and Technology Research (IJSETR). 2015;4(4).
4. Jacob V, manwell B. Spirometry in Fuel Station Attendants: a Comparative Study malta medical jornal. 2015;27(02).
5. Gayatri B, Nila S, Anjaly M, Sanjeev N, Vijayakumar K, Anitha K. Low Pulmonary Function in Petrol Pump Workers in Trivandrum City. 2014;16(13).
6. Singhal M, Khallq F, Singhal S, Fandon O. pulmunary functions in petrol pump worker:a prelliminary study. indian jornal of physiology and pharmacology. 2007;51(3):244-48.
7. Bamidele A. Pulmonary Function And Symptoms Among Petrol Pump Attendants In Nigeria. biological and medical research. 2014;5(1): 3780-4.
8. Madhuri B, Chandrashekar M, Ambareesha K, Qairunnisa S, Suresh M, Lalitha A. A study on pulmonary function test in petrolpump workers in kanchepuram population. International Journal of Biological and Medical Research. 2012;3(2).
9. Sandip M, Prashant M, Avinash E, Yuganti P. lung function test in petrol pump workers. National Journal of Physiology, Pharmacy & Pharmacology. 2012;2(1):71-5.
10. Sadiqua B. Pulmonary function test in petrol filling workers in Mysore city park j phisiol. 2012;8(1).
11. Mandhuri B, Chandrashekar M, Ambareesha K, Qairunnisa S, Suresh M, Lalitha A. A study on pulmonary function test in petrolpump workers in kanchepuram population. BioMedSciDirect Publications 2012;3(2):1712-4.
12. Yoseph A, Yalemtsehay M. Spirometric lung function tests in normal non-smoking Ethiopian men and women. 1985;40:465-8.
13. WHO. global status report on non comunicable disease. 2014.
14. non communicable disease country profile [Internet]. world health organization. 2014 [cited august 2018]. Available from: www.who.int/nmh/countries//eth-en.pdf.
15. Zafar M. Correlation of respiratory symptoms and spirometric lung pattern among petrol pump workers Karachi, Pakistan: Cross-sectional survey. International Journal of Health System and Disaster Management. 2016;4(1):36-40.
16. Sumathi P, Neelambikai N. Evaluation of pulmonary functions in petrol pump workers. Indian Journal of Clinical Anatomy and Physiology. 2016;3(2):189-94.
17. Rutaba A, Amsa Z, Asmara G, Aiman N, Quratulain A, Fauzia I. Lung function abnormalities among fuel filling workers in karachi, pakistan. Pinnacle Environmental and Earth Sciences. 2014;1(1):1-5.
18. Rahul, Sangeeta V, Manisha S, Jitendra G. Spirometric evaluation of the pulmonary functions in the petrol pump workers of Jaipur city, Rajasthan, India. 2016;3(11).
19. Institute for Health Measuring and Evaluation. Measuring what matters. Univercity of Washington: institute for health measuring and evaluation, 2016.
20. Bekele K. Ethiopian petrolium supply Entrerprise plans to build 160 gas stations. reporter. 12 may 2018.
21. Samira S, Nahida H, Hans S, Katrien L, Linda B, etal. Occupational Exposure to Petroleum Products and Respiratory Health. Occupational and Environmental Medicine. 2012;54.
22. Michelle C, Jeffrey C, James V, Samuel A, Dori G, Kenneth K, et al. It is all about sex: male-female differences in lung development and disease. Trends Endocrinol Metab. 2007.

23. Joyashree B, Anindya R, Anilbaran S, Pranab Kumar D, Achyut G, Anubrata D. Association of Body Mass Index (BMI) with Lung Function Parameters in Non-asthmatics Identified by Spirometric Protocols. Journal of Clinical and Diagnostic Research 2014;8(2).
24. Alfrayh A, Khoja T, Alhusain K, Alshehri SG, A, Madani M. FEV1 and FVC pulmonary function reference values among 6–18-year-old children: a multi-centre study in Saudi Arabia. east mediterr jornal 2014;20(7).
25. Shonga Y, Siziya S. Association between exposure to fuel and respiratory health among fuel attendants in Ndola, Zambia. Asian pacific journal of health sciences. 2015;2(4):27-32.
26. Nazia U, Khaja M, Santhosh K, Nusrat A, Anthony D, Devender R. Impact of organic solvent and environmental pollution on the physiological function in petrol filling worker. environmental research and public health. 2008;5(3):139-46.
27. Addis Ababa population.Retrieved 2019-10-31. Available from: http://wrldpopulationreview.com/world-cities/addis-ababa/.
28. Zemichael G, Bamlaku Y, Takele T. Chronic respiratory symptoms and associated factors among cement factory workers in Dejen town, Amhara regional state, Ethiopia, 2015. Multidisciplinary Respiratory Medicine. 2016;11.
29. Matthew G, Trishul S, Muhammad A, Ali S, Adolfo R, and ES, et al. Socioeconomic status and COPD among low- and middle-income countries. international jornal of COPD. 2016:2497-507.
30. ILO. personal protection. personal protective equipment2004.
31. Laurelize P., Marta R., Marlise C. CA, Mara S. VZ. use of personal protective equipment by gas stations workers: a nursing contribution. 2014;23(1):193-202.
32. Udonwa N, Uko K, Ikpeme M, Ibanga A, Okon O. exposure of petrol station attendants and authomechanics to petrolium motorspirit fumes in Calabra, Nigaria. journal of environmental and public health 2009;2009(1):5.
33. Arpana B, Kaarna M, Hemalatha D, Shiva Krishna G. pulmonary function tests in petrol pump workers in chittoor district. International Journal of Physiotherapy and Research. 2014;2(1):354-58.
34. Singhal M, Khaliq F, Singhal S, Tandon O. pulmonary functions in petrol pump workers : a preliminary study. indian journal of phsiology and pharmacology. 2007;51(3):244-8.
35. Ravi S, Anjali B, Bharat D. A study on spirometry in petrol pump workers of Ahmedabad, India. indian chest society. 2015;32(4):342-52.
36. The 2007 Population and Housing Census preliminary Results of Ethiopia. Addis Ababa: Central Staisical Authority(CSA), 2009.
37. Rivinus L. Respiratory health problems among petrol pump attendants. Dissertation Research2016.
38. Asfaw S, Enquselassie F, Tefera Y, Gizaw M, Wakuma S, Woldemariam M. Determinants of Chronic Respiratory Symptoms among Pharmaceutical Factory Workers. Journal of tropical medicine. 2018;2018:10.
39. Debasish C, Mohit A, Debasish P. A comparative evaluation of respiratory indices in petrol station workers of agartala. international jornal of basic and and aplied physiology 2016;5(1).
40. Walaiporn P, Alan F, Silom J, Sarayut L, Boonsin T. Occupational Tasks Influencing Lung Function and Respiratory Symptoms Among Charcoal-Production Workers: A Time-Series Study. safety and health at work. 2016:250-57.
41. National, Health, and, Nutrition, Examination, Survay. Respiratory health. Spirometry procidures manual CDC; 2008.
42. Heather R, Angela T, Joe G. Adult Current Smoking: Differences in Definitions and Prevalence Estimates -NHIS and NSDUH, 2008. Journal of Environmental and Public Health. 2012.
43. Miller J, Hankinson V, Brusasco F, Burgos R, Casaburi A, Coates P, et al. Standardisation of spirometry. europian respiratory jornal. 2005;26(2):319-38.
44. Anthony S, David A, Michael D. passive smoking and chronic respiratory ddisease syptoms in non smoking adults. international jornal of epidemiology. 1993;22(5):809-17.

ANNEXES

Annex I: participant Information sheet

My name is __________________. I am working as a data collector for the study conducted in this fuel station by Bezayit Girma who is studying for her Master's degree at Addis Ababa University, Collage of Health Science, and School of Public Health. I kindly request you to give me your attention to explain you about the study and study participant.

The study title: Assessment of lung function and prevalence of chronic respiratory symptom among fuel station workers in Addis Ababa, Ethiopia

Purpose of the study: The main aim of this study is to write a thesis as a partial fulfillment of a Master's degree in public health for the principal investigator. After completion of this study the results used as evidence and input to reduce the potential health risk of exposure to petrol vapor.

Procedure and duration: I will be assessing chronic respiratory symptoms by using Questionnaires, pulmonary function by using Spirometer that needs your full cooperation and this may take few minutes, and the procedures will take place in your working environment.

Risks and benefits: Risk of participating in this study is nil since the study does not have invasive procedure and need collecting any samples. There would have no any direct benefits for being study participant but indirectly the findings from this research will be important for improving occupational health safety practice, information for the gas stations and for scientific knowledge.

Confidentiality: All information forwarded kept confidential and names will not be written.

Rights: Giving permission for this study is voluntary. You have the right to permit or not for this study. If you decide to permit the study, you have the right to terminate the study at any time if you consider something related to the study is wrong.

Contact address: If you have any question, which is not clear, you can contact the investigator.

Investigator: Bezayit Girma

Mob +251-911 39 16 02 Email:- bezayitgirma@gmail.com

Advisor: Dr. Abera Kumie, 0911882912

Addis Ababa University, school of public health

Annex II. Informed consent form

Detail information about the study explained to me. I have understood that the objective of this study is to assess chronic respiratory symptoms, pulmonary function, and associated factors in workers of gas station.

In addition, I understand about how the data collection is proceeding and the time it takes to complete the data collection. I also understand that the research imposes no risk on me. I assured that there would be confidentiality of my response and collected data used only for the study.

It also explained to me that I have the right to stop participation at any time.

In addition, I understood that participating in this study is important for scientific knowledge and base for further study. Therefore, I have now consented to participate in the study by signing this form.

Signature of participants________________________ date _____________________

Name and signature of data collector_______________________ date ____________

Annex III English Version Questionnaire

Addis Ababa University Health Science Collage, School of Public Health

A questionnaire designed to assess chronic respiratory symptoms and pulmonary function and associated factors among fuel station workers in Addis Ababa Ethiopia, 2018/19.

Data collection date: ___________

100. Work place code ___________

101. Status of workers fuel station worker = 1 federal police worker = 2

102. ID number of subjects_________________

Part I. Socio-demographic characteristics of respondents

s/no	Question	Response	skip
103	Sex(observe)	1. Male 2. female	
104	What is your age in complete year	----------- year	
105	What is your marital status	1. Single 2.married 3.Separated 4.Divorced 5. Widowed	
106	What is your religion?	1. Orthodox 2.Muslim 3.Protestant 4. Catholic 5. Others------------	
107	What was the highest level of education you attend?	1. Can't read and write 2. Can read and write 3. Education grade----------	
108	How much is your average monthly income in Ethiopia birr?	---------(complete in Ethiopia birr)	

Part II Occupational history

S/no	Question	Response	skip
201	For how long have you been working in this working area	Year and month-------------	
202	For how many working hour per day you have been working in this working area.	--------------------hour/day	
203	For how many working days per a week you have been working in this working area.	-----------------day/week	
204	How long have you been working in fuel station, summarizing all periods?		

205	Have you ever worked in similar working environment where there is petrol vapour or in dusty environment before?	1.yes 2.No		
206	If Q 205 answer is "Yes", for how long have you worked in any of the following types of work? (in years/months)	Work area	Service year	
		1.garage 2.petrol purifying 3.four processing 4.coblestone work 5.cement factory 6. other specify-----		
207	Are you normally cooking food at home?	1.yes 2.no		If no go to 301
208	Where is cooking normally taking places in your home?	1. Inside house 2.outside house in open area 3. in the kitchen		
209	What type of energy source mostly do you use for food preparation?	1. Charcoal 2. Fire wood 3. Kerosene 4.electricksity 5.LPG(liquefied petroleum gas) 6 other		

Part III. Respiratory symptoms of respondents

I am going to ask you some questions mainly about your chest. I would like you to answer Yes or No wherever possible

S/no	Questions	Response	Skip

A cough: - Is experience of a cough for 4 days or more per a week for at least three consecutive months in one year**.**			
301	Do you usually have a cough?	1. Yes 2. No	If "No" go to 306
302	When do you usually have a cough?	1.morning 2.day time 3.night time	
303	Do you usually cough for 4 days or more per a week?	1.Yes 2.No	
304	Do you usually cough for 3 consecutive months or more during the year?	1.Yes 2.No	
305	For how long have you had this cough?	------------------year	
	A Cough with sputum production related questions **A Cough with sputum :-** is sputum expectoration on most days of the week (5 days) for at least three 3 consecutive months in one year		
306	Do you usually cough with sputum?	1. Yes 2. No	**If no go 310**
307	When do you usually have cough with sputum?	1. morning 2. In the day time 3. At night	
308	Do you usually cough with sputum for 4 or more days in a week?	1. Yes 2. No	
309	Do you cough with sputum on most of days for as much as 3 consecutive months or more in a year?	1. Yes 2. No	
Wheezing Related Question **Wheezing:-is** a condition of causing wheezy or whistling sound heard during inhalation or exhalation (at least for three month in a year).			
310	Do you have wheeze/whistling/ sound in your chest?	1. Yes 2. No	**If "No" go to 313**

311	When you have wheeze/whistling/ sound in your chest?	1. In the morning. 2. In the daytime 3. At night More than one answer is possible	
312	For how long has this wheezy sound persisted?	---------------- years	
Breathlessness Related Question **Breathlessness:-**is discomfort or difficulty to breath in different activity			
313	Are you troubled with shortness of breath during hurrying or walking uphill	1.Yes 2.No	If No go to Q.N. 317
314	Have you had trouble of breathlessness while walking with a person of the same age?	1. Yes 2. No	
315	Do you have to stop for breath when walking at your own pace on the level ground	1. Yes 2. No	
316	For how long have you been this short of breath?	-------------(in year)	
Chest pain Related Questions			
317	In the past one year, have you experienced any chest illness that kept you off duty, or in bed?	1. Yes 2. No	**If "No" go to Q.n.401**
318	If you get a cold, does it usually go to your chest?	1. Yes 2. No	
319	Did you produce phlegm with any of these chest illnesses?	1. Yes 2. No	

Part IV Past respiratory illness

S.no	Questions	Response	skip
401	Have you experienced any respiratory illness, which is	1.Yes 2.No	If "No" go to Q.no.501

	confirmed by a physician before		
402	Have you ever had any of the following respiratory illness? (Mention all you had)	1.Asthma 2.Tuberculosis (TB) 3.Chronic bronchitis 4. Emphysema 5. Lung cancer 6. Any other chest illness	

Part V: Behavioral factors of workers

S.no	**Questions**	**Response**	**skip**
Ever smoker: - a person smoked at least 100 cigarettes in his entire life. **Currently smoker: -** a person who smoke cigarettes every day or some days. **Passive smoker:-** a person who never smoke cigarettes but live with smoker and exposed to environmental tobacco smoke.			
501	Have you ever-smoke cigarette?	1. Yes 2. No	**If "no" go to 506**
502	Do you smoke Cigarette Currently?	1.Yes 2.No	
503	How many cigarette normally do you smoke per day	---------(number of cigarette per day)	
504	how many days do you smoke per week?	--------days/week	
505	For how long have you been smoking?	--------year	
506	Is there any person who smoke cigarette in your home?	**1. Yes 2. No**	

Part VI. Respiratory protective devices

S.no	Questions	Response	Skip
601	Do you usually wear respiratory protective devices while at	1.Yes 2.No	If " No" go to 603

	work?		
602	Which of the following type of protective devices did you use? (choose all that you apply in your working area)	1. Mask respiratory 2. Full face pieces respiratory 3. Breathing apparatus 4. others________	
603	If Q601 answer is "No "Select the most appropriate reasons for not using	1. Not available 2. Not comfortable for work 3. Not provided by institution 4. The petrol fume not harmful 5. Others specify_____	
604	Do you ever have occupational health and safety training?	1. Yes 2. No	
605	Do you ever been supervised at work place on occupational safety issues?	1. Yes 2. No	
Part VII family history of respiratory illness			
701	Either of your natural parents ever told by a doctor that they had a chronic lung condition?	1.Yes 2. No	
702	Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:	1.Asthma 2.Tuberculosis (TB) 3.Chronic bronchitis 4. Emphysema 5. Lung cancer 6. Any other chest illness	

Name of data collector: ______________________________ signature______________

Checked by (supervisor name): __________________________signature_____________

Annex. IV Observational checklist for PPE usage and workplace environment

s/no	Questions	Observation		Comment
		Yes	No	
701	Is respiratory protective equipment available for each worker in the gas station			
702	Is respiratory protective equipment (RPE) provided?			
703	Is provided respiratory protective equipment properly used?			
704	Is there a written procedure for the selection, use and maintenance of PPE?			
705	Is personal protective utilized only when it is not reasonably practicable to eliminate or control the hazardous substance or process?			
706	Are the areas requiring PPE usage properly identified by warning signs?			

Annex V. Information sheet (Amharic version)

የስምምነት ማሰወቂያ ቅጽ

ስሜ………………ይባላል፡፡እዚህ የተገኘሁት የአዲስ አበባ ዩኒቨርስቲ ጤና ሳይንስ ኮሌጅ የህብረተሰብ ጤና ሳይንስ ትምህርት ቤት የድህረ-ምረቃ ተማሪ የሆኑት ቤዛይት ግርማን ወክዬ ነው፡፡ እሳቸውም ነዳጅ ማደያ ውስጥ በሚሰሩ ሰራተኞች የመተንፈሻ አካላት ችግርና መንስኤዎቻቸው ዙርያ ጥናት በመስራት ላይ ይገኛሉ፡፡ ይህንን ጥናት ለማካሄድ ተሳታፊ የሚሆኑትን በሎቶሪ የናሙና አወጣጥ ምልመላ ሲካሄድ እርሶ በዚህ ጥናት እንዲሳተፉ የተመረጡ ሲሆን ጥናቱ በሚካሄድበት ወቅት የመተንፈሻ አካላት ችግር መንስኤዎቻቸው ዳሰሳ ለማድረግ፤

1. ለጥናቱ የተዘጋጀ መጠይቅ እጠቀማለው

2. ቀላል ዘዴ በመጠቀም አተነፋፈስዎን እንለካለን ይህም የእርሶን ሙሉ ትብብር የሚጠ ይቅይሆናል፡፡ ስለሂደቱም አጭር ገለጻ ይደረጋል፡፡ልኬቱ የሚካሄደው ሥራ ቦታ ሲሆን የሚወስደው ጊዜ ከ 30-45 ደቂቃ ነው፡፡የምትሰጡን መረጃ ሁሉም ምስጢራዊነቱ የተጠበቀና ቅፅ ላይ ስም አይሰፍርም፡፡ ከጥናቱ በቀጥታ የሚገኙት ጥቅም የለም፡፡ ነገር ግን በተዘዋዋሪም ጥናቱ በነዳጅ ማደያ ውስጥ በሚሰሩ ሰራተኞች ላይ የሚታዩ የመተንፈሻ አካላት ችግሮች ለመከላከልና ለመቆጣጠር ትልቅ አስተዋፅኦ ይኖረዋል፡፡ በተጨማሪም ለቀጣይ ምርምር መሰረት በመሆን ያገለግላል፡፡

እንዲሁም ይህንን ጥናት መሰረት በማድረግ መንግስትና የተለያዩ ባለድርሻ አካላት ትኩረት በመስጠት ችግር ላይ የራሳቸው አስተዋፆ እንዲያደርጉ ይረዳል ብዬ አስባለሁ፡፡ስለዚህ የእርሶ ተሳትፎ ለዚህ ምርምር ጠቃሚ ነው፡፡በዚህ ምርምር መሳተፍ ምንም አይነት ጎንዮሽ ጉዳት አይኖረውም፡፡ስለዚህ በጥናቱ መሳተፍምሆነ አለመሳተፍ የእርሶ መብት ነው፡፡ ከጥናትጋር ተያያዥ ጥያቄ ካለዎት ወይም ተጨማሪ መረጃ ከፈለጉ ከአዲስአበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ የህብረተሰብ ጤና ሳይንስ ትምህርት ክፍልን ወይም ጥናት አድራጊውን በሚከተለው አድራሻ ማግኘት ይችላሉ፡፡

ጥናት አድራጊ፡-ቤዛይት ግርማ ስልክ ስልክ+251-911882912

ስልክ+251-911391602

አማካሪ፡-ዶ/ር አበራ ቁሜ

Annex VI. Informed consent (Amharic version)

የስምምነት መዋዋያ ቅጽ

ጥናቱን በሚያካሂደው አካል ስለጥናት በቂ መረጃ ተሰጥቶኛል። የዚህ ጥናት ዓላማም የአተነፋፈስ ችግሮችንና መንስኤዎቻቸውን ማጥናት መሆኑን ተረድቻለሁ። ከኔ የሚወሰደው መረጃ በእኔ ላይ ምንም ዓይነት ጉዳት የማያስከትልናመረጃውን ለጥናት ዓላማ ብቻ እንደሚውል ተረድቻለሁ።

ማንኛውም እኔን የተመለከተ መረጃ ሚስጥራዊነቱ የተጠበቀ ነው። እንደዚሁም በጥናቱ ለመሳተፍ ፍቃደኛ ካልሆንኩ በጥናቱም ለመሳተፍ እንደማልገደድ ነገር ግን በዚህ ጥናት መሳተፌ ለሳይንሳዊ ዕውቀት ጠቃሚ መረጃ የማበርከትና ወደፊት በዚህ ዙሪያ ለሚሰሩ ስራዎች መሰረት የሚሆኑ ግብዓት መስጠት እንደሚችል ተረድቻለሁ። በመሆኑም በዚህ ጥናት ላይ ለመሳተፍ የተስማማሁ መሆኔን በፊርማዬ አረጋግጣለሁ።

የተሳታፊው ፊርማ……………………… ቀን……………………….

መረጃሰብሳቢ ስምናፊርማ…………………………… ቀን……………………

Annex VII. Amharic version questionnaire

የሀ መጠይቅ በ2011 ዓ.ም የአዲስ አበባ ነዳጅ ማደያ ሰራተኞችን የመተንፈሻ አካል ችግርና መንስኤዎቻቸውን ለማጥናት የተዘጋጀ መጠይቅ ነው።

የአዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ የሕብረተሰብ ጤና ትምህርት ቤት

ቃለ-መጠይቅ የተደረገበት ቀን_______________________

100. የስራቦታው ኮድ_____________________

101. የተሳታፊ ሁኔታ 1. ነዳጂ ማደያ ላይ የሚሰሩ 2. በነዳጅ ማደያ ውስጥ የማይሰሩ

102. መለያ ቁጥር ____________________

ክፍልአንድ፡- ማህበራዊ ሁኔታ መስፈርት

ተ.ቁ	ጥያቄ	ምላሽ	ይለፉ
103	የተሳታፊው ፆታ ምንድነ?	1. ሴት 2. ወንድ	
104	እድሜዎ ስንት ነው በሙሉ አመት	---------------------አመት ነው	
105	የጋብቻ ሁኔታ እንዴት ነው?	1. ያላገባ(ች) 2. ያገባ(ች) 3. ተለያይተው የሚኖሩ 4. የፈታ(ች) 5. የሞተበት(ባት)	
106	ሐይማኖቶ ምንድነው?	1.ኦርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ካቶሊክ 5. ሌላካለይግለፅ-----------	
107	ከፍተኛው የተከታተሉት ትምህርት ደረጃ	1. ማንበብና መፃፍ የማይችል 2. ማንበብናመፃፍ የሚችል 3. የትምህርት ደረጃ-------------	
108	አማካኝ ወርሃዊ ገቢ በብር ምን ያክል ይሆናል?	-------(በኢትዮጵያ ብር ይግለፁ)	
ክፍል ሁለት የስራ ሁኔታ			
201	አሁን በሚሰሩበት የሥራ ቦታ ስንት ዓመት ሰርተዋል?	----------በአመት ና በወር ይግለፁ	

202	አሁን በሚሰሩበት የስራ ቦታ ውስጥ በቀን ምን ያክልሰዓት ይሰራሉ?	------------ በሰአት/በቀን	
203	አሁን በሚሰሩበት የስራ ቦታ ውስጥ በሳምንት ስንት ቀን ይሳራሉ?	-------- (የቀንብዛት/በሳምንት)	
204	በአጠቃላይ ነዳጅ ማደያ ድርጅት ውስጥ ለምን ያህል አመት ሰሩ?	-------------በአመት	
205	ከአሁን በፊት ከነዳጅ ማደያ ጋር ተመሳሳይነት ያለው ወይንም አቧራማ የስባ አካባቢ ላይ ሰርተው ያውቃሉ?	1. አዎ አውቃለሁ 2. 2. አላውቅም	
206	ለጥያቄ ቁጥር 205 መልስዎ አዎን ከሆነ በየተኛዉ የሥራ ክፍል ለምን ያክልጊዜ ሰርተዉ ነበር? (ከአንድ በላይ መልስ መስጣት ይቻላል)	1. ጋራጅ 2. የነዳጅ ማቀነባበሪያ ድርጅት 3. በዱቄት ማቀነባበሪያ ውስጥ 4. የኮብል እስቶን ስራ 5. በሴምንቶ ማምረቻ ውስጥ 6. ሌላ ካለ ይገለፅ-----	
207	ምግብ እቤት አብስለዉ ነዉ የሚጠቀሙት?	1አዎ 2. ዐይደለም	መልሱ አይደለም ከሆነ ወደ ጥያቄ ቁጥር 301ይዝለሉ
208	መልስዎ ለጥያቄ 207 አዎን ከሆነ ምግብ የሚሰሩበት ቦታ የት ነዉ?	1. እቤትዉስጥ 2. እደጅ ክፍት ቦታ ላይ 3. ኮሽና ወስጥ	
209	ምግብ የሚያበስሉት ምን በመጠቀም ነዉ?	1. ከሰል 2. እንጨጥ3. ጋዝ 4.የኤሌትሪክ ሃይል5.የሲሊንደር ጋዝ 6 ሌላ ካለ ይግለፁ-----------	
ክፍል ሶስት፡-የአተነፋፋስ ስርዓት ምልክቶችን የተመለከቱ ጥያቄዎች			

301	አብዛኛው ጊዜ ያስለዎታል?	1. አዎ 2. አያስለኝም	መልሱ አስያስለኝም ከሆነ ወደ ተራ ቁጥር 306 ይሻገሩ
302	መቼ መቼ ነው አብዛኛውን ጊዜ የሚያስሎት?	1. ጠዋት 2.ቀን ላይ 3. ማታ	
303	አብዛኛው ጊዜ በሳምንት 4 ቀን ወይም ከዛ በላይ ያስለዎታል?	1. አዎ 2. አያዉቅም	
304	አብዛኛው ጊዜ ለተከታታይ 3 ወርናከዛ በላይበ 1 አመት አስሎዎት ያውቃል?	1. አዎ 2. አያዉቅም	
305	ይህ ሳልለምን ያክል ዓመት ነበረብዎት	______________ዓመት	
አክታ ያለበትን ሳል በተመለከተ			
306	አብዛኛው ጊዜ አክታ ያለበት ሳል ነበረብዎት?	አዎ 2 የለብኝም	የለብኝም ካሉ ወደጥያቄ 310 ይለፉ
307	በአብዛኛው መቼ መቼ ነው አክታ ያለበት ሳል ያለቦት?	1. ጠዋት 2. ቀን 3.ማታ	ከአንድ በላይ መልስ መስጠጥ ይቻላል
308	አብዛኛው ጊዜ 4 ቀን ወይም ከዛ በላይ በሳምንት አክታያለበትሳል ነበረብዎት?	አዎ 2 የለብኝም	
309	በአመት እንደዚህ አይነት አክታያለበት ሳል በአብዛኛው ቀናት ለተከታታይ ሶስት ወር ነበረብዎት?	አዎ 2 የለብኝም	
የማንኮራፋት ድምፅ በተመለከተ			
310	ከደረት የማንኮራፋት ወይም የማፏጨት ድምፅ ያሰማሉ ወይ?	አዎ 2 የለብኝም	የለብኝምካሉወደ ጥያቄ 313 ይለፉ
311	ከደረት የማንኮራፋት ወይም	1. ጠዋት 2. ቀን 3. ሌሊት	ከአንድ በላይ

	የማፏጨት ድምፅ የሚሰማዉመቹ ነዉ?		መልስ መስጠት ይቻላል
312	የማፏጨት ማሰማትከ ጀመሩ ምን ያክል ዓመት ሆነዎት?	----------አመት	
ትንፋሽ ማጠርን በተመለከተ			
313	ደረጃ ወደ ላይ ወይም ተራራ ሲወጡ ትንፋሽ ያጥሮታል?	1. አዎ 2. አያጥረኝም	አያጥረኝም ካሉ ወደጥያቄ 317ይለፉ
314	ከዕድሜ አቻ ከሆኑ ጓደኞችዎ ጋር ሲሄዱ ትንፋሽ የማጠር ስሜት ይሰማዎታል ?	1. አዎ 2. አያጥረኝም	
315	በራስዎ ፍጥነት ሜዳ ላይ ሲራመዱ የትንፋስ መቋረጥ ችግር ኣጋጥመዎት ያውቃል?	1. አዎ 2. አያጥረኝም	
316	ትንፋሽ ማጠር ከጀረዎት ምን ያክል ዓመት ሆነዎት?	-----------------አመት	
የደረት ህመምን በተመለከተ			
316	ባለፈው አንድ አመት ውስጥ በደረት ህመም ምክንያት ስራ ቀርተዉ (ተኝተዉ) ያዉቃሉ?	1. አዎ 2. አላዉቅም	አላዉቅም ካሉ ወደ ጥያቄ 401 ይለፉ
317	በአብዛኛዉ ለቅዝቀዜ በሚጋለጡበት ጊዜ የደረት ህመም ይሰማዎታል?	1. አዎ 2. አይሰማኝም	
318	የደረት ህመሙ አክታ ኑሮት ያዉቃል?	1. አዎ 2. አያውቅም	
ክፍል አራት ፡- ከዚህ በፊት የነበረ ህመምን የተመለከቱ ጥያቄዎች			
401	በሀኪም የተረጋገጠ የመተንፈሻ ህመምነበረብዎት?	1. አዋ 2. የለኝም	የለብኝም ካሉ ወደጥያቄ 501 ይለፉ
402	ከተዘረዘሩት ህመሞች ዉስጥ	1. አስም	

	የትኞቹን ታመዉ ነበር?	2.የሳንባነቀርሳ(ቲቢ) 3. የቆየ የጉሮሮ ቁስለት (የቆየ ብሮንካይትስ) 4. መተንፈስ የሚያውክ የሳንባ በሽታ 5.የሳንባ ካንሰር 6. ሌላ ኣይነት የደረት አካባቢ ህመም ካለ ይጠቀስ	
ክፍል አምስት :- የአኗኗር ዘይቤጋር የተያያዙ ጥያቄዎች			
501	በህይወተዎ ሲጋራ አጭሰዉ ያቃሉ?	1. አዎ2. አላዉቅም	አላውቄም ካሉ ወደ ጥያቄ 506 ይለፉ
502	በአሁኑ ጊዜ ሲጋራ ያጨሳሉ?	1. አዎ 2.አላጨስም	
503	በቀን ስንት ስጋራ ያጨሳሉ?	_____________(በቁጥር)	
504	በሳምንት ስንት ቀን ሲጃራ ያጨሳሉ?	____________ (ቀን/በሳምንት)	
505	ለምን ያህል ዓመት ነዉ ሲጃራ ያጫሱት?	_____________(በዓመት)	
506	በቤቶ ውስጥ ሲጋራየሚያቸስ ሰው አለን?	1. አዎ 2. የለም	
ክፍል ስድስት :- የመተንፈሻ አካል አዳጋ መከላከያ መሳሪያ			
601	በስራ ላይ የብናኝ መከላከያ ልብስ ይለብሳሉ?	1. አዎ2. አለብስም	አለብስም ካሉ ወደ ጥያቄ 603 ይለፉ
602	ከሚከተሉት ዉስጥ የትኛዉን መከላከያ ይጠቀማሉ? (ከአንድ በላይ መልስ ይችላል)	1. የአፍ/አፍንጫመሸፈኛ 2. ጭምብል (የፊትመሸፈኛ) 3. የአየር ማጣሪያ መሳሪያ 4. ሌላ ካለ ይጥቀሱ_________	
603	የብናኝ መከላከያ ልብስ የማይለብሱበት ምክንያቱ	1.ጭራሽ ስለሌለ 2. ለመልበስ ስለማይመች	

	ምንድን ነዉ?	3. በማስሪያ ቤት ስለማይቀረብ 4. የፔትሮል ትነት ጎጅ ስላልሆነ 5. ሌላ ካለ ይጥቀሱ______	
604	የሥራ ደህንነት ስልጠና ወስደዋል?	1. አዎ 2. አልወሰድኩም	
605	በስራ ደህንነት ጤና ጉዳዮች ላይ ክትትልና ድጋፍ ተደርጎሎት ያውቃል?	1. አዎ 2. አያዉቅም	
ክፍል ሰባት የቤተሰብ የመተንፈሻ አካል በሽታ ታሪክን በተመለከተ			
701	ከወላጅ እናትና አባቶ አንዳቸው በሃኪም የተረጋገጠ የቆየ የሳንባ ችግር እንዳለባቸው ተነግሮአቸው ያውቃል?	1. አዎ 2. አያዉቅም	አያውቅም ካሉ ጥያቄውን ያብቁ
702	ከተዘረዘሩት የቆየ የሳንባ በሽታ ውስጥ በሃኪም ለወላጆቾ የተነገረው የቱ ነው?	1. 1. አስም 2. 2.የሳንባነቀርሳ(ቲቢ) 3. 3. የቆየ የጉሮሮ ቁስለት 4. (የቆየ ብሮንካይትስ) 5. 4. መተንፈስ የሚያውክ 6. የሳንባ በሽታ 7. 5.የሳንባ ካንሰር **8.** 6. ሌላ ኣይነት የደረት አካባቢ ህመም ካለ ይጠቀስ	

መረጃ ሰብሳቢዉባለሙያስም___________________________

ፊርማ__________________

ያረጋገጠው ሱተርቫይዘር ስም____ፊርማ

____

Annex IX: principal investigators curriculum vitae

Bezayit Girma Abay

Telephone 0911391602

E-mail: bezayitgirma@gmail.com

Personal data

Name:	**Bezayit Girma**
Sex:	Female
Date of Birth:	Jan 30, 1986
Place of Birth:	Girawa town, East Hararge zone, Ethiopia
Marital Status:	Married
Nationality:	Ethiopian
Address:	Sub city- Bole, woreda -03, H/No-676

Educational back ground

2017-upto date	MPH with specialty of Environmental and Occupational Health candidate at Addis University
2006-2008 G.C	BSC degree in Environmental health from University
2001-2005 G.C	Secondary education, at Girawa High School
1993-2000G.C	primary education, at Girawa Primary School

Professional Experience 1

Since 2009 up to 2010 G.C - As an **Environmental health officer** at Minilik II Hospital under Addis Ababa City Administration Health

Duties and Responsibilities

- Responsible for controlling and managing the overall environmental health & hygiene promotion activities in the hospital.
- Draw the annual physical and financial action plan of the Department.
- Manage the overall waste disposal system of the compound starting from waste generation point to final disposal.
- Regulate safety of drinking water in the compound including water sample taking every quarter for laboratory analysis.
- Make a report for the public emergency disease to regional health biro, daily and weekly base.
- Control safety of food which is served for patient and staff on duty.
- Insure medical checkup for food handlers every six month.
- Insure the availability of the required personal protective equipment in each department for each worker.
- Conduct assessment on utilization and availability of PPE and based on assessment result setting purchasing plan for required PPE material.
- Give training on infection prevention and personal safety for food handler, cleaner, laundry workers and porter.
- Perform other duties as assigned by the medical director

Professional Experience 2

2010 up to 2012 G.C As disease prevention and health promotion core process leader at Minilik second hospital under Addis Ababa City Administration Health Biro

Duties and Responsibilities

- Draw the annual physical and financial action plan of the core process.
- Participate as member of the hospital management committee, representing the core process.
- Coordinate and chair the infection prevention committee.
- Participate in different committees like hospital reform committee, BPR(business processing and reengineering) and BSC(balanced score card) implementing committee.
- Conduct supportive supervision for the departments under the core process, HIV clinic, TB clinic, VCT (volunteer counseling and testing) service and environmental health department.
- Monitor and evaluate disease prevention and health promotion activities.
- Perform other duties as assigned by the medical director.
- I have also organized and lead the team for epidemic AWD(acute watery Diarrhea) treatment site at the hospital in 2010.

Professional Experience 3

Since 2012-september 2017 as food and drinking establishment, industry and health related organization inspection and competency certification officer in Addis Ababa food medicine and health administration control authority(AAFMHACA)

Duties and Responsibilities

- Draw the annual physical and financial action plan of the department and prepare activity report quarterly
- Develop standard for food and drinking establishment ,industry and health related organization
- Conduct inspection on food and drinking establishment, industry and health related organization and give competency certificate based on the standards

- Collect samples of drinking water and food staff from food and drinking establishment for farther laboratory analysis
- Perform other duties as assigned by the Addis Ababa food and drinking establishment, industry and health related organizations controlling and competency certification core process leader.

Language proficiency

Language	Speaking	Writing	Listening	Reading
Amharic	Excellent	Excellent	Excellent	Excellent
English	v.good	Excellent	Excellent	Excellent
Oromifa	Excellent	Excellent	Excellent	Excellent

Trainings

- Training on acute flaccid paralysis AFP measles, neonatal tetanus (NNT) and integrated disease surveillance (IDS) from novenber29-decenber02/2010 organized by Addis Ababa Health Bureau in collaboration with WHO .
- Training on basic managerial skill from march8-19/2010 at Ethiopia management institute.
- **Computer Literate** – Basic Computer skill of Microsoft office packages (work, Excel, Access) from CPU training center.
- **Training on programmatic management of MDR**-TB from September 05-09/2011organised by regional health bureau in collaboration with Johns Hopkins university/TSEHAI.
- **Training on environmental audit** from march11-14/2009 organized by Addis Ababa city administration environmental protection authority in collaboration with U.N. habitat.
- **Training on STI/PEP from** decenber31-january2/2011organized by regional health bureau in collaboration with Johns Hopkins university/TSEHAI.
- **training on Scientific writing** from December 3-7/2018 organized by Addis Ababa university
- **I do have driving license**

References

Dr.kassahun Adem :-Medical director and internist at Minilik II Hospital Email- kasshun_adem@yahoo.com **tel.0911684451**

Mr.Taddesse Wordofa:- Department of Food and Drinking Establishment,

Health Relate Institute and Industry Licensing leader at Addis Ababa FMHACA. **Tel.0913789524**

M r. Getachew Woreti general director of Addis Ababa Food, Medicine,

Health, Administration and Control Authority.**Tel.0911691162**

Declaration

I, the undersigned declared that this my original work, has not been presented for degree in this or other university and that all sources of materials used for this thesis has been fully acknowledged.

Name: Bezayit Girma

Signature ____________________

Place: Addis Ababa University

Date of submission

This thesis has been submitted for examination with my approval as university advisor,

Name: Abera Kumie (MD, MSc, Ph.D.)

Signature ____________________