ASSESSMENT OF RISK FACTORS FOR ASTHMA AMONG PEOPLE 15-64 YEARS OLD AT THE GILGEL GIBE FIELD RESEARCH CENTER, SOUTH WEST ETHIOPIA.

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A THESIS TO BE SUBMITTED TO DEPARTMENT OF EPIDEMIOLOGY, COLLEGE OF PUBLIC HEALTH &MEDICAL SCIENCES, JIMMA UNIVERSITY; IN PARTIAL FULFILLMENT FOR THE REQUIREMENT FOR MASTERS in General Public Health.

JIMMA UNIVERSITY

COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES

DEPARTMENT OF EPIDEMIOLOGY

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Acronyms

CNCD   Chronic Non Communicable Disease

DALYs   Disability Adjusted Life Years

ECHRS   The European Community Respiratory Health Survey

GGFRC   Gilgel Gibe Field Research Center

GINA   Global Initiative for Asthma

ISAAC   International Study of Asthma and Allergies in Childhood

NCD   Non Communicable Disease

NSAID   Non –Steroidal Anti Inflammatory Disease

SPSS   Statistical Package for Social Science

USA   United State of America

WHO   World Health Organization

OR   Odds Ratio

CI   Confidence Interval

Abstract

Back ground: Asthma is one of the most common chronic diseases in the world. It is estimated that around 300 million people in the world currently have asthma. The rate of asthma increases as communities adopt western lifestyles and become urbanized. Asthma is a complex disease that can be aggravated by various personal health behaviors as well as environmental triggers.

Objective: The objective of this study was to identify risk factors of asthma among people 15-64 years old in the Gilgel Gibe Field Research Center, South west Ethiopia.

Methods: The data were extracted from the population based cross sectional study conducted from late September 2008 to the end of January 2009 at Gilgel Gibe Field Research Center (GGFRC).A total of 4030 participants were used for the analysis. Data were analyzed by using SPSS version 16 and results were presented by tables, charts and descriptive statistics like proportion. Binary logistic regression analysis was used to examine association between each independent variable with the dependent variable. To assess the effects of each independent variable on the dependent variable multivariable logistic regression analysis was carried out and fit to the final model. A 95% confidence level with p-value of < 0.05 was used to declare statistical significance.

Result: From a total 4030 respondents 57 (1.4%) had reported asthma. Of those 57 asthmatics 31 (54.4%) were women, 19(33.3%) within age 55-64 years, 36 (63.2%) had no formal education and 25(43.9%) unpaid and unemployed. Fifty four (94.7%) were ever smokers, 49 (86%) consumed alcohol in the 30 days before the survey, 55 (96.5%) consumed less than five servings of fruit and vegetable (low level consumption) and 12 (21.1%) were physically inactive. Age ranges 35-44,45-54,55-64 years and educational level grade nine and above were significantly associated with reported asthma with P-value (0.006,0.005,0.0001 and 0.001) respectively.

Conclusion: In conclusion this study identified older ages and higher educations were associated with higher levels of reported asthma. **Key words**: Asthma, Socio demographic factors, Behavioral factors, GGFRC

Table of content

Contents   Page number

List of tables

1. Introduction

1.1. Background

Non communicable diseases (NCDs) are diseases of long duration and have generally slow progression. NCDs are the leading cause of adult mortality and morbidity worldwide and reached epidemic proportions in many countries [1-2]. Non communicable diseases that include cardiovascular diseases (including heart disease and stroke), diabetes, cancers, and chronic respiratory diseases (including chronic obstructive pulmonary disease (COPD) and asthma) are the global burden and the major challenges in the 21st century [1-3].

Global Initiative for asthma (GINA) defines asthma as a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation causes an associated increase in airway hyper responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment [4-5].

Asthma is one of the most common chronic diseases in the world. It is estimated that around 300 million people in the world currently have asthma. The rate of asthma increases as communities adopt western lifestyles and become urbanized. With the projected increase in the proportion of the world's population that is urban from 45% to 59% in 2025, there is likely to be a marked increase in the number of asthmatics worldwide over the next two decades. It is estimated that there may be an additional 100 million persons with asthma by 2025. In many areas of the world persons with asthma do not have access to basic asthma medications or medical care.

Increasing the economic wealth and improving the distribution of resources between and within countries represent important priorities to enable better health care to be provided [6].

Eleven studies on the prevalence of asthma in sub-Saharan Africa, all of them showed that consistent increase, particularly in urban regions. The data show that a wide variation, 5.7–20.3%, with the highest prevalence in 'Westernized' urban areas [7].

Similarly in East Africa the prevalence of asthma is higher in urban compared with rural areas. Social and economic factors including the limited access to health care are major contributors to morbidity and mortality from asthma in the region [6].

1.2. Statement of the problem

The economic cost of asthma is considerable both in terms of direct medical costs (such as hospital admissions and cost of pharmaceuticals) and indirect medical costs (such as time lost from work and premature death) [6].The burden of asthma is substantial due to its high prevalence, morbidity and mortality both in developed and developing countries. The trends in prevalence, severity and mortality show that currently the problem is increasing more in developing countries than in developed ones. Barriers to the optimal management of asthma exist throughout the world, but poorer access to, and availability of drugs in developing countries is a cause of great concern.

The workplace environment contributes significantly to the general burden of asthma. Patients with occupational asthma have higher rates of hospitalization and mortality than workers who don't suffer from the condition [8].

World Health Organization has estimated that 15 million disability-adjusted life years (DALYs) are lost annually due to asthma .It is estimated that asthma accounts for about 1 in every 250 deaths which representing 1% of the total global disease burden [4, 5,6].

The global prevalence of asthma ranges from 1% to 18% of the population in different countries. The increases in asthma symptom prevalence in Africa, Latin America and parts of Asia indicate that the global burden of asthma is continuing to rise, but the global prevalence differences are lessening. In sub-Saharan Africa, the prevalence of asthma ranges from 2% in Ethiopia to 18.4% in Nigeria among children between 13 and 14 years [9].Another study done in Nigeria on individuals whose age 18-65 years showed that current prevalence of self reported asthma is 12.8 % [10]. In Ethiopia a study done in Jimma (study area) indicated that the prevalence of asthma is 1.5 % [11].But factors associated with asthma in adults were not studied in the study area. So the objective of this study is to identify factors associated with asthma.

1.3.   Literature Review

Asthma is a complex disease that can be aggravated by various personal health behaviors as well as environmental triggers. Smoking and exposure to secondhand smoke, lack of physical activity, and obesity can be characterized as risk factors that affect asthma. Studies have shown they can result in increased asthma episodes or exacerbations, increased asthma severity, decreased asthma control, and increased utilization of health care services [12]

Factors associated with asthma

The study conducted on 499 families from the Boston metropolitan area showed that yearly income, low level of education and residence in high poverty have association with increased risk of Asthma [13].

Another study conducted on the 18,393 adults of USA implied that Low education level, female sex, current and past smoking status, pet ownership, lifetime diagnosis of physician-diagnosed hay fever and obesity were all significantly associated with asthma and/or wheezing [14].

Cross sectional study done on 7,109 adults from families of subjects with asthma in the Anhui province, China showed that both under- and overweight were associated with asthma in women, and underweight was associated with asthma in men. Among adults in families of subjects with asthma living in rural China, both underweight and overweight are associated with an increased risk of asthma [15].

Another study conducted on 135,000 Norwegian adult men and women revealed that there is association between body mass index and asthma for never smokers, ever smokers, persons with less than or equal to 12 years of education, and persons with more than 12 years of education.   Overweight or obese persons reported asthma more often than did thinner persons after adjustment for smoking, education, and physical activity [16].

There was association between sensitization to dust mite, cat, dog and mixed grasses with Asthma. The odds ratios for current asthma increased with the increasing number of positive skin tests and current smoking were significantly and directly associated with 'asthma ever' as showed in the study done on 5890 pregnant women and their partners attending `Booking' antenatal clinics at Wythenshawe and Stepping Hill Hospitals, Manchester [17].

In South Australia there is association between soft drink consumption and Asthma; which was identified by conducting study on 16907 adults of aged 16 and above [18].

On the other hand the cross sectional study conducted in Ilorin, Nigeria showed that Family history of asthma was the strongest risk factor of asthma, followed by allergic rhinitis, outdoor Pollutants, tobacco smoking, and indoor pollutants, as well as a family history of allergic disease and obesity [19].

Study conducted in India on the Prevalence and Risk Factors for Bronchial Asthma in Indian Adults revealed that Female sex, advancing age, usual residence in urban area, lower socio-economic status, history suggestive of atopy, history of asthma in a first degree relative, and all forms of tobacco smoking were associated with significantly higher odds of having asthma [20].

Another cross sectional study conducted in India to assess Prevalence and risk factors for self-reported asthma showed that sex, consumption of chicken/meat, a lower body mass index (BMI; <16 kg/m2) as well as a higher BMI (>30kg/m2), current tobacco and ever use of alcohol were associated with an increased asthma risk [21].

On the other hand history of atopy in self and/or history of Atopy/Asthma in the first-degree relative, advancing age, usual residence in rural area, tobacco smoking especially hookah smoking were found to be risk factor for Asthma as study conducted in Jaipur district, India [22].

Another study conducted in Poland on 16,238 participants showed that family history of asthma, black smokers, residential exposure to traffic-related air pollution in both children and adults, and damp or overcrowded housing in adults [23]. Similarly, there were evidence of association between hay fever, a family history of asthma, ex-smoking status and elevated body mass index (25.0–29.9 ando30) and Asthma in the study conducted on the adults living in the northern Sweden [24].

Study conducted in Metropolitan and Coastal Areas of Bangladesh to assess risk factors of Bronchial Asthma showed that Concomitant existence of atopic diseases, like allergic rhinitis, eczema and allergic conjunctivitis were found to be significant risk factors in both the settings. History of early childhood lung infections, like pneumonia, bronchiolitis and intake of antibiotics and paracetamol in last 12 months were also observed to be the risk factors in both the areas. [25]. On the other hand hypersensitivity to animals or other allergens, presence of rhinitis, family history of asthma, occupational risk/exposure to irritants and the hypersensitivity/intolerance to NSAIDs were observed determining factors for the presence of asthma as showed in the study conducted on the 923 subjects of aged between 12 to 40 years living in Spain [26].

1.4.   Conceptual framework

Socio demographic factors

Age

Sex

Residence

Educational status

Occupation

Behavioral risk factors

Tobacco use

Diet

Alcohol use

Physical activity

Asthma/ (allergic
Respiratory disease)
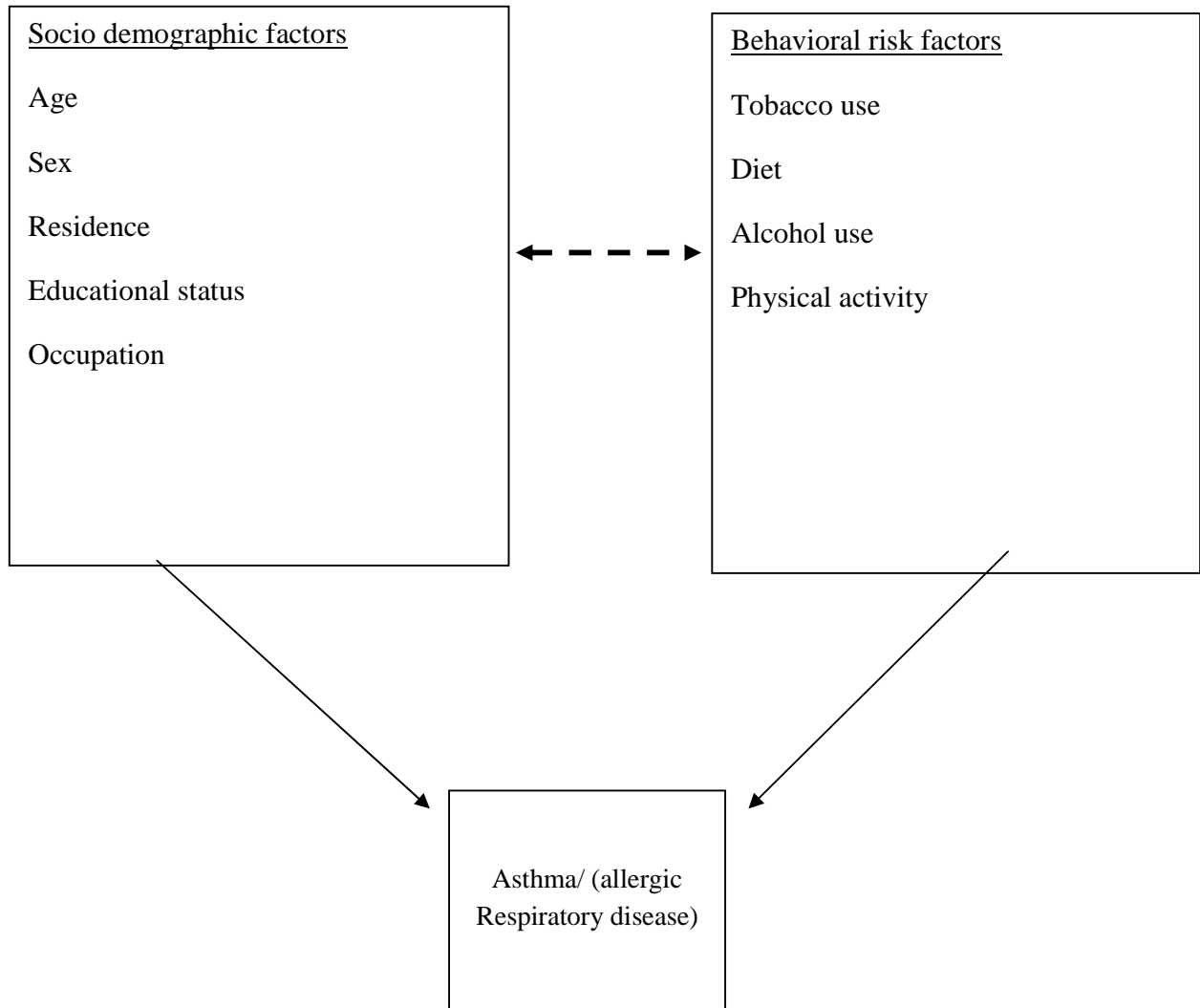
Figure 1 : A Conceptual framework that shows socio demographic and behavioral factors of

Asthma developed after reviewing literatures.

1.5. Significance of the study

The basis of non communicable disease prevention is the identification of the major common risk factors and their prevention and control [2]. This study aimed to identify risk factors for asthma at the Gilgel Gibe Field Research Center; Jimma University based on population based cross-sectional study. Therefore, this study is intended to provide basic information for communities, health planners, service providers, researchers as well as other stakeholders involved in activities and programs relevant for the prevention and control of asthma in the study area and other settings.

2. Objective of the study

2.1. General objective

To identify risk factors associated with asthma at Gilgel Gibe Field Research Center of Jimma University, from September 2008 to January 2009.

2.2. Specific objectives

1. Describe socio-demographic characteristics of the study population

2. Describe behavioral characteristics of the study population

3. Identify socio demographic factors associated with asthma.

4. Identify behavioral factors associated with asthma.

3. Research Methods

3.1. Study area and period

The study was conducted from late September 2008 to the end of January 2009 at Gilgel Gibe Field Research Center (GGFRC) of Jimma University located in Jimma Zone of Oromia regional state about 260 Kilometers (Km) Southwest of Addis Ababa and 55 kilometers Northeast of Jimma City. The center comprises of eight rural and two urban kebeles (the lowest administrative unit in Ethiopia) found within 10 kilometers distance from the periphery of the water body of the Gilgel Gibe Dam. The study area comprised of about 11,000 households with a total population of 50,000 in the center. Out of the total population, age range of 15 to 64 years comprised of about 49%. There were one health center, two health stations and 4 health posts in the center during the study period. There were two trained health extension workers in each kebele. In the urban kebeles the source of water was either shallow dug well, pipe water or protected springs whereas the major sources of water in rural kebeles were unprotected. All rural kebeles were accessible only during dry season by four-wheel drive. All the kebeles had access to mobile phone and in addition the urban kebeles had access to home phone [11]

3.2. Study design

Population-based cross-sectional survey

3.3. Population

Source population

All people age 15 to 64 years who were residents of the 10 kebeles of the center.

Study population

The study population was all sampled individuals from the source population

3.4. Sample frame, Sample size determinations and Sampling procedures

Sample frame

To select the study participants, the 2005 updated census list of the population and households of the 10 kebeles was used as sampling frame.

Sample size determination

The sample size was determined based on the WHO STEPS guideline stratifying the population by sex, age and residence. For each sex, 250 individuals were taken from each age stratum giving a sample size of 2500.

However, due to further stratification of the study population into urban and rural within age and sex, the sample size was doubled to 5,000. Taking 10% non-response rate, the total sample size became 5,500 [11].

Sampling procedures

Taking 25% urban and 75% rural population distribution in the center, the total sample was distributed proportionally. Then the sample was distributed to each kebele proportional to their population size. Using the age and sex stratified sampling frame obtained from the census list, individuals were selected randomly.

3.5. Variables

Dependent Variable

Asthma (allergic respiratory disease)

Independent variables

Age

Sex

Residence

Level of Educational

Occupation

Tobacco use

Diet

Alcohol use

Physical activity

3.6. Data collection procedures

Data collection instrument

Interviewer administered structured questionnaires in English language were adapted from WHO STEPS instruments to collect data. All study instruments were translated into local languages (Amharic and Afaan Oromo) by native speakers and then back translated to English by two other competent persons. The questionnaires comprised of: socioeconomic and demographic variables, risk factors, and symptoms and history of CNCDs. Formats adapted from WHO STEPS guidelines were also used to measure weight, height, waist and hip circumference [11].

Data collectors

Field personnel had a minimum of high school completion and competent in Amharic and Oromifa languages. Fifteen (15) interviewers, 6 physical measurement recorders and 3 supervisors were recruited for CNCDs survey. [11].

Data collection method/technique

The data was collected using face-to face interview.

3.7. Data quality assurance

Training was given for data collectors and supervisors on the purpose of the study, how to get informed consent, on interviewing technique, physical measurements and recording data. Supervisors were additionally trained on supervision techniques [11].

Pre-test was conducted on the interview and measurement sections of the study instrument in urban and rural settings which are physically away from the study area. After the pre-test, data collectors, supervisors and investigators discussed on experiences and identified gaps. Daily supervision was made in the field during data collection by field supervisors and investigators. Data collectors checked for data completeness and consistency before leaving each house.

Field supervisors also checked the completeness and consistency of the data on daily basis and they returned to interviewers if the data were incomplete and inconsistent. Interviewers administered the questionnaire to the respondent under supervision by the supervisors. Data were double entered by trained data clerks using EpiDdata version 3.1. Incomplete and inconsistent data identified during data entry were returned to the data collectors for rectification [11].

3.8. Data extraction

For this analysis data were extracted based on the study variables by preparing data extraction template. The coordinator of GGFRC has extracted the data based on the template. The data were examined for completeness, consistency and missing values before analysis.

3.9. Data processing and analysis

Data were analyzed by using SPSS version 16 and results were presented by tables, charts and descriptive measures like proportion. Binary logistic regression analysis was used to examine association between each independent variable with the dependent variable.

To assess the effects of each independent variable on the dependent variable multivariable logistic regression analysis was carried out and fit to the final model. A 95% confidence level with p-value of < 0.05 was used to declare statistical significance

3.10. Ethical consideration

Ethical clearance was obtained from Jimma University, College of Public health and Medical science Ethical Review Committee. Supportive letter was taken from Department of Epidemiology and presented to Gilgel Gibe Field Research Center to access the data. Before any analysis done the principal investigator was assured that the data should only be used for the preparation of the thesis by signing a contract agreement with the center.

3.11. Dissemination plan of study findings

The finding will be presented to Jimma University College of Public health and Medical science, department of Epidemiology. Summary of the findings will be communicated to Jimma zone health office, Woreda Health offices of the study area, GGFRC and Organizations working on this area. Further attempt will be made to publish it on national and international reputable scientific journals.

3.12. Operational Definitions

Reported asthma: In this study reported asthma was defined as based on positive response of the questions "Have you ever been diagnosed with asthma (an allergic respiratory disease)?" Or "Have you ever been diagnosed with asthma (an allergic respiratory disease) during the past 12 months?"

Ever smokers: is a report of current smoking at the time of the survey and history of smoking but quit at the time of the survey.

Never smoker: has no any history of smoking any tobacco product.

Low serving of fruits and vegetables was defined as less than five serving of fruits and vegetables per day [28].

Category of Drinking: Was categorized by asking the past 30 days experience of the respondents alcohol consumption.

Physical activity: For the calculation of a categorical indicator, the total time spent in physical activity during a typical week, the number of days as well as the intensity of the physical activity is taken into account [29].

Physically active A person reaching the following criteria is classified in this category:

➢ 5 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes per week.

Physically inactive: **A** person not meeting the above mentioned criteria falls in this category.

4. Result

From the 4371 interviewed participants, 4030 were included in the analysis. This study was tried to identify socio demographic and behavioral risk factors associated with asthma.

4.1. Socio-demographic Characteristics of the population

From a total 4030 respondents 2112 (52.4%) were women. Three thousands and thirty one (75.3%) was from rural area. About 899 (22.3) were within the age category of 35 to 44 years. Most of the participants, 2980 (73.9%) had no formal education. Concerning occupation 1729 (42.9%) of the respondents were farmers (Table 1).

Table 1: Socio-demographic characteristics of the study population, GGFRC, Sep.2008-Jan.2009.

Variables	Number	Percent
Sex		
Male	1918	47.6
Female	2112	52.4
Total	4030	100
Residence		
Urban	999	24.8
Rural	3031	75.2
Total	4030	100.0
Age in years		
15-24	705	17.5
25-34	852	21.1
35-44	899	22.3
45-54	848	21.1
55-64	726	18.0
Total	4030	100.0

Educational level		
Had no formal education	2980	73.9
1-4	383	9.5
5-8	382	9.5
Nine and above	285	7.1
Total	4030	100.0
Occupation		
Farmers	1729	42.9
Employed	466	11.5
Unpaid work and unemployed	1739	43.2
Others	96	2.4
Total	4030	100.0

4.2. Behavioral characteristics of the study population

Three thousands five hundred and thirty (87.6%) and 500 (12.4%) of respondents were never smokers and ever smokers respectively. Two hundred twenty eighty (5.7 %) respondents were drunk alcohol 30 days prior to the survey date. About 93% of the respondents ate less than five servings of fruit and/or vegetable per day. Concerning Physical activity, 13.4% were physically inactivity.

Table 2: Behavioral characteristics of the study population at the GGFRC, Sep. 2008-Jan.2009.

Variables	Number	Percent
Smoking status category		
Never smoker	3530	87.6
Ever smokers	500	12.4
Total	4030	100.
Drink alcohol in the last 30 days		
No	3802	94.3
Yes	228	5.7
Total	4030	100.0
Number of servings of fruit and/or vegetable category		
≥ 5 servings/day	281	7.0
< 5 servings/day	3749	93.0
Total	4030	100.0
Physical activity category		
Total physical activity 600+ MET-minute/week	3488	86.6
Total physical activity < 600 MET-minute/week	542	13.4
Total	4030	100.0

4.3. Socio-demographic and behavioral factors for Asthma

From a total 4030 respondents 57 (1.4%) had reported asthma. Of those 57 asthmatics 31 (54.4%) were women. Nineteen (33.3%) were within the age range of 55-64 years. Thirty six (63.2%) had no formal education and 25(43.9%) were within unpaid and unemployed work category. Fifty four (94.7%) and 3 (5.3%) were never smokers and ever smokers respectively. Forty nine (86%) were consumed alcohol in the 30 days before the survey. Fifty five (96.5%) of the respondents were consume less than five servings of fruit and vegetable (low level consumption).Twelve (21.1%) of the respondents were physically inactive. (Table 3)

Table 3: A cross tabulation of Socio-demographic and behavioral variables with Asthma in GGFRC, Sep. 2008 - Jan 2009.

| Variables | Asthma | | Total |
	Yes Number (%)	No Number (%)	Number (%)
Sex			
Male	26 (45.6)	1892 (47.6)	1918 (47.6)
Female	31 (54.4)	2081 (52.4)	2112 (52.4)
Total	**57 (100)**	**3973 (100)**	**4030 (100)**
Residence			
Urban	17 (29.8)	982 (24.2)	999 (24.8)
Rural	40 (70.2)	2991 (75.3)	3031 (75.2)
Total	**57 (100)**	**3973 (100)**	**4030 (100)**
Age in years			
15-24	5 (8.8)	700(17.6)	705(17.5)
25-34	3 (5.3)	849(21.4)	852(21.1)
35-44	16 (28.0)	883(22.2)	899(22.3)
45-54	14 (24.6)	834(21.0)	848(21.1)
55-64	19 (33.3)	707(17.8)	726(18.0)
Total	**57(100)**	**3973(100)**	**4030(100)**
Educational level			
Had no formal	36(63.2)	2944(74.1)	2980(73.9)

education			
1-4	7(12.3)	376(9.5)	383(9.5)
5-8	4(7.0)	378(9.5)	382(9.5)
>=9	10(17.5)	275(6.9)	285(7.1)
Total	**57(100)**	**3973(100)**	**4030(100)**
Occupation			
Farmers	16(28.1)	1713(43.1)	1729(43.1)
Employed	12(21.1)	454(11.4)	466(11.6)
Unpaid work and unemployed	25(43.9)	1714(43.1)	1739(43.3)
Others	4(7.0)	92 (1.9)	96 (2)
Total	**57(100)**	**3973(100)**	**4030(100)**
Smoking status			
Never smokers	54(94.7)	3476(87.5)	3530(87.6)
Ever smokers	3(5.3)	497(12.5)	500(12.4)
Total	**57(100)**	**3973(100)**	**4030(100)**
Alcohol consumption in the last 30 days			
Yes	8(14.0)	220(5.5)	228(5.7)
No	49(86.0)	3753 (94.5)	3802(94.3)
Total	57	3973(100)	4030(100)
Number of servings of fruit and/or vegetable			

< 5 servings per day	55(96.5)	3694(93.0)	3749(93.0)
>= 5 servings per day	2(3.5)	279(7.0)	281(7.0)
Total	**57(100)**	**3973(100)**	**4030(100)**
Physical activity			
Total physical activity 600+ MET-minute/week	45(78.9)	3443(86.7)	3488(86.6)
Total physical activity < 600 MET-minute/week	12(21.1)	530(13.3)	542(13.4)
Total	**57(100)**	**3973(100)**	**4030(100)**

4.4. Socio demographic and behavioral factors associated with asthma

As shown in Table 4 from socio demographic variables older age (55-64 years) ,educational level grade nine and above and Employed were significantly associated with reported asthma at P-value < 0.05.However,no association was found between residence and sex with reported asthma. Of those behavioral factors alcohol consumption during the last 30 days before survey was significantly associated with reported asthma. Significant association was not found between smoking, fruit and vegetable consumption and physical activity with reported asthma (Table 4).

Table 4 : A crude odds ratios and 95% confidence interval (95% CI) of socio demographic and behavioral factors associated with asthma in GGFRC, Sep. 2008-Jan.2009.

Variables		Asthma		COR(95%CI)	P-value
		Yes (Number)	No (Number)		
Sex	Male	26	1892	1.00	
	Female	31	2081	0.9 (0.5, 1.6)	0.763
Residence	Rural	40	2991	1.00	
	Urban	17	982	1.3(0.7,2.3)	0.376
Age	15-24	5	700	1.00	
	25-34	3	849	0.5 (0.1, 2.1)	0.336
	35-44	16	883	2.5 (0.9, 7.0)	0.071
	45-54	14	834	2.4 (0.8, 6.6)	0.103
	55-64	19	707	3.8 (1.4, 10.1)	0.009*
Educational level	Had no formal education	36	2944	1.00	
	1-4	7	376	1.5 (0.7,3.4)	0.317
	5-8	4	378	0.9 (0.3,2.4)	0.780
	Nine and above	10	275	3.0 (1.5,6.0)	0.003*
Occupation	Farmers	16	1713	1.00	
	Employed	12	454	2.8 (1.4,6.0)	0.007*
	Unpaid work and unemployed	25	1714	1.6 (0.8,2.9)	0.166
	Others	4	92	5.6 (1.8,17.3)	0.002*

Smoking status	Never smokers	54	3476	1.00	
	Ever smokers	3	497	0.4 (0.1,1.2)	0.112
Alcohol consumption in the last 30 days	No	49	3753	**1.00**	
	Yes	8	220	2.8 (1.3,6.0)	0.008*
Fruit and vegetable consumption	≥ 5 servings per day	2	279	1.00	
	< 5 servings per day	55	3694	2.1 (0.5, 8.6)	0.308
Physical activity	Total physical activity 600+ MET-minute/week	45	3443	1.00	
	Total physical activity < 600 MET-minute/week	12	530	1.7 (0.9,3.3)	0.094

*P-value < 0.05, COR=Crude Odds Ratios, CI=Confidence Interval

Multivariable logistic regression analysis result

All variables were entered in multiple logistic regression analysis regardless of their significance and analyzed using backward Stepwise method. Variables like sex, physical activity, occupation, number of serving of fruit and vegetable, resident and drinking in the past 30 days were not significant and removed from the final model. On the other hand age, educational level and smoking status were in the final model. However, age range 25-34 years, Educational level (grade 1-4 and grade 5-8) and smoking status were not significant (Table 5).

Respondents whose age range 35-44 years were 4.2 times more likely to have reported asthma than 15-24 years (AOR= 4.2, 95% CI:1.5,12.0) and age range 45-54 years were 4.7 times more likely to have reported asthma than 15-24 years (AOR = 4.7 , 95%CI: 1.6, 13.8) similarly age range 55-64 were 8.4 times more likely to have asthma than 15-24 years (AOR = 8.4, 95% CI: 2.8, 25.0). On the other hand respondents whose educational level grade 9 and above were 6.2 times more likely to have reported asthma than respondents who had no formal education (AOR = 6.2, 95% CI: 2.8, 13.7).Table 5 shows an adjusted odds ratios and 95% confidence interval of socio demographic and behavioral factors associated with asthma in the final model of multivariable logistic regression.

Table 5: An adjusted odds ratios and 95% confidence interval (95% CI) of socio demographic and behavioral factors associated with asthma in the final model of multiple logistic regression in GGFRC, Sep. 2008-Jan 2009.

Variables	Asthma		COR(95%CI)	P-value	AOR(95%CI)	P-value
	Yes (Number)	No (Number)				
Age						
15-24	5	700	1.00			
25-34	3	849	0.5 (0.1, 2.1)	0.336	0.7 (0.2,3.0)	0.659
35-44	16	883	2.5 (0.9, 7.0)	0.071	4.2 (1.5,12.0)	0.006*
45-54	14	834	2.4 (0.8, 6.6)	0.103	4.7 (1.6,14.0)	0.005*
55-64	19	707	3.8 (1.4, 10.1)	0.009*	8.6(2.9, 25.5)	0.0001*
Educational level						
Had no formal education	36	2944	1.00			
1-4	7	376	1.5 (0.7,3.4)	0.317	2.3(1.0,5.3)	0.05
5-8	4	378	0.9 (0.3,2.4)	0.780	1.6(0.5,4.6)	0.403
Nine and above	10	275	3.0 (1.5,6.0)	0.003*	6.4(2.9,14.1)	0.0001*
Smoking status						
Never smokers	54	3476	1.00			
Ever smokers	3	497	0.4 (0.1,1.2)	0.112	0.3 (0.1,1.1)	0.064

* P-value < 0.05, COR=Crude Odds Ratios, AOR=Adjusted Odds Ratio, CI=Confidence Interval

5. Discussion

This secondary data analysis used to identify socio-demographic and behavioral factors associated with asthma in the study population. In this study from binary logistic regression, of socio demographic variables older age (55-64 years) ,educational level grade nine and above and Employed were significantly associated with reported asthma at P-value < 0.05.However,no association was found between residence and sex with reported asthma. Of those behavioral factors alcohol consumption during the last 30 days before survey was significantly associated with reported asthma. Significant association was not found between smoking, fruit and vegetable consumption and physical activity with reported asthma

Respondents whose age range 35-44 years were 4.2 times more likely to have reported asthma than 15-24 years (AOR= 4.2, 95% CI:1.5,12.0) and age range 45-54 years were 4.7 times more likely to have reported asthma than 15-24 years (AOR = 4.7 , 95%CI: 1.6, 13.8) similarly age range 55-64 were 8.4 times more likely to have asthma than 15-24 years (AOR = 8.4, 95% CI: 2.8, 25.0) . This study was consistence study conducted in India on the Prevalence and Risk Factors for Bronchial Asthma in Indian Adults revealed that advanced age was associated with higher odds of having asthma and the same country in Jaipur district of Rajasthan revealed that advanced age was significantly associated risk for asthma [20, 22]. This may indicate that actions should be taken at younger age about prevention and control of asthma.

On the other hand respondents who had grade 9 and above educational level were 6.2 times more likely to have asthma than who had no formal education (AOR = 6.2, 95% CI: 2.8, 13.7). This finding contradicts with the study done in Boston and USA [13, 14]. The reason of this discrepancy might be due to socio economic and geographic difference of the populations. Another reason may be people with higher educational level may have access to health information that initiates them to seek health services.

Residence was not associated with asthma in this study. But other Studies done in Boston, India and Sweden have association with asthma [13, 20, 22, and 24]. This may be geographical and life style difference between our study area and those countries. Another reason may be due to study purpose and design as well as the culture of the community also different.

In this study no association was found between sex and asthma .However, a study done in USA and India revealed that female sex and asthma were associated [14,20]. The reason may be in our study most of the participants were non smokers and household related factors were not studied.

In the current study association was not found between smoking status and asthma. This is in contrary with a study done in USA, Nigeria, India, Jaipur district, Poland and Sweden [14, 19,20,22,23 and 24]. One of the reasons may be the proportion of smoking status among study population and the second possible reason may be the classification of smoking status. The types of study design may be another reason.

Strength and limitation of the study

Strength

- Since WHO Standardized questionnaire were used to collect the data, it is possible to compare with similar studies.
- The data was collected from representative of the population so generalization is possible.

Limitation

- Some important variables like environmental related factors and family history of asthma were not included in this study.
- Variables such as Yearly family income and BMI were excluded from analysis due to large missing value

6. Conclusion

In conclusion this study identified that age and educational level were associated factors for reported asthma after controlling confounding. Older age and higher education were associated with higher levels of reported asthma. This may indicate that exposure to different risk factors for asthma at younger age may result in disease and disability at middle and older age. On the other hand people who have lower educational level may not have awareness and access to health services (but it needs further study).

7. Recommendation

For Researchers

- Further study is needed to identify other risk factors related to asthma by including variables which were not included in this study.

For Health professionals

- Health professionals should give age and education level544specific health information related to asthma for their clients.

For Zonal and Woreda health offices

- Zonal and woreda health offices should plan to aware the population about triggers and risk factors for asthma.

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Annex I: Data Request template used to extract the data

Demographic Variables	Sex Age Residence Level of Education Occupation Family Income
Behavioral Risk factor variables	Tobacco use Alcohol Consumption Diet habit Physical Activity
History of Chronic disease(dependent variable)	Asthma

NNEX II. English questionnaire

Jimma University

College of Public Health and Medical sciences

A part of questionnaire used to extract data related to risk factors for asthma at the

Giggle Gibe Field Research Center, South west Ethiopia**.**

I.   Identification

Identifications		Response	Code
	Kebele Name		
	House number		
	Family ID		
	Participant ID		

II.   Demographic Information

Question		Response
201	Sex (Record Male / Female as observed)	0. Male 1. Female
202	How old are you?	_____ 777. Don't know
204	Can you read and write?	0. No ➝ 207 1. Yes
205	Are you learning basic education in school?	0. No ➝ 207

		1. Yes
206	What is the highest level of education you have completed?	_____ 999. Refused
207	Which of the following best describes your main work status over the past 12 months?	1.Farmer 2. Government employee 3. Non-government employee 4. merchant 5. Self-employed 6. Non-paid 7. Student 8. housewife 9. Homemaker 10. Retired 11. Unemployed 12. Others_____ 999. Refused
209	Taking the past year, can you tell me what the average earnings of the household have been?	Per month _____birr Per year _____birr Teff _____ Quintile Maize _____ Quintile paper _____ Quintile Others(specify)--------------- 999.Refused

III. Behavioral Measurements

	1. **Tobacco Use**	
301	Do you currently smoke any tobacco products, such as cigarettes, cigars or pipes?	0. No → 306 1. Yes
302	Do you currently smoke tobacco products daily?	0. No → 306 1. Yes
303	How old were you when you first started smoking daily?	Age (years)_____ → 305 777. Don't know
304	Do you remember how long ago it was?	Years ago___ Or month ago ___ Or week ago _____ 777. Don't know
305	On average, how many of the following do you smoke each day?	Manufactured cigarettes ____ Hand-rolled cigarettes ____ Pipes full of tobacco _____ Others___ 777. Don't know
306	In the past, did you ever smoke daily?	0. No → 309 1. Yes
307	How old were you when you stopped smoking daily?	Age (years) ____ 777. Don't know
		Years ago___

308	How long ago did you stop smoking daily?	Or month ago ___ Or week ago _____
	2. **Alcohol Consumption**	
309	Have you ever consumed an alcoholic drink such as beer, wine, spirits, fermented cider, tej and tella	0. No ➔ 315 1. Yes
310	During the past 12 months, how frequently have you had at least one alcoholic drink?	1.Daily 2. 5-6 days per week 3. 1-4 days per week 4. 1-3 days per month 5. Less than once a month
311	When you drink alcohol, on average, how many drinks do you have during one day?	Types of drink No ------------ ---------- -------------- -----------
312	Have you consumed an alcoholic drink within the past 30 days?	0. No ➔ 314 1. Yes
313	During each of the past 7 days, how many standard drinks of any alcoholic drink did you have each day?	Monday---------- Tuesday---------- Wednesday------- Thursday---------- Friday------------- Saturday----------- Sunday-------------
314	In the past 12 months what was the largest number of drinks you had on a single occasion, counting all types	Types of drink Largest No ----------------- -------------

	of standard together?	---------------- -------------
3.	**Diet**	
315	In a typical week, on how many days do you **eat fruit**? (*USE SHOWCARD*)	Type of fruit N<u>o</u> of days _____ _____ _____ _____ 777. Don't know If Zero days ➜ 317
316	How many **servings** of fruit do you eat on **one** of those days? (*USE SHOWCARD)*	Type of fruit Q'ty of serving -------------- --------------- -------------- ---------------- 777. Don't know
317	In a typical week, on how many days do you **eat vegetables**? *(USE SHOWCARD)*	Type of vegetable N<u>o</u> of days _____ _____ _____ _____ 777. Don't know If Zero days ➜ 319
318	How many **servings** of vegetables do you eat on one of those days? *(USE SHOWCARD)*	Type of vegetable No of days ----------- ---------- ---------- ------------ 777. Don't know
319	What type of **oil or fat is most often** used for meal preparation in your household? *(USE SHOWCARD)* *(SELECT ONLY ONE)*	1.Oil grain 2. Butter 3. Vegetable Butter eg. Girl ghee 4. Others

		5. None in particular
		6. None used
		777. Don't know

4. Physical Activity

320	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously?	1.Yes 0.No → 323
321	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days_____
322	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours_____ Minutes_____
323	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking *[or carrying light loads]* for at least 10 minutes continuously?	0. No → 326 1. Yes
324	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days_____
325	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours____ Minutes_____
326	Do you walk or use a bicycle *(pedal cycle)* for at least 10 minutes continuously to get to and from places?	0. No → 329 1. Yes
327	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to	Number of days_____

	and from places?	
328	How much time do you spend walking or bicycling for travel on a typical day?	Hours_____ Minutes_____
	Recreational activities	
329	Do you do any vigorous-intensity sports, fitness or recreational *(leisure)* activities that cause large increases in breathing or heart rate like *[running or football]* for at least 10 minutes continuously?	0. No ➔ 332 1. Yes
330	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational *(leisure)* activities?	Number of days_____
331	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours_____ Minutes_____
332	Do you do any moderate-intensity sports, fitness or recreational *(leisure)* activities that cause a small increase in breathing or heart rate such as brisk walking, *[cycling, swimming, volleyball]* for at least 10 minutes continuously?	0. No ➔ 335 1. Yes
333	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational *(leisure)* activities?	Number of days_____
334	How much time do you spend doing moderate-intensity sports, fitness or recreational *(leisure)* activities on a typical day?	Hours_____ Minutes_____

335	The following question is about **sitting or reclining** at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping. How much time do you usually spend sitting or reclining on a typical day?	Hours_____ Minutes___
IV.	**Chronic disease: Asthma**	
367	During the last 12 months, have you experienced with attack of wheezing or whistling breathing?	0.No →369 1.Yes
368	During the last 12 months, have you experienced with attack of wheezing that came on after you stopped exercising or some other physical activity?	0.No 1.Yes
369	During the last 12 months, have you experienced with a feeling of tightness in your chest?	0.No→371 1.Yes
370	During the last 12 months, have you woken up with a felling of tightness in your chest in the morning or any other time?	0.No 1.Yes
371	During the last 12 months, have you had an attack of shortness of breath that came on without obvious cause	0.No 1.Yes

	when you were not exercising or doing some physical activity?	
372	Have you ever been diagnosed with asthma (an allergic respiratory disease)?	0.No →375 1.Yes
373	During the last 12 months, Have you ever been diagnosed with asthma (an allergic respiratory disease)?	0.No →375 1.Yes
374	Have you ever been treated for it?	0.No 1.Yes
375	Have you been taking any medications or other treatment for it during the last 2 weeks?	0.No 1.Yes
376	During the past 12months have you seen a traditional healer for Asthma?	0.No 1.Yes
377	Are you currently taking any herbal or traditional remedy for Asthma?	0.No 1.Yes