

## Prevalence of Asthma and Its Associated Factors to Visit Health Institution among Patient at Emergency Department: Retrospective Cross Sectional

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### Abstract

**Introduction:** Asthma is a major cause of chronic morbidity and mortality worldwide and represents a substantial economic and social burden throughout the world. Asthma can develop at any age in life including adult hood. Most patients have poor access to health care; this is even true of the poorest minorities in industrialized countries. The study is aimed to assess the prevalence of asthma and factors that lead patients visit health institutions.

**Methodology:** Institutional based cross sectional study design with retrospective data extraction was conducted, for which recorded data of asthmatic case were obtained from Dessie Referral Hospital from April 1, 2018 to April 1, 2019. The data was entered into Epi info version 7 and exported & analyze in SPSS. Binary logistic regression model was used to identify association between each independent variable and outcome variable. Statistical significance was determined using OR with the corresponding p value. Hosmer-Lemeshow test used to check model fitness. In the final model those variables with p-value less than 0.05 were considered as statistical significant and it was presented on odds ratio (OR), with 95% confidence interval (CI).

**Result:** From the total of 423 patient 44 patients (10.4%) were diagnosed with bronchial asthma. In the study about, 39 (88.63%) had wheezing, 36(81.81%) had cough, 35(79.54%) had Dyspnea, 13(29.54%) had rhinitis, 19(43.19%) sinusitis. 3(6.82%) atopic dermatitis, and 5(11.37) had altered mental status.

**Conclusion:** There was a high prevalence of bronchial asthma in emergency with no difference in sex. The mean age was 46.76. The prevalence was high in age group of 34-43 and 54-63. Majority of the patients with asthma were urban dwellers. Wheezing, dyspnea (breathing trouble) and Cough were the predominant symptoms and signs seen in the study. Up-to-date training should be given to ED staffs for properly classification of bronchial asthma based on severity and should have guide line for classification of asthma based on severity were recommended.

**Keywords:** Asthma; Predominant symptoms

**Abbreviations** AaBET: Addis Ababa Burn Emergency and Trauma Hospital; CDC: Center of Disease Control; ICU: Intensive Care Unit; OT: Operating Theatre; OTT: Operating Theatre Technique; OTN: Operation Theatre Nurses; PPE: Personal Protective Equipment; SPHMMC: Saint Paulo's Hospital Millennium Medical College; SSI: Surgical Site Infection; WHO: World Health Organization

### Introduction

Asthma is defined as a "chronic inflammatory disease of the airways" that can cause any or all of the following symptoms: - shortness of breath, tightness in the chest, coughing and wheezing [1] Asthma is a highly prevalent disease that presents commonly to the emergency department (ED) in acute exacerbation. People with asthma are often referred to as "twitchy," meaning they seem to overreact to stimuli such as aero-allergens and cold, dry air. Mucus is produced within the bronchial tubes further restricting air flow. Asthma is one of the most prevalent chronic diseases in the world and is considered a public health problem worldwide [1,2]. The prevalence of asthma in developed countries increased 50% per decade in the last

40 years of the 20<sup>th</sup> century, and approximately 250,000 deaths occur worldwide because of asthma each year [1].

Asthma is often associated with chronic rhinitis, which can be allergic or not. Studies indicate that 75% to 80% of the individuals with asthma have allergic rhinitis, and 40% to 50% of the individuals with allergic rhinitis and eosinophilic non-allergic rhinitis have bronchial hyper responsiveness (BHR) [2-4]. Asthma continues to be a serious public health problem. In one study conducted, in south west Ethiopia, asthma accounted for 2% of outpatient and 5.4% of medical admission and different risk factors are responsible for this problem like poor compliance for the drugs, lack of awareness about the disease, low socio economic status and hyper sensitivity [5]. In Ethiopia this problem is coming another burden for the country next to those communicable diseases [5]. Asthma is an important and increasing public health problem in Africa which receives inadequate priority and attention. With increasing urbanization, population aging, and adoption of western lifestyles in many African settings, these trends are set to continue in the near future. There is a need to identify and prioritize feasible strategies that can be adopted to promote the implementation of effective interventions that will address this increasing burden in Africa [6].

There are many factors that lead patients to visit the ED. The most common reported factors include asthma severity, poor compliance, the inappropriate use of inhalers and incorrect perceptions about asthma as a disease [7]. That is why we interested to study in Dessie town. The data obtained in this study may have its own contribution for policy makers, clinicians for planning and evaluating the management of asthma. The study is intended to assess the prevalence of asthma and its associated factors among patient at emergency department of Dessie referral hospital, Ethiopia, 2019.

## Methodology

### Study design and study period

Institutional based cross sectional study design with retrospective data extraction was conducted, for which recorded data of asthmatic case were obtained from Dessie Referral Hospital from April 1, 2018 to April 1, 2019, the study was conducted from April 29 2019 to May 6, 2019.

Source population: All patients at emergency department of Dessie referral hospital from April 1, 2018 to April 1, 2019

Study population: All patients who visited emergency department of Dessie Referral hospital and diagnosed as a case of bronchial asthma from April 1, 2018 to April 1, 2019. Inclusion criteria: All adult patients visited adult emergency department (whose age is >15 years) with from April 1, 2018 to April 1, 2019.

### Exclusion criteria

- Incomplete cards. .
- Patients whose age <15 years.

### Sample size and sampling procedure

Taking 50 % prevalence study since no study in area, 5% margin of error, and 95% confidence interval the sample size was calculated using single population proportion formula to determine minimum sample size as follows:

$$n = Z\alpha/2^2 \times P \times (1-p)/d^2$$

$$n = 1.96^2(0.5(1-0.5)) / (0.05)^2$$

$$n = 1.96^2(0.5) (0.5) / (0.05)^2$$

$$n \approx 384$$

Thus the final minimum sample size involved was 384 plus 10% non-respondent rate, which were 423 from April 1, 2018 to April 1, 2019 was included in the study population. Dependent variable: Prevalence of asthma

### Independent variables

#### Socio-demographic age of a patient

- Sex of a patient
- Ethnicity
- Religion
- Marital status
- Occupation
- Smoking status

Symptoms seen: Wheezing, Cough, Rhinitis, Sinusitis, Atopic dermatitis, altered mental status, Cyanosis.

### Severity of asthma

- Mild
- Moderate
- Sever

### Presence of Comorbidity

#### Operational definitions

Mild asthma, if the speech is in sentences, , not use accessory muscle, respiratory rate is in 12 to 20, heart rate is in 60 to 100, oxygen saturation is > or =95%.

Moderate asthma, if the speech is in phrases, mental status is agitated, sometimes use of accessory muscle, respiratory rate is in 20 to 30, heart rate is in 100 to120, oxygen saturation is in 90% to 95%. Severe asthma, if the speech is in words, mental status is decreased, using of accessory muscle, respiratory rate is >30, heart rate is >120, oxygen saturation <90% (NB. The severity of asthma of is taken from GINA-pocket-2015).

#### Data collection procedures

Data was collected from Dessie referral hospital by using a structured and pretested extraction format which is prepared in English; started by abstracting data from HMIS log book and then reviewing patients' card for all information, and then the data was collected through gathering all medical records of patients who came in the study period. The data was collected by the researcher and other 4 assistants after giving a proper training.

#### Data quality management

To ensure the quality of the data first the extraction format was design carefully and developed in English language, one supervisor and four data collectors was selected based on a set of criteria such as ability to read, write and understand English language, previous experience on data collection and they was trained on the objective of the study. The tool was pre-tested on 5% of the sample in borumeda hospital coming for the same service. The collected data was also continuously reviewed for accuracy and completeness by supervisors and principal investigators daily.

#### Data processing and analysis

Relevant variables were explained by frequency Tables 1-5, graphs and Summary statistics. Binary logistic regression model was used to identify association between each independent variable and outcome and statistical significance was determined using odds ratios with the corresponding p value. First bivariate analysis was done for each independent variable to the outcome variable and those variables resulting p value less than 0.2 were entered to multivariate analysis and Hosmer-Lemes how test used to check model fitness. In the final model those variables with p-value less than 0.05 were considered as statistical significant and it was presented on odds ratio (OR), with 95% confidence interval (CI) to show the strength and direction of association.

### Ethical clearance

Formal letter was written by Wollo University CMHS, school of nursing and midwifery from department of comprehensive nursing in order to get permission from Dessie referral hospital. The names of the respondents were replaced with codes to keep confidentiality.

### Result

#### Socio demographic results

From the total of 423 patients from HMIS log book register and charts from Dessie referral hospital were included in the study. From these 187(44.20%) were males and 236(55.80%) were female. Majority of age group found in the age class of 54-63 years and 64-73 that accounts 105(24.82%) and 86(20.33%) respectively. only 21(4.96%) patients found in the age class of 14-23 years. The mean age of the patient was 46.73, median of 43, mode of 40, standard deviation, 17.5. With regard to their residency 278(65.72%) were urban and 145(34.28%) were rural. Most of the patients are self-employee 149(35.22%).

Variable	Frequency	Percentage (%)
Age		
15-24	21	4.96
25-34	44	10.4
35-44	79	18.67
45-54	47	11.11
55-64	105	24.82
65-74	86	20.33
75-84	31	7.32
>85	10	2.36
SEX		
Male	187	44.2
Female	236	55.8
Residency		
Urban	278	65.72
Rural	145	34.28
Occupation		
Farmer	118	27.89
Trader	95	22.45
Government employee	61	14.42
Self-employee	149	35.22

**Table 1:** Socio-demographic characteristics of patients who visit DRH from April 1, 2018 to April 1, 2019.

### Prevalence of bronchial asthma

The total 423 patients who visited adult emergency room of Dessie referral hospital from April 29, 2019 to May 6, 2019, from these 44 patients (10.4%) were diagnosed with bronchial asthma. In the study about, 39 (88.63%) had wheezing, 36(81.81%) had cough, 35(79.54%) had Dyspnea, 13(29.54%) had rhinitis, 19(43.19%) sinusitis. 3(6.82%) atopic dermatitis, and 5(11.37) had altered mental status.

Clinical manifestations	Frequency	Percentage (%)
<b>Wheezing</b>		
Yes	39	88.63
No	5	11.37
Cough		
Yes	36	81.81
No	8	18.19
Dyspnea		
Yes	35	79.54
No	9	20.46
<b>Limits daily activities</b>		
Yes	29	65.9
No	15	34.1
Rhinitis		
Yes	13	29.54
No	31	70.46
Sinusitis		
Yes	19	43.19
No	25	56.81
<b>atopic dermatitis</b>		
Yes	3	6.82
No	41	93.18
Cyanosis		
Yes	4	9.1
No	40	90.9
<b>Altered mental status</b>		
Yes	5	11.37

**Table 2:** Prevalence of bronchial asthma of who visit DRH from April 1, 2018 to April 1, 2019.

### Severity of bronchial asthma

From patients included in the study (n=44), 24(54.5%) were moderate, 12(27.3%) were mild and 8(18.2%) were severe asthma (Figure 1).

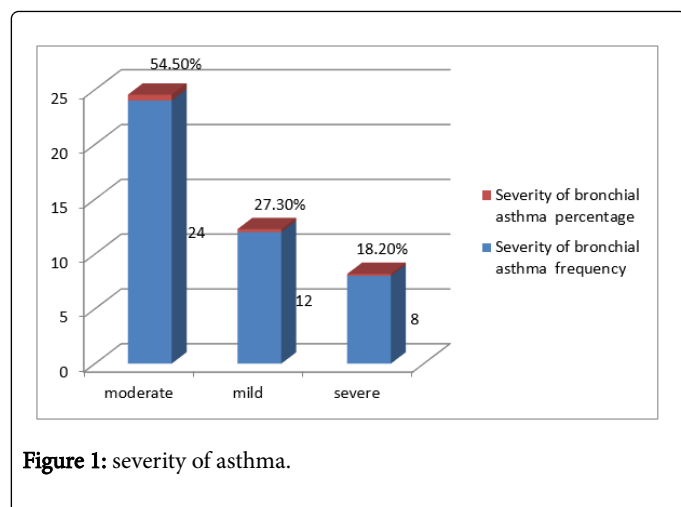


Figure 1: severity of asthma.

### Smoking status of patients

In this study, most patients 237(56.1%) patients smoking status is unknown, 117(27.6%) were non-smokers and the rest 69(16.3%) were smoker (Figure 2).

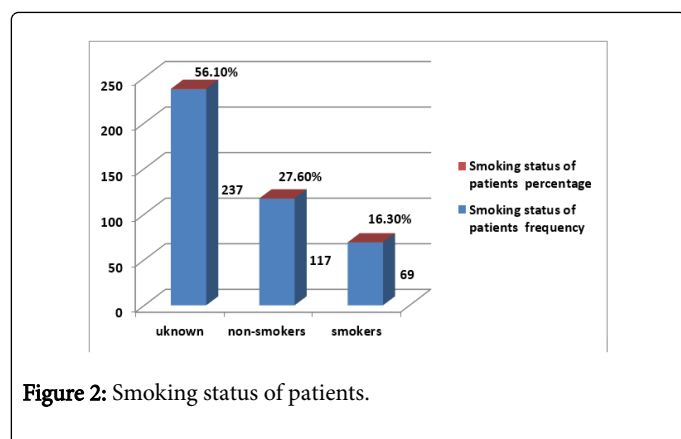


Figure 2: Smoking status of patients.

### Co-morbid disease

When we consider the presence of co morbid disease 7(15.9%) of the study subject had problems of co morbid disease. The mentioned co morbid disease was tuberculosis, COPD, Hypertension, DM, Cardiovascular disease.

Co morbidity	improved	Died	Total
yes	6 (85.7%)	1(14.3%)	7
No	36 (97.3%)	1 (2.7%)	37
Total	42	2	44

NB. (% within the presence of co morbid disease)

This table shows that most patients died due to asthma had co morbidity.

Table 3: Presence of co morbid disease and the outcome of the patient in cross tabulation of patients who visit DRH from April 1, 2018 to April 1, 2019.

### Factors that lead patients to visit emergency room

From the study subjects, 21(47.7%) Were forced to visit emergency due to exposure to allergen, 8(18.2%) due to severity of asthma, 4(9.1%) came due to drug compliance (poor adherence to regular treatment) and the rest 11(25%) had come due to other reasons like stress, exercise.

Factors that lead patients to emergency room	Frequency	Percentage (%)
Exposed to allergen	21	47.7
Severity of asthma with unknown cause	8	18.2
Drug compliance	4	9.1
Others (stress, exercise...)	11	25

Table 4: Factors that lead patients to visit emergency room of patients who visit DRH from April 1, 2018 to April 1, 2019.

### Factors associated asthma

From bivariate analysis, sex and residence had association to outcome of asthma with p-value of 0.029 and 0.049 respectively. But in multivariate logistic regression they did not have association with AOR of 0.966[0.114-8.195] P-Value=0.975 and AOR=1.344[0.134-13.483] respectively. But age hadn't association with outcome of asthma both in chi-square test and multiple logistic regression tests with p-value of 0.276 and 0.610 respectively.

Factors	LBW		P-value	OR(95%CI)	
	Yes	No		COR	AOR
Age of the patient					
<19	3	2	0.725	1	1
20-25	11	56		0.13[0.02, 0.87]*	1.46[0.002, 11.6]
26-30	22	82		0.17[0.02, 1.13]	1.38[0.007, 3.75]
>31	27	55		0.32[0.05, 2.00]	2.95[0.016, 9.74]
Sex of the patient					
Male	40	117	0.591	1	1
Female	18	23		2.86[1.47, 5.56]	0.43[0.91, 6.47]
Residence					
Urban	48	179	0.61	1	1
Rural	15	16		3.49[1.61, 7.57]*	3.21[1.06, 9.68]
*significant					

Table 5: The association between Socio-demographic variables and outcome of asthma.

### Discussion

The prevalence of this study was 10.4%. The World Health Organization (WHO) estimates that there are 300 million people world-wide suffering from asthma with approximately 250,000 asthma-related annual deaths. The Global Initiative for Asthma

(GINA) estimates that the global prevalence of asthma ranges from 1 to 18% of the total population of different countries. Studies indicate that asthma is not just a public health problem for high-income countries but is increasingly becoming widespread in the developing world with most asthma-related deaths occurring in low and lower-middle income countries including Sub-Saharan Africa [6].

This finding is relatively high from that of a research conducted in Indian adults on prevalence and risk factors for bronchial asthma which was 2.38 and vary in different places with in the country (Chandigarh=2.28, Delhi =1.9, Kamur=2.05 and Bangalore =3.47[3]. The WHO estimates the prevalence as 1.5 % for Ghana compared to 0.3% for Greece and 2.8% for Wales and New Zealand [6]. This number is relatively low when compared with a study done in Uganda which shows 2.5% were diagnosed with asthma. Even though it is slightly higher from a research done in Black Lion Hospital which was 1.04 % [8-10] it is still low. A lower number of prevalence in this study may be due to incompleteness of Patient's chart that were excluded in the study, Dessie referral hospital is a referral hospital and a number of patients might be treated and managed in the nearby health institution.

From 44 patients included in the study, 88.63 % (n=39), had wheezing, 79.54% (n=35) had dyspnea and 81.81% (n=36) had cough. Only 3 patients had atopic dermatitis. As we see from the result the most dominant symptoms are wheezing, dyspnea and cough. This study finding is relatively comparable with the study conducted in Black Lion Hospital ( research done in 2015) the major symptom and sign seen among those diagnosed with asthma was cough (84.5%), wheezing (91.9%) or breathing trouble (88.5%.) [11-15].

From patients included in the study (n=44), 24(54.5%) were moderate, 12(27.3%) were mild and 8(18.2%) were severe asthma. When I compare this from a research done in Brazil, from 102 patients 2.9% were mild, 30.4 % were moderate and 66.7% were sever [16,17]. Most of the patients from this study were sever as it is expected for specialty service in emergency. Our study is contrast to this study; the reason may be due to improper classification of asthma according to the GINA asthma classification system [18-20].

When we consider the presence of co morbid disease 7(15.9%) of the study subject had problems of co morbid disease. The mentioned co morbid disease was tuberculosis, COPD, Hypertension, DM, Cardiovascular disease A study showed that asthma is often diagnosed after a long time because of the patients' low medical seeking behavior and not knowing the exact triggering factor, this may be an important factor for increasing morbidity [4].

The most frequent factor was exposure to different allergens. And other factors were poor adherence to the drug, exercise, stress. Literatures also mentioned the same factors [21]. Also from bivariate analysis, sex and residence had association to outcome of asthma with p-value of 0.029 and 0.049 respectively. But in multivariate logistic regression they hadn't association with AOR of 0.966[0.114-8.195] P-Value=0.975 and AOR=1.344[0.134-13.483] respectively. But age hadn't association with outcome of asthma both in chi-square test and multiple logistic regression tests with p-value of 0.276 and 0.610 respectively.

### Limitations of the study

I. One of the major limitations of this study is inability to assess many factors like economic status of the patient and educational status

with retrospective study design because these factors has a greater importance for the prevalence of asthma in different literatures. II. It may not be generalized beyond the study population, as it involves patients at a single center

### Conclusion

There was a high prevalence of bronchial asthma in emergency with no difference in sex. The mean age was 46.76. The prevalence was high in age group of 34-43 and 54-63. Since patients in this age group are active in participating in different tasks, there is an impact on the economic development and other aspects of the country. Majority of the patients with asthma were urban dwellers. Wheezing, dyspnea (breathing trouble) and Cough were the predominant symptoms and signs seen in the study. Most patients came to emergency due to exposure to different allergens.

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### References

1. Adams JY, Sutter ME, Albertson TE (2011) The patient with asthma in the emergency department. *Clinic Rev Allergy Immunol* 43: 14-29.
2. Adeloje D, Chan KY, Rudan I, Campbell H (2013) an estimate of asthma prevalence in Africa: A systematic analysis. *Croat Med J* 54: 519-531.
3. Aggarwal AN, Chaudhury K, Chhabra SK, D'Souza GA, Gupta D, et al. (2006) prevalence and risk factor for bronchial asthma in Indian adults: A multicentre study, *Multicenter Study* 48: 13-22.
4. Musafri S, Joos G, Van meerbeeck JP (2011) asthma, atopic, and COPD in sub-Sahara countries: The challenges. *East Afr J Public Health* 8: 161-163.
5. Mekonnen D, Mossie A (2010) Clinical effects of yoga on asthmatic patients: A preliminary clinical trial. *Ethiop J Health Sci* 20: 107-112.
6. Amoah AS, Forson AG, Boakye DA (2012) A review of epidemiological studies of asthma in Ghana. *Ghana Med J* 46: 23-28.
7. Jie Ys, Zaleha M, Jie X, Ju ZL, Ismail NH (2013) urban vs. rural factors that affect adult asthma. *Rev Environ Contam Toxicol* 226: 33-63.
8. Wjst M, Boakye D (2007) Asthma in Africa. *PLoS Med* 4: e72.
9. ISAAC (2011) The global asthma report 2011.
10. Al-Jahdali H, Anwar A, AL-Harbi A, Bathrooms S, Halwani R, et al. (2012) factors associated with patients visit to the emergency department for asthma therapy. *BMC*12: 80.
11. Sa-Sousa A, Almeida MM, Azevedo LF, Carvalho R, Jacinto T, et al. (2012) Prevalence of asthma in Portugal: The Portuguese national asthma survey. *Clin Transl Allergy* 2: 15.
12. Al-Mazam A, Mohamed AG (2001) Risk factors of bronchial asthma in bahrah, SAUDI ARABIA. *JFCM* 8: 33-39.
13. Ngui R, Lim YAL, Chow SC, de bruyne JA (2011) prevalence of bronchial asthma among orang asli in peninsular malaysia. *Med J Malaysia* 66: 27-31.
14. WHO (2020) Asthma. Geneva
15. Lawson JA, Janssen I, Bruner MW, Hossain A, Picket W (2014) Asthma incidence and risk factor in a national longitudinal sample of adolescent Canadians, prospective cohort studies, *BMC Pulm Med* 14: 51.
16. Costa E, Bergma M, Araujo DV, Costa CH, Rufio R (2013) Asthma and socio-economic reality in Brazil. *World allergy organization J* 6: 1-9.

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17. Khaled NA, D Enarson, J Bousquet (2001) Chronic respiratory disease in developing countries: The burden and strategies for prevention and management. *Bull World Health Organ.* 79: 971-979.
  18. Litonjua AA, Carry VJ, Weiss ST, Gold DR (1999) Race, socio-economic factors and area of residence are associated with asthma prevalence: *Pediatric pulmonary* 28: 394-401.
  19. Al Frayh AR, Shakoor Z, Gad El Rab MO, Hasnain SM (2011) Increased prevalence of asthma in Saudi Arabia. *Ann Allergy Asthma Immunol* 86: 292-296.
  20. Kirenga JB, Nwang MO (2012) The proportion of asthma and patterns of asthma medications prescriptions among adult patients in the chest, accident and emergency units of a tertiary health care facility in Uganda. *Afr Health Sci* 12: 48-53.
  21. Mekonnen D, Mossie A (2010) Clinical effects of yoga on asthmatic patients: A preliminary clinical trial. *Ethiop J Health Sci* 20: 107-112.