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**WOLKITE UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE,
DEPARTMENT OF PUBLIC HEALTH**

ASSESSMENT OF MAGNITUDE, RISK FACTORS, TREATMENT OPTIONS AND OUTCOMES
OF ACUTE EXACERBATIONS OF BRONCHIAL ASTHMA AMONG PATIENTS VISITING
EMERGENCY DEPARTMENT IN WUSH

Proposal to be submitted to Wolkite University College of Medicine and Health sciences, department
of public health.

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A Research proposal to be submitted to Wolkite University College of Medicine and
Health Sciences, department of medicine.

Prepared by: WUSTH medical interns

- Abdelshukur Mohammed
- Gebremeskel Alemineh
- Jima Ejira
- Yokabed Belay

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ACRONYMS AND ABBREVIATIONS

EOPD: Emergency Out Patient Department

GINA: Global Initiatives for Asthma

MEOPD: Medical emergency OPD

TASH: Tikur Anbessa Specialized hospital

URTI: Upper respiratory infection

WHO: World Health Organization

WUSH: Wolkite University Specialized Hospital

ZMH- Zewditu Memorial Hospital

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ABSTRACT

INTRODUCTION: Asthma is a chronic inflammatory disorder of the airways. Most asthma exacerbations can be prevented if management is comprehensive. Poorly managed asthma leads to emergency treatment and hospitalization. It imposes a large burden on individuals and healthcare systems so that periodic research on the prevalence and factors that lead patients to visit ER is mandatory for proper health care planning, management and prevention of the problem in order to reduce health care cost, morbidity and mortality thereby assuring productive citizens.

Objective: This study was aim to assess the magnitude, identify the risk factors, and evaluate the treatment options of acute exacerbations of bronchial asthma among patients visiting the emergency department at WUSH.

Methods: The study was from facility based cross sectional, The study was carried out at WUSH, Ethiopia from November 26, 2023to November 26, 2024G.C. The Source population was all patients who visited EOPD of WUSH during study period. The Study population is all adult patients who present with acute exacerbation of bronchial asthma and visited adult emergency department. All adult patients who visited EOPD of WUSH and diagnosed as a case of bronchial asthma during study period was selected. The sampling technique was by sequential sampling technique. The required data was obtained by preparing a structured check list table. The data was obtained from HMIS logbook of WUSH. Patients with the diagnosis of asthma was retrieved from HMIS log book, and then the data was collected through gathering all medical records of patients with asthma who came in the study period.

1. INTRODUCTION

1.1 Background

Asthma is a common chronic disease that is estimated by the global burden of disease collaboration in 2019 to affect as many as 262 million people worldwide. It is a cause of substantial burden of disease, including both premature death and reduced quality of life, in people of all ages in all parts of the world. Globally, asthma is ranked 24th among the leading causes of years lived with disability and 34th among the leading causes of burden of disease, as measured by disability adjusted life years (1)

Asthma continues to be a major source of global economic burden in terms of both direct and indirect costs. Strategies to improve access and adherence to evidence-based therapies can be effective in reducing the economic burden of asthma in both developed and developing countries. About 1000 people per day die from asthma; these fatalities are of serious concern because many of them are preventable. Although age-specific asthma mortality rates have fallen in many countries over the last decade, the number of deaths certified as asthma has changed little, due to ageing of the population. Avoidable asthma deaths are still occurring due to inappropriate management of asthma, including over-reliance on reliever medication, rather than preventer medication, and these needs to be rectified.(1)

Asthma exacerbations can be associated with a variety of risk factors. Notably, these exacerbations are often associated with exposure to irritants such as cigarette smoke, diesel exhaust fumes as well as inhalant allergens such as house dust mites. Other contributing factors include drugs known to worsen asthma, poor adherence/non-compliance to therapy; extremes weather conditions, exercise and respiratory infections. (2)

The five countries with the highest prevalence of clinical asthma are Australia (21.5%), Sweden (20.2%), UK (18.2%), Netherlands (15.3%), and Brazil (13.0%). This could be due to the effects of increased urbanization and industrialization. (2)

The goal of treatment is to achieve overall clinical control, which entails the achievement of symptom-free control and to minimize future risks. The goal is the same for all severity of the disease current control of asthma includes achievement of symptom relief, reduction in the use of on demand inhalers, improvement in activity, and improvement in lung function. Future risk minimization is achieved by ensuring the absence of asthma exacerbations, the prevention of accelerated decline in lung function over time, and no side-effects from medications.(3)

Enormous advances have been made in the understanding and management of asthma in the past 20 years. These include; understanding the inflammatory nature of the disease, use of steroids, add-on of long acting bronchodilators to steroids, use of devices to deliver the medications more appropriately/conveniently, and appreciation of the value of self-management education.(3)

In managing asthma, health-care providers and the patients are often faced with lots of challenges and these challenges of asthma management include challenges in diagnoses, challenges in the treatment, follow-up challenges, and other general challenges.(3)

1.2. Statement of Problem

GINA 2024 estimates that asthma causing 1000 death per day, many of which are preventable. The deaths are mostly attributed to long term sub optimal therapy and delay in obtaining help in acute attacks Studies have shown that damage of the airway epithelium as a result of deleterious effects of uncontrolled asthma, predisposes to respiratory tract infections such as pneumonia.(4)

Asthma is an important non-communicable disease (NCD) affecting people of all ages and is a large worldwide health problem, especially in low- and middle-income countries(5)

The burden of acute exacerbation of asthma in Ethiopia poses a significant public health issue with studies indicating high rates of Uncontrolled Asthma and frequent exacerbation among patients.

Studies have shown that a substantial portion of asthma patients in Ethiopia have uncontrolled asthma. For example, one systematic review found that 45% of asthma patients had uncontrolled asthma and a study in the Tigray region found that 88.9% of asthma patients experience frequent exacerbation. Similarly in Jimma, 64.5% of asthma patients had uncontrolled symptom, often linked to socioeconomic challenges.(6)

Common Predictors: Factors such as incorrect inhalation techniques, frequent use of short-acting beta-agonists (SABA), moderate to severe persistent asthma, comorbidities, and irregular follow-up visits are common predictors of uncontrolled asthma.

Impact

Healthcare Burden: Acute asthma attacks are one of the most common reasons for emergency department visits across all age groups. This places a significant burden on healthcare facilities and resources.(6)

Economic Impact: The cost of managing uncontrolled asthma, including hospital visits, medications, and loss of productivity, can be substantial.(6)

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1.4. Significance of the Study

This study will add knowledge on understanding of the prevalence and factors that lead to emergency. In addition, the study may provide base line information about prevalence of asthma and it may be important for researchers who are interested.

The data obtained in this study may have its own contribution for clinicians for planning and evaluating the management of asthma. It is also expected to assess and promote national asthma management guideline utilization in relation to levels of asthma control.

2. LITERATURE REVIEW

Global Context

Bronchial asthma is a major cause of morbidity and mortality and WHO estimates globally, 300 million are suffering with bronchial asthma with approximately 25,000 asthma related annual death (7).

The global initiative for asthma (GINA) estimates that the global prevalence of asthma ranges from 1 to 18% of total population of different countries. Although assessing the prevalence and incidence of asthma with certainty is challenging due to lack of reliable population based figures that use uniform diagnostic criteria, it has been suggested that approximately 5% of adults in USA and Australia have the disorder (5). And it accounts for approximately 1.6 million emergency room visits in United States each year alone.

Research from high prevalence areas, including parts of Africa, Asia and South America, shows that ED visits for asthma are increasing due to population growth, urbanization and inadequate primary healthcare for asthma management (7).

A study conducted in Portugal on prevalence of asthma reported that the prevalence of 'Diagnosed asthma' was 5.0% (95%CI 4.2 -5.8) and the 'Lifetime asthma' prevalence was 10.5% (95%CI 9.5-11.6). Among those with 'Lifetime asthma', 72.8% had their first asthma attack before 18 years old, 25.5% between 19 and 64 years old and 1.7% after 65 years old. Prevalence was similar in men and women across all age groups. Another study done in the Kingdom of Saudi Arabia in 2001 found the prevalence of asthma to be 12%. (8)

In Malaysia, 73% outpatient clinic attendees are treated for respiratory symptoms, with asthma being a major case. It is estimated that there is 1.6 to 2 million asthmatics in Malaysia. The second Malaysian health and morbidity survey conducted in 1996 showed that the prevalence of asthma among the general population of Malaysia was 4.6 % in children and 4.1% in adults respectively. (9)

It also revealed that 9.9% and 2.7% of asthma cases were moderate and severe forms that required hospitalization, respectively. (25) A cross-Sectional study conducted from 2007-2009 in Malaysia in Orang Asli area showed a prevalence of 1.2% in adults and (1.7%) in children. Regarding gender, the prevalence was slightly higher in females (1.7%) compared to males (1%).

In a study carried in New Zealand comparing regular versus on-demand inhaled bronchodilator therapy, regular inhalation of beta sympathomimetic agent was associated with deterioration of asthma control. Another study was carried out to compare the effectiveness of a β_2 agonist; terbutaline and ICS; budesonide in managing newly diagnosed asthma. The findings revealed that budesonide was more superior to terbutaline. (9)

Asthma management guidelines provide recommendations for the optimal asthma control.

Adherence to asthma guidelines can improve compliance and patient care, which, overall, results in improved patient outcomes.

African context

A systematic analysis estimating asthma prevalence in Africa found a prevalence of 11.7%, totaling over 74 million people in 1990. By 2010 prevalence had increased to 12.8%, affecting approximately 120 million people. All the above result indicates the prevalence is significant.

Studies based on written questionnaires showed that “asthma ever” (cumulative prevalence of asthma) was highest in South Africa (53%, 5-12 years) in 1997, followed by Egypt (26.5%, 11-15 years) in 2005, Nigeria (18.4%, 15-35 years) in 1995, and Ethiopia (16.3%, >20 years) in 1997. The lowest prevalence was recorded in Gambia (1.9%, >15 years) in 1997. (10)

However, across all the studies, the pooled crude prevalence (weighted means) for “current wheeze” was 13.2% (male 10.8%, female 13.1%, mean age 18.4 years), and “asthma ever” was 6.6% (male 6.7%, female 6.3%, mean age 22.9 years). The study indicated that crude prevalence were consistently higher among urban dwellers than rural dwellers. “Current wheeze” was 9.6% (male 12.1%, female 7.0%, mean age 19.6 years) in urban settings and 7.0% (male 5.5%, female 3.8%, mean age 17.5 years) in rural settings. “Asthma ever” prevalence was 5.9% (male 5.6%, female 3.9%, mean age 22.9 years) and 5.1% (male 4.2%, female 3.1%, mean age 17.5 years) in urban and rural dwellers, respectively. (10)

A study conducted in Uganda in March 2012 examined the proportion of asthma cases and the patterns of asthma medication use. The result showed that at the accident and emergency department four hundred and sixteen (416) patients out of 16 800 (2.5%) were diagnosed with asthma. Sixty-nine point seven (69.7%) were female. The median age was 29 years.

Wheezing was the commonest presenting symptom (55%). Only 32.2% of the patients at the A&E department received asthma therapy prescriptions as recommended for managing asthma exacerbations during hospitalization. These results indicate a gap in adherence to the international asthma management guidelines. The recommendation given was to provide training on asthma management for health professionals and to develop local guidelines on asthma management [\(7\)](#).

A literature review conducted in Nigeria on challenges of asthma management also identified the high cost and unavailability of ICS as major obstacles to adequate asthma management. Similar findings were reported from Uganda and Ethiopia [\(11\)](#).

According to the 'Kenya national asthma guidelines', drugs used to treat asthma are classified into 2 groups: Relievers (bronchodilators) and controllers (anti-inflammatory drugs). Relievers are used on an 'as-needed' basis to promptly reverse bronchoconstriction and relieve symptoms. Oral salbutamol is commonly used in Kenya as it is cheap and widely available. However, it has been associated with frequent and severe side effects such as palpitations and tremors. [\(16\)](#)

Ethiopia context

In a study conducted in Ethiopia in 1997, the prevalence of asthma in adults (>20years) was found to be 16% [\(9\)](#). However, a subsequent study conducted by the Global Initiative for Asthma in 2003 reported a decline in prevalence, with asthma affecting 4% of an adults (>20 years). Asthma prevalence was noted to be lower in rural, subsistence areas and higher in the urban areas in the same country [\(4\)](#).

In southwest Ethiopia asthma accounted for 2% of outpatient visits and 5.4% medical admission [\(5\)](#). A cross-sectional study done in Jimma assessing asthma control in patients attending chest clinic of Jimma University Specialized Hospital reported that only 9 subjects (3.8%) were using ICS [\(10\)](#), whereas a similar conducted at Tikur Anbessa Specialized Hospital (TASH) indicated approximately 76% use ICS [\(13\)](#).

Conceptual framework

The conceptual frame work includes the key process, defining variables, and cause and effect relationship. This conceptual framework aims to provide structured approach to understanding the factors influencing the acute exacerbation of bronchial asthma and the relationships between these factors and treatment options.

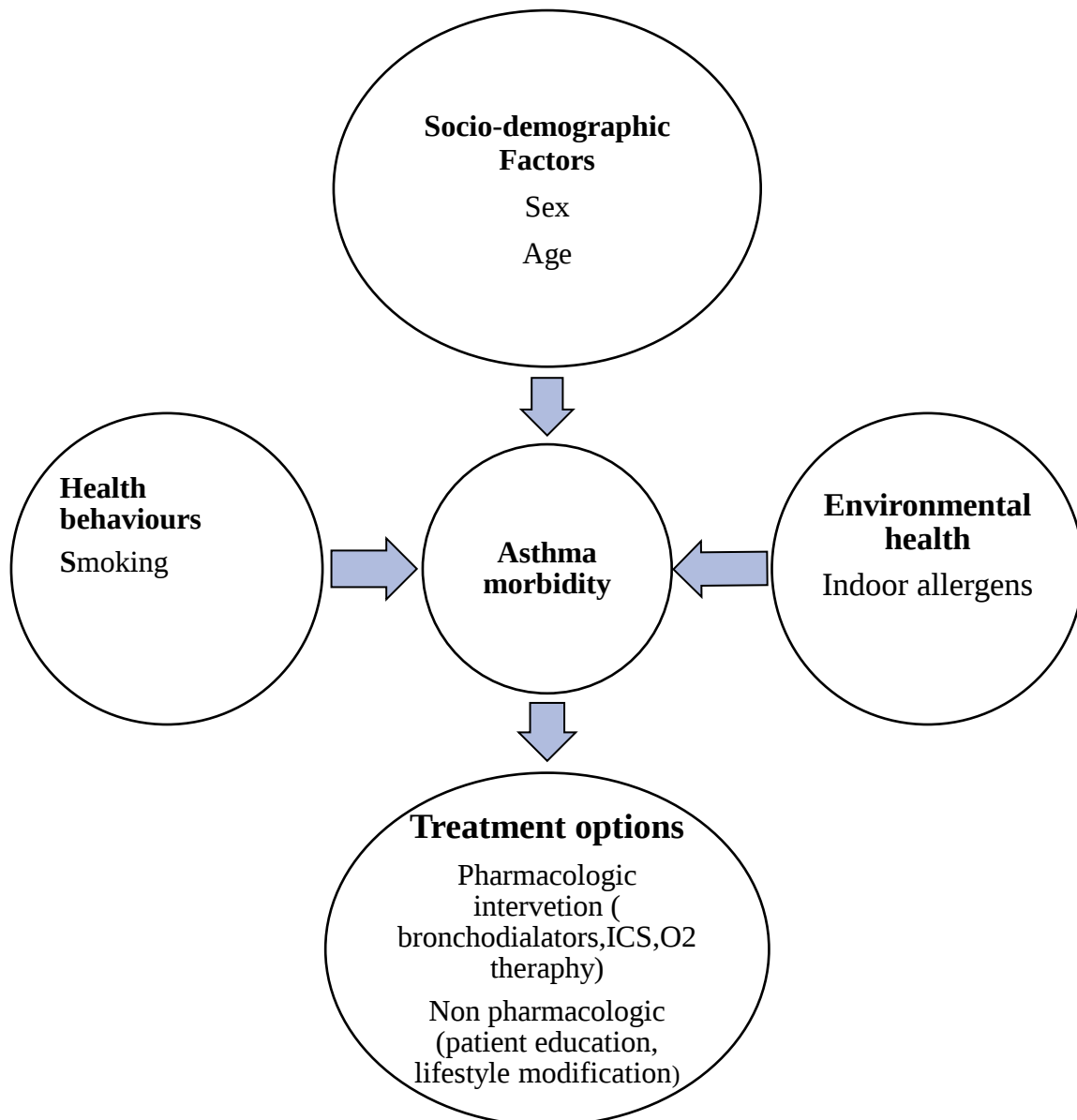


figure 1 conceptual framework(4)

3. OBJECTIVES OF STUDY

3.1. General objectives

To assess the magnitude, risk factors, treatment options and outcomes of acute exacerbations of bronchial asthma.

3.2 Specific objectives

- ✓ To assess the magnitude of patients with acute exacerbation of bronchial asthma
- ✓ To identify risk factors for acute exacerbation of bronchial asthma
- ✓ To identify available means of treatment
- ✓ To determine patient's response to available methods of treatment

4. METHODS AND MATERIALS

4.1. Study area- The study will be conducted in Wolkite University Specialized Hospital (WUSH) which is a referral hospital located in Gubre sub city, Wolkite, Gurage zone, Central Ethiopia. It is about 158km from the capital Addis Ababa, almost halfway between Addis and Jimma. Geographically, it lay between 8°17'N latitude and 37°49'E longitude with an elevation between 1910 and 1935 meters above sea level. It is surrounded by Kebena and Abeshghe woredas, and Chehaworeda. According to the statistics obtained from Wolkite's Town Municipality, the population was 70,796 out of which 35,848 were males and 34,948 females. Gubre sub city is located at about 12 km from Wolkite town in South West direction.

Wolkite university specialized teaching hospital (WUSTH) was established on 2019 GC. This hospital provided full health care service for population Gurage zone and its surrounding in Oromia region such as Silk Amba and Ketawayu as their primary catchment areas. The total number of staff of the hospital was 406 including 6 general surgeon, 5 gynecologist- obstetrician, 8 internist, 45 general practitioners, 10 health officers, 5 anesthetists, 1 dentist, 128 nurses, 23 laboratory technologists, and 24 pharmacists..

4.2 study period- November 25\2024-November 27\2024

4.3. Study design- A facility based cross-sectional study design will be used.

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4.4 Source population- All patients who visited MEOPD of WUSH during study period.

4.5. Study population- All adult clients who presented with acute exacerbation of bronchial asthma and visit

4.6. Inclusion and exclusion criteria

Inclusion criteria

Patients with bronchial asthma who Visited adult Emergency Department of WUSTH will be included.

Exclusion criteria

Patients with diagnosis of chronic bronchial asthma without exacerbation
Patients having bronchial asthma as comorbidity at emergency department

4.7.Sample size determination and Sampling technique

4.7.1Sample size determination

The sample size will be determined by using a formula for estimating a single population proportion assuming confidence level of 95%, 5% marginal error.

$$n_0 = z^2 pq / d^2$$

Where:

n_0 = calculated sample size

Z = Z value of confidence level = 1.96

P = Sample population proportion

d = Margin of error

q = complementary of population proportion

$p=0.16$ will be used from previous study $q=(1-p) = (1-0.16) =0.84$

$$n_0 = (1.96)^2 (0.16)(0.84) / (0.05)^2$$

$= 3.8416 * 0.1344 / 0.0025 = 206.5 = 207$ because in sample size we approximate to next whole number.

we will add 10 % to compensate some contingencies

$$10\%(207) = 10/100 * 207 = 20.7$$

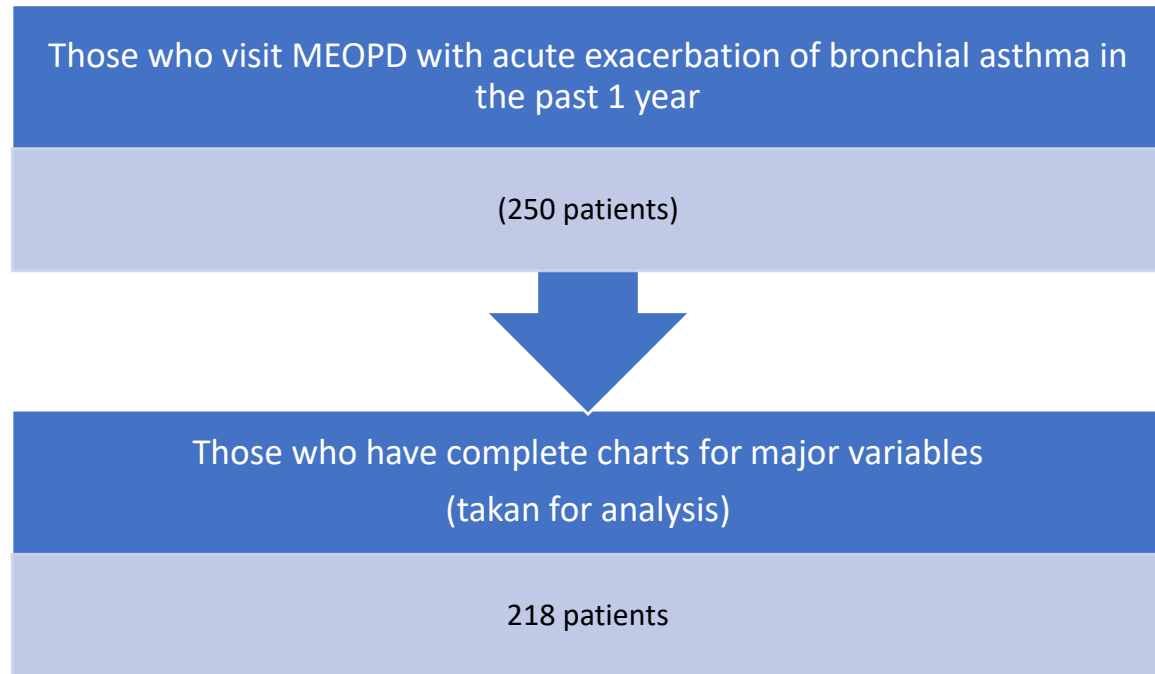
The sample size is $207 + 21 = 228$

Since source population(N) is less than 10000 we use ; $n = n_0 / (1 + n_0/N) = 228 / (1 + 228/4590) = 218$

this is our final sample size

4.7.2 Sampling technique and procedure

The sampling technique was by sequential sampling technique.



4.8. Study Variables

4.8.1 Dependent Variables:

Status of Patients with acute exacerbation of Bronchial Asthma: severity, and outcome.

4.8.2 Independent variable:

Socio-demographic characteristics: Age, Sex, Occupation, Residence, Educational level, smoking habits.

Disease characteristics: sign and symptoms, comorbidity, use of asthma medications, allergy.

4.9. Operational Definitions

Asthma: is a chronic inflammatory disease of the air ways characterized by variable and recurring symptoms, reversible air way obstruction and bronchospasm.(4)

Acute Exacerbations of Bronchial Asthma: are episodes of progressive increase in shortness of breath, cough, wheezing, chest tightness, or a combination of these symptoms.(4)

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 $\geq 95\%$.(7)

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 to 120, oxygen saturation is in 90% to 95%.(7)

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 $<90\%$.(7)

Improvement: those who get symptomatic relief, clear chest, and discharged with inhalers

Death: those with acute exacerbation of bronchial asthma who subsequently deteriorate and die

And death upon arrival.

4.10. Data collection Procedures

4.10.1 Methods of data collection

The data will be collected by members of last year medical students. Data will be collected from patients' charts after tracing by ID number. The information will be collected using a structured check list.

After preparing a check list cards will be collected from the card office by team members. For this purpose the card number in the registration book of medical OPD will be used. After selecting the cards, the structured format will be filled by the team members.

4.10.2 Data Quality assurance and Control

In ensuring the quality of data, all the data for each patient will be checked for completeness, accuracy, clarity and consistency by researchers. The data will be collected from HMIS log book at Medical Emergency OPD(MEOPD).

Data analysis method

Data was analyzed by using SPSS version 27.0.

Both bivariate and multivariate logistic regression analysis were used to identify the predictors of asthma. Adjusted odds ratios with 95% confidence interval was calculated and P-value less than 0.05 was considered as statistically significant. Finally, was displayed by tables, graphs and statements.

4.12. Ethical Considerations

After obtaining ethical approval letter from Wolkite University (WKU) School of health science and medicine for WUSTH and different administrations sector, the objective of the study will be briefly explained to the concerned body. The confidentiality will be maintained during exploring of the data. Details will be only for the purpose of study and will not be used for other purpose.

5. Results

5.1 Sociodemographic results

From the total of 228 patients retrieved from HMIS log book, From these 111 (48.7%) were males and 117(51.3%) were female, giving a male to female ratio of 0.949.

From the study of age group found in the age class of 34-43 years and 54-63 that accounts 37(30.6%) and 32(26.4%) respectively. Only 4 (3.3%) patients found in the age class of 14-23years. The mean age of the patient was 41.88 and standard deviation 11.5. With regard to their residency 103(45.2%) were urban and 125(54.8%) were rural.

Table 5.1. Socio demographic characteristics of Patients

Characteristic		Frequency	Percentage
Age	14-23	8	3.3
	24-43	52	23.1
	44-53	99	43.2
	54-63	65	27.7
	>63	4	1.7
Sex	Male	106	48.6
	female	112	51.4
Residency	Urban	103	45.2
	Rural	125	54.8

5.2 Magnitude of Bronchial Asthma

The total patients who visited adult Medical emergency department of WUSH from NOV- 26 -2023 to NOV-26-2024 were 4590; from this 218 patients were diagnosed with bronchial asthma.

5.3 Sign and symptoms

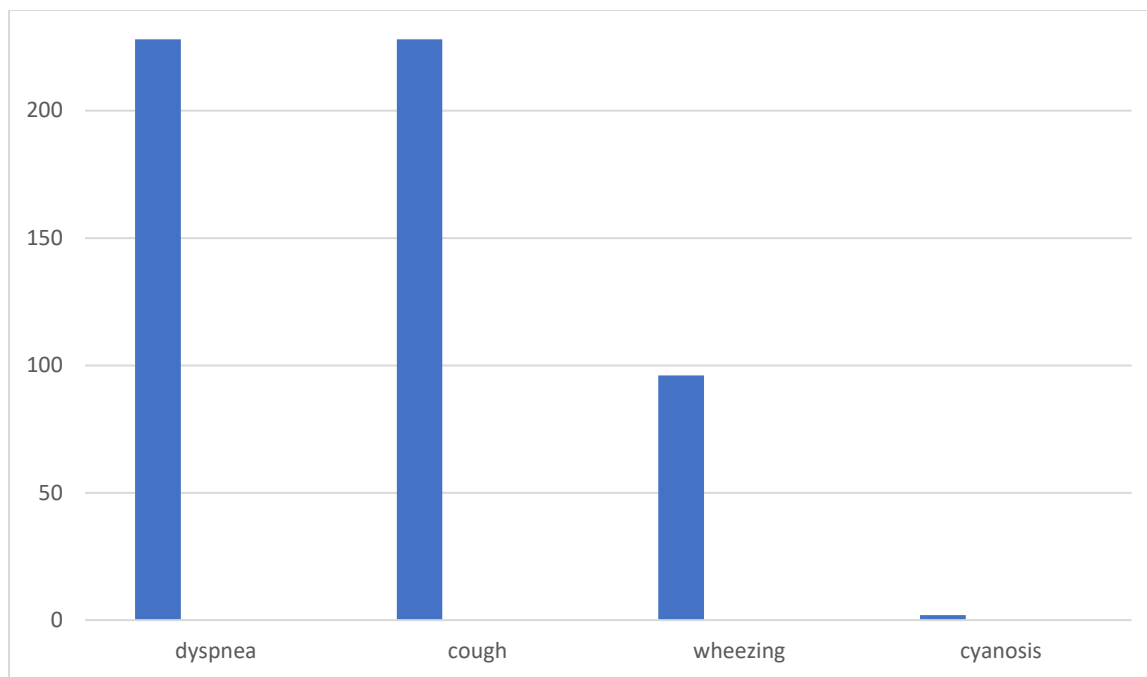


Fig5.3. Sign and symptoms

5.4 Severity of Bronchial Asthma

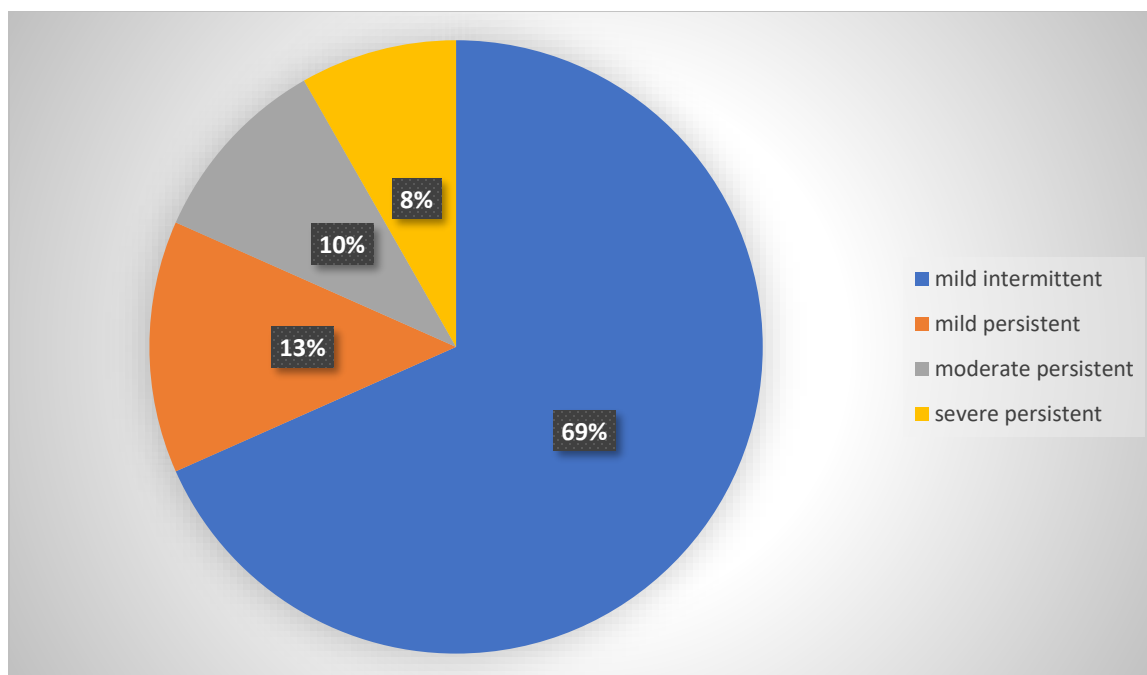


Figure 5.4 – severity of bronchial asthma

5.5 smoking status of the patient

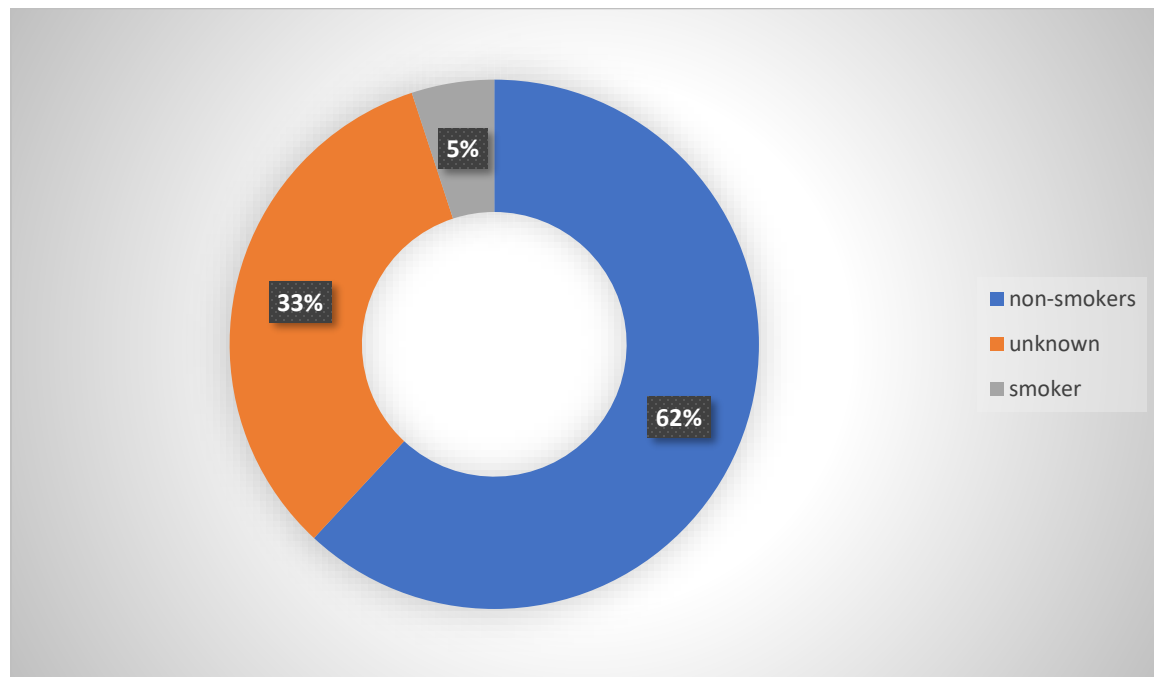


Fig 5.5 Smoking status of patients

5.6 Acute Triggers for Acute Exacerbations of Bronchial Asthma

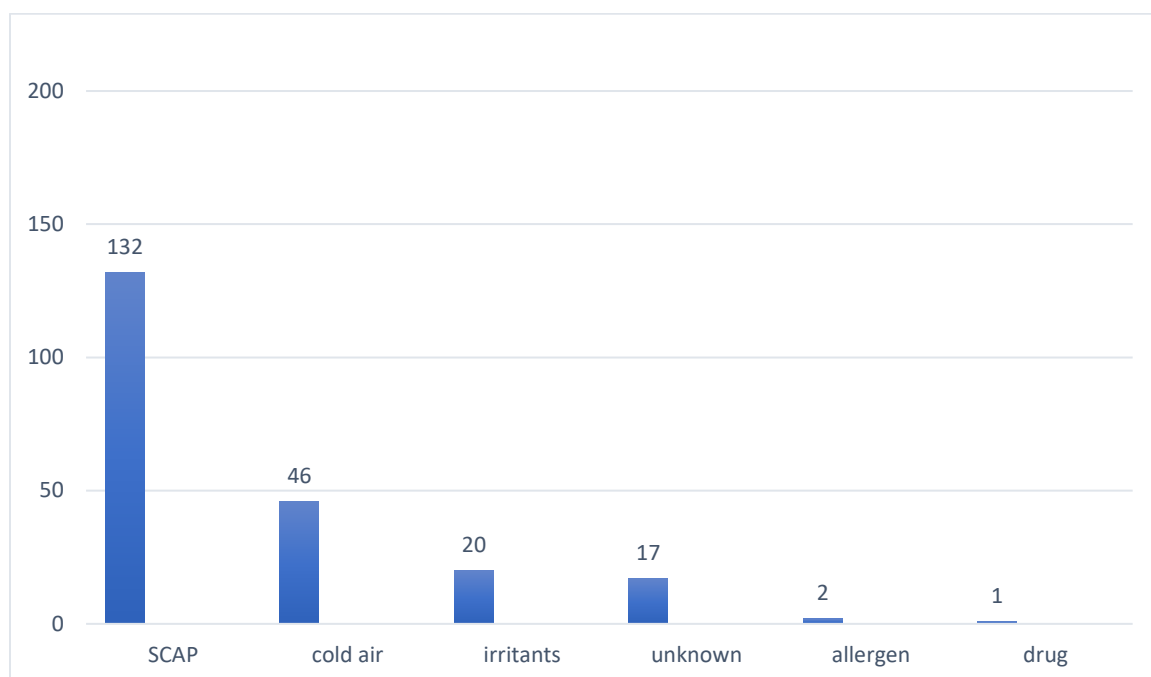


Fig 5.6 Acute Triggers for Acute Exacerbations of Bronchial Asthma

5.7 Physical Examination

Table 5.7.1. Vital sign

Characteristic	Value	Frequency	Percentage
PR	60-100	104	47.7
	101-120	109	50
	>120	5	2.3
RR	14-22	5	2.3
	22-30	128	58.7
	>30	85	39
Saturation	>90	2	9

	80-89	168	77.1
	70-79	48	22
Mental status	Alert	214	98.2
	Altered	4	1.8

Table 5.7.2 WBC and Chest Findings of patients

Characteristic	Value	Frequency	Percentage
WBC	> 12000	96	44
	4000-12000	113	51.8
	<4000	9	4.1
Diffuse wheezing only	Yes	92	47.2
Creptation and wheezing only	Yes	102	46.8
Creptation,wheezing and decreased air entry	Yes	23	5.9

5.8 Pattern of Medication prescriptions

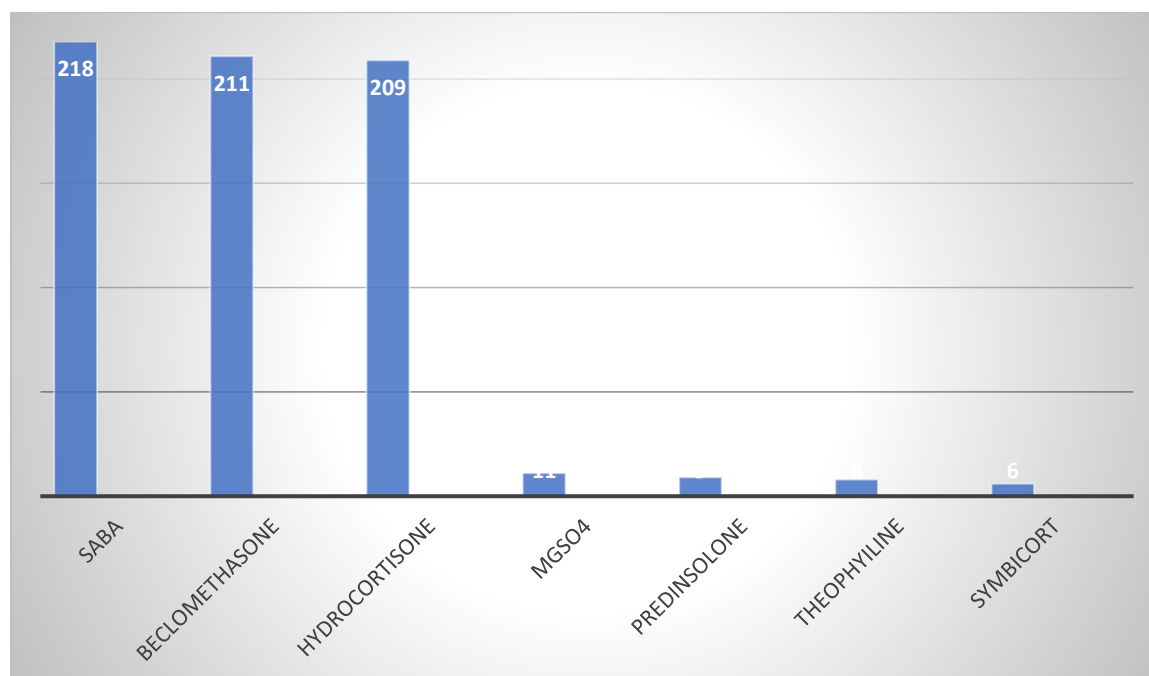


Fig 5.8 Pattern of Medication prescriptions,

5.8.1 Adjunctive Treatment

Characteristic		Frequency	%
Oxygen	Yes	218	100
Antibiotics	Yes	128	56.1
Analgesics	Yes	69	30.3

Table 5.8.1. Adjunctive Treatment for supportive therapy

Table 5.9 Comorbid Diseases

Characteristic	Frequency	%
HTN	8	3.7
DM	3	1.4
HF	2	0.9
Other	5	2.29
None	200	91.7

5.10 Outcome of the patient

Characteristic	Frequency	%
Improved	210	96.3%
Died	8	3.7%

5.3 Factors associated with outcome

Distribution of factors associated with treatment outcome of acute exacerbation of bronchial asthma admitted to wolkite university specialized hospital EOPD, Gurage zone, central Ethiopia, Ethiopia, nov 2023 -nov 2024 for that factors associated with outcome of adults with acute exacerbation of bronchial asthma 8 variables were identified as associated factor for outcome of acute exacerbation of bronchial asthma after bivariate logistic regression analysis was run. after adjusting in multivariate logistic regression; 8 variables such as comorbidity,impending respiratory failure,altered mentation,severe exacerbation of asthma,smoking ,scap,wbc>12000 ,number of hospital ≥ 2 as significant factors affecting outcome of acute exacerbation of bronchial asthma .we used (p-value<0.25) in bivariate logistic criteria the we selected and we put on multivariate logistic regression and the we select (p-value<0.05)

Table 6. Outcome of the patient

Characteristics	Treatment out come		COR (CI95%)	p-value for category of AOR	AOR (CI 95%)
	Improved	Died			
Comorbidity	yes 10 no 213	5 3	1 0.028(0.019-0.21)	0.005	2 4.3(2.51-9.07)
Impending respiratory failure	yes 10 no 208	3 5	9.8(1.507-5.08)	0.019	2 3.3(1.11-6.01)
Altered mentation	yes 3 no 207	5 3	1 0.0087(0.0021-0.252)	0.04	2 2.4(1.48-9.02)
Severe exacerbation of asthma	Yes 7 No 1	200 10	1 0.35(0.3-1.3)	0.02	2 1.98(1.34-5.78)
SCAP	Yes 6 No 90	126 2	2 0.001(0.0008-1.02)	0.029	3.2(0.67-5.1)
Number of Hospital admission ≥ 2	Yes 7 No 1	166 44	2 1.8(2.6-7.98)	0.006	2 4.23(1.68-8.97)

6. DISCUSSION

The male to female ratio was 0.95. This shows the prevalence with regard to sex almost the same. There was a research done in Malaysia in 2009 regarding gender, the prevalence was slightly higher in females (1.7%) compared to males (1%).(9)

Our result showed that the prevalence of acute exacerbation of bronchial asthma is 4.7%. The research done in Zewditu Memorial Hospital in 2017 and in Tikur Anbessa Specialized Hospital in 2015 is 1.5% and 1.04% respectively.(13)

The result showed 43.2 % between 44-53yr, 27.7% between 54-63, 23.1% between 24-43, 3.3% between 14-23, and 1.7% >63. There was a study done in Zewditu Memorial Hospital which was 46.6% in the age groups 34-64. (22). The research done in Egypt in 2015 showed that most belonged to 20–29 years' age group. This might be due to geographical and occupational variability between the countries.

A study conducted in Portugal on prevalence of asthma reported that the prevalence of 'diagnosed asthma' was 5.0% and the 'lifetime asthma' prevalence was 10.5%. Among those with 'lifetime asthma', 72.8% had their first asthma attack before 18 years old, 25.5% between 19 and 64 years old and 1.7% after 65 years old. Prevalence was similar in men and women across all age group.

The result showed that the prevalence of acute exacerbation of bronchial asthma is 4.7%. The research done In Zewditu Memorial Hospital in 2017 and in Tikur Anbessa Specialized Hospital in 2015 is 1.5% and 1.04% respectively. (15) The global initiative for asthma (GINA) estimates that the global prevalence of asthma ranges from 1 to 8% of the total population of different countries. (4). This finding is relatively high from that of a Zewditu memorial hospital in 2017 and in Tikur Anbessa specialized hospital in 2015 that may be due to the presence of exposure to triggering factors is high.

The WHO estimates the prevalence as 3.4%. Prevalence in AFRICA estimated that a prevalence of 6.6% in 2019, and in 2010 prevalence was 12.8% (3). A study done in Uganda in 2010 showed 2.5% were diagnosed with asthma. (11)

According to our study result the most frequently encountered symptoms are Dyspnea , cough and wheezing this finding similar to results that of Zewditu Memorial Hospital in 2017, which was 90.8 % had wheezing, 85% had dyspnea and 80.8 % had cough and in Tikur Anbessa Specialized Hospital in 2015, (91.9%) had wheezing, (88.5%) had breathing trouble, (84.5%) had cough.(13)

Most of the patients visiting adult emergency department 60.6% had URTI as triggering factor, 21.1% has cold air, 9.2% had irritants, 9% had allergen, 1% drugs and, 17% unknown. The findings correlate with symptomatic presentation of patients. This finding is comparable with the research done acute asthma attack among adult asthmatic patients visiting hospitals of Tigray, Ethiopia, 2019 in their study having URTI increases the occurrence of acute asthma attack 6.8 times.

The study done in the national referral hospital in Kampala, Uganda in the 2012 was also comparable which was 67.4% had rainy weather as triggering factor, and 55.8% had URTI. Respiratory tract infections were significant as a risk factor for exacerbations in this study. (17) This is consistent with a study by Nicholson et al which found that URTI/viral infections are the cause of an exacerbation in about 65% of adults with asthma (18).

For our study 21.1% had family history of asthma while the research done in JUSH, Jimma in 2012 showed 26.1%. (14)

The data for evaluation of severity of exacerbation of asthma in our study 95% was severe, 3.7% moderate and 1.3% impending respiratory failure, in contrast to the research done in Tikur Anbessa Hospital in 2015, which revealed 43.9% moderate, 41.9% were mild, and 14.2% severe. Such clinical classification based on the severity of exacerbation of asthma is very important to decide whether the patient can be managed at home or needs to

be hospitalized or he/she is to be admitted to an intensive care unit with or without ventilator support and also such analysis of severity of exacerbation of asthma enables the clinician to select appropriate therapy.

In contrast to this study, in Bangalore, India 2012 a research done revealed, highest number of patients with moderate severity (53%) followed by mild (30%) and severe (17%). (19). According to GINA, severity of asthma according to global initiative for asthma classification 34.4% were mild persistent, 33.6% moderate persistent and 32.1% severe persistent.

Physical examination revealed almost all were tachypneic (97.7%), and 99.1% were desaturating and about 52.3 % were tachycardic. All study subjects had diffuse wheezing up on auscultation. Comparable with the research done in Madrid, Spain in 2014, physical examination revealed 33.5% were tachycardic, 26.8% were tachypneic, wheezing in 77% of cases oxygen saturation <92% was observed in 31% of patients. The difference in the studies may be attributed to that patients in our set up present after they were seen and failed to properly respond at local clinics.

The results of this study showed that most of the patients received combination therapy when compared with individual therapy regarding patterns of medication. From this study finding all patients were given salbutamol, the main reason for its use is rapid onset and low cost. In addition, salbutamol does not increase exacerbation rates and provides instant symptomatic relief, all were prescribed SABA, 9 took OCS, 209 get parenteral corticosteroid and all patients were supplemented with oxygen.

Comparable to this study, study done In Tikur Anbessa Hospital Showed low dose inhaled SABA were 78 (52.7%), medium dose inhaled SABA, 64(43.2%), high dose inhaled SABA, 5(3.4%), systemic CS, (65.5%), oxygen 122(84.4%), and adjective therapy 34(23.0%). The study done in SAUDI ARABIA in 2017 showed, that maximum number of patients (78.9%) were prescribed beta-agonists, salbutamol, 7.89% anticholinergics, (5.26%)

methylxanthines, (21.84%) steroids alone,(4.21%) leukotriene modifiers, (13.16%) miscellaneous. (20)

In Egyptian study done In Bengaluru in 2015, the most commonly prescribed inhaled bronchodilator was salbutamol with ipratropium bromide (87%) followed by formoterol with budesonide (26%) which was in coherence with the study done in Malaysia in which salbutamol was the most commonly prescribed (21) and also study done in Bareilly, which showed inhaled salbutamol was received by 100% of the patients irrespective of the severity.

In our study 6% had comorbidity. In contrast to my study, study done in Jimma Specialized Hospital in 2016 showed that 24% had comorbidity.

From the 218 studied patients 210 (96.3%) were improved and discharged and 8(3.7%) died. The death might be due to severity of asthma and comorbid factors. The risk estimation of smoking status of the patient with the outcome can't be computed because of most of the patients smoking status is unknown. This finding is comparable to the research done in ZMH in 2017, which showed 96.7% had improved and discharge to home and only 3.3% of the studied subjects died.

There was a high prevalence of bronchial asthma in emergency compared to most African countries and slightly higher than some European countries, with slight difference in sex with female predominance. The prevalence was high in age group of 44-53 and 54-63. Majority of the patients with asthma were rural dwellers. Wheezing, cough and dyspnea were the predominant symptoms and signs seen in the study. Most patients came to emergency due to trigger with URTI, cold air and exposure to different allergens. Up on presentation in emergency most patients were tachypneic , desaturating and tachycardic. Most patients with acute exacerbation were classified as mild intermittent asthma. Most of the patients received combination therapy and all patients took salbutamol. The outcome of nearly all patients were good.

Adults with comorbidity are 4.3 times more likely to have mortality rate as compared to those with out comorbidity (AOR=4.3,95% CI=2.52-9.07) and those who have impending respiratory failure 9.8 times more likely to have death as compared to those with no impending respiratory failure .

8. Recommendation

- ☐ *FMOH should provide on the means of reduction of the burden of acute exacerbation of bronchial asthma.*
- ☐ *Patients should be advised by treating physician to avoid most commonly triggering factors for the exacerbation.*
- ☐ *Proper chart documentation and thorough patient assessment should be done by all physicians.*
- ☐ *The available treatment modalities should be carried out for all patients by all health professionals.*

9. Limitation and strength of the study

- The data of patients which are undocumented on the patient's charts were taken as unknown, there were difficulty in finding symptoms, associated factors and the management given for patient due to lack of proper documentation.
- It may not be generalized beyond the study population, and applies for patients with only acute exacerbations.
- The study provides mode of the acute presentation with its clinical, laboratory, physical examination and each patient's medical management.

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- 23.

ANNEX

1. Sociodemographic data

1. Patient card number-----
2. Age of a patient in years-----
3. Sex of a patient A. Male B. Female
4. Residency A. Urban B. Rural
5. Smoking status A. Smoker B. Non-smoker C. Unknown
2. Symptoms seen
6. Wheezing A. YES B. NO
7. Cough A. YES B. NO
8. Dyspnea A. YES B. NO
9. Altered mental status A. YES B. NO
10. Cyanosis A. YES B. NO
3. Physical Examination at Presentation
11. Heart rate A. 60-100 B. 101-120 C. >120
12. Respiratory rate A. 14-20 B. 21-30 C. >30

13. Oxygen saturation A.>90% B.80%-89% C. 70% - 79% D. <70%

14. Mental status A. Alert B. Altered

15. Severity A. Mild Intermittent B. Mild persistent

C. Moderate Persistent D. Severe persistent

4. Acute Triggers

A. SCAP A. yes B. no

B. Cold air A. yes B. no

C. Irritants A. yes B. no

D. Allergens A. yes B. no

E. Drugs A. yes B. no

F. Smoking A. yes B. no

5. Do you have family history of asthma? A. yes B. no

6. WBC count of the patient A. >12000 B. <4000 C. 4000-12000

7. Chest findings of the patient A. diffuse wheezing B. Wheezing and creptation C. Wheezing ,creptation and decreased air entry

8. No of hospital admission of the patient A. once B. twice C. three times D. four & more

9. Pattern of medication given;

16. Bronchodilators

1. SABA A.YES B,NO

2.Theophylline A.YES B,NO

3.Hydrocortisone A,yes B.no

4.predinsolone A.yes B.no

5. Beclomethasone A. yes B. no

6. Symbicort A. yes B. no

7. MgSO₄ A. yes B. no

17. Adjunctive

1. Oxygen A. yes B. no

2. Antibiotics A. yes B. no

3. Analgesics A. yes B. no

18. ICU Admission A. yes B. no

19. Presence of comorbidity

A. HTN B. DM C. HF D. others E. None

20. Presence of complications

A. Pneumothorax B. Atelectasis C. Cor-pulmonale D. Respiratory failure

E. Subcutaneous Emphysema F. none

21. Outcomes

A. Improved

B. Died