



**St. Paul Hospital Millennium Medical College
Graduate Study Program**

**Non-adherence to bronchial asthma treatment and associated
factors in selected hospitals of Addis Ababa**

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Addis Ababa, Ethiopia

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Graduate Study Program**

**Non-adherence to bronchial asthma treatment and associated
factors in selected hospitals of Addis Ababa
A multi-centered cross-sectional study**

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**A thesis to be submitted to St. Paul Millennium Medical College and the
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Medicine**

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Abstract

Background: Asthma is a major global public health concern and killed 455,000 people in 2019 due to poor medication compliance, mainly in low- and middle-income countries. Suboptimal medication adherence negatively impacts patient quality of life and increases healthcare costs. The data on adherence to anti-asthmatic medication and its associated factors among asthmatic patients in Addis Ababa is limited.

Objective: To assess non-adherence to bronchial asthma treatment medication and associated factors in selected hospitals of Addis Ababa, 2023

Methods: A multi-center cross-sectional study was conducted at four selected hospitals in Addis Ababa from March 11 to October 11, 2024. A total of 422 asthma patients aged 18 years and older and using asthma medicines for at least 12 months were recruited randomly. An interviewer-based structured questionnaire will be used to collect the data. The Adherence to Asthma Medication Questionnaire (AAMQ-13) was used to assess the participant's medication adherence. Binary logistic regression analysis was used to identify factors associated with non-adherence to medication. The adjusted odds ratio (AOR) with a 95% confidence interval (CI) will be used to determine the strength of the association. Variables with a p-value of < 0.05 were considered statistically significant.

Results: The study found that the prevalence of nonadherence rate was 135 (33%; 95% CI: 28.6, 37.8%). Not attended formal education (AOR: 3.56; 95% CI: 1.85, 6.88, not attending regular follow-up as scheduled (AOR: 2.77; 95% CI: 1.37, 5.60), poor knowledge (AOR: 2.8; 95% CI: 1.74, 4.50), duration of medication for 6-10 years (AOR: 0.43; 95% CI: 0.22, 0.83) and over 10 years (AOR: 0.42; 95% CI: 0.21, 0.83) were associated with poor adherence

Conclusion: The study found that a third of asthmatic patients are non-adherent to their medication, and half have exacerbated asthma. Strategies to improve adherence include boosting health literacy and focusing on those who haven't attended formal education.

Keywords: non-adherence, suboptimal, asthma, Addis Ababa, Ethiopia

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Abbreviations and acronyms

AOR	- Adjusted Odds Ratio
ASK-12	- Adherence Starts with Knowledge-12 Tool
CI	- Confidence interval
COPD	- Chronic Obstructive Pulmonary Disease
ED	- Emergency Department
ETB	- Ethiopian Birr
GINA	- Global Initiative for Asthma
HMIS	- Health Management Information System
LMICs	- Low- And Lower-Middle-Income Countries
MARs	- Medication Adherence Reporting Scale
NCD	- Noncommunicable Disease
SPHMMC	- St. Paul's Hospital Millennium Medical College
SPSS	- Statistical Package for the Social Sciences

1. INTRODUCTION

1.1 Background

Asthma is a noncommunicable disease (NCD) that remains a significant public health concern globally (1, 2). It is characterized by inflammation and narrowing of the lungs' small airways, causing symptoms like cough, wheezing, shortness of breath, and chest tightness (3). In 2019, 262 million people were affected by asthma, causing 455,000 deaths, mainly in low- and lower-middle-income countries (LMICs), where underdiagnosis and undertreatment are significant challenges (3, 4). Asthma is caused by genetic and environmental factors and can be prevented by avoiding allergens and irritants (5).

Although there is no cure, symptoms can be improved with a combination of medications and avoiding triggers (5). Short-acting beta2 agonists are the first-line treatment for acute asthma symptoms, while anticholinergic medications provide additional benefits when used in combination (6). Corticosteroids are the most effective treatment for long-term asthma control, typically used in inhaled forms(7). Oral corticosteroid medication is commonly used to treat asthma, but its use is linked to poor adherence and increased mortality risk among asthmatic patients (8, 9).

Adherence to asthma management guidelines has significantly enhanced patient quality of life and reduced mortality risk (10). However, poor medication adherence hindered optimal benefits and resulted in uncontrolled asthma(11). In Ethiopia, approximately 30% of asthmatic patients do not adhere to inhaled anti-asthmatic medications(12).

Patients' adherence to medication is influenced by various factors, including patient, physician-physician interaction, and the healthcare system. Patients acknowledge their role in healthcare barriers and emphasize the importance of quality patient-physician interaction and accessibility, requiring a multifaceted approach to treatment plan adherence(13). Despite the implementation of various intervention programs aimed at enhancing adherence in patients with asthma and chronic obstructive pulmonary disease, their effectiveness is often limited (14).

1.2 Statement of the problem

Adherence to anti-asthmatic medications is crucial for improving asthma patients' quality of life and prognosis (15). Poor adherence to anti-asthmatic medications is a serious public health problem (16); it leads to poor clinical outcomes (17). Asthma not only imposes a significant healthcare burden but also a significant economic burden, resulting in both direct healthcare costs and indirect costs like frequent and prolonged hospitalizations and decreased work productivity (18). Poor adherence to asthma medication is a serious concern and contributes to the majority of global asthma-related deaths in LMICs (3).

The World Health Organization is dedicated to enhancing asthma diagnosis, treatment, and monitoring to alleviate the global burden of noncommunicable diseases and advance universal health coverage(3). Multiple intervention programs have been endorsed to improve adherence to asthma medication (17), but suboptimal adherence remains a significant health issue, potentially leading to life-threatening complications (19). As a consequence of suboptimal adherence, the majority of cases resulted in uncontrolled and exacerbated asthma (20, 21). Medication adherence decreased the risk of severe asthma exacerbations by 47% while discontinuing therapy increased the risk by 2.4 times (22).

Adherence to anti-asthmatic medication varies across regions, with non-adherence rates at 8.3% in Morocco(23), 32% in Sweden(24), 34.9% in Egypt (25), 48.5% in Kenya(26), 63.8% in China (27), 86.4% in Kuwait(10), and 86% in Bangladesh(28). Studies in Ethiopia reveal that non-adherence to anti-asthmatic medications is prevalent, ranging from 39.9% at Jimma University Medical Center(29) to 86.1% at selected public referral hospitals in northwestern Ethiopia (20).

Non-adherence to antiasthma medication can be attributed to various factors, such as educational status, family history of asthma, patient knowledge and attitude, adverse drug reaction, co-morbidity, polypharmacy, poor counseling, and disease duration increases the likelihood of non-adherence to anti-asthmatic medications (29-32), whereas, wealth status patients were found to have a positive association with adherence (33).

The quality of asthma care is crucial for improving medication adherence. Collaborating with patients to establish a shared decision-making model that considers their beliefs and preferences can enhance medication adherence and overall patient outcomes in asthma and COPD management (34, 35). Although the high cost and availability of asthma medications pose a significant challenge to effective asthma management in low and middle-income countries, access to adequate treatment is crucial (4, 36). Health institutions in developing countries like Ethiopia face challenges in managing asthmatic patients due to limited diagnostic options and medication unavailability (33).

Furthermore, contrary findings have been reported regarding the duration of medication and adherence level. Some studies reported that patients on medication for over four years are more likely to be non-adherent (28, 32), while others have not found a significant association (33). This underscores the need for further research to understand factors related to non-adherence to medication. There is limited evidence on adherence level and its associated factors in the large capital city of Ethiopia. This study aims to assess the non-adherence to anti-asthmatic medication among asthmatic patients in selected hospitals in Addis Ababa, Ethiopia.

1.3 Significance of the study

The findings of this study will help determine the extent of medication adherence and its associated factors. It will also play a significant role in improving the clinical outcomes of patients whose factors led to uncontrolled asthma and exacerbated asthma. It also aids caregivers and policymakers in establishing evidence-based guidelines by identifying therapeutic communication levels, thereby promoting shared decision-making on medication choice. The results will inform the hospital administrative bodies to develop a plan to enhance patients' medication adherence levels. The study will provide baseline data for internal medicine, emergency departments, managing bodies, program managers, and implementers, and encourage further research on medication adherence levels.

2. LITERATURE REVIEW

2.1 Magnitude of medication non-adherence

A survey of 889 patients in Jilin Province, China, revealed that only 38.4% continued their medication for more than 3 months after discharge, and only 8.66% were regularly reviewed by physicians(21). The Sweden Asthma Study revealed an average adherence value of 68% for regular asthma medications, based on filled prescriptions for all prescribed medications(24). A study in a tertiary hospital in Rajshahi, Bangladesh, found that 86% of 357 patients were non-adherent to inhaler medication (28). A study of 110 asthma patients in Sohag, Egypt, found that 42.2% had high medication adherence, 22.9% medium, and 34.9% low levels among the 110 patients (25).

A study at Mama Lucy Kibaki Hospital in Kenya revealed that 51.5% of patients take asthma medication regularly, while 48.5% do not. The majority forget to take asthma medicines, while 28.8% do not. Additionally, 66.7% of patients stopped using controllers without doctors' advice, while 33.3% never stopped using (26).

The national prevalence of non-adherence to inhaled medications among asthmatic patients in Ethiopia is 29.95% (12). A study of 422 chronic asthma patients from three public hospitals in Bahir-Dar city found that 55.45% of them were non-adherent to their prescribed medicines, while the remaining 188 (44.55%) adhered to their anti-asthmatic medications (30). Similarly, a multicenter study in Eastern Ethiopia from October 2020 to January 2021 involved 416 adult asthmatic patients from six hospitals. The study revealed that 57.2% were non-adherent to medications in follow-up clinics(11).

Another study from Eastern Ethiopia showed that medication adherence was poor; only 109 (34.1%) of the study participants had good adherence to anti-asthmatic medications(32). A study at the University of Gondar found that only 49.4% of respondents adhered to inhalations, while 18.3% of asthmatic patients were not adherent to anti-asthmatic medications(31). A study conducted at Jimma University Medical Center found that 37.9% of patients were non-adherent (29).

A study in north-western Ethiopia found that only 13.9% of patients adhered to prescribed asthma medication, with a majority (74.6%) on optimal dosage. However, 21.8% of prescribers did not follow the guidelines. Most respondents were educated about asthma management, and 91.7 and 89.5% had good relationships with healthcare providers(20). Moreover, a study at Soddo Christian General Hospital in Southern Ethiopia revealed that 59% of asthmatic patients had poor medication adherence, with only 11% having high adherence(37).

2.2 Factors related to medication non-adherence

2.2.1 Socio-demographic characteristics

Studies have found that socio-demographic characteristics of patients were the most important predictors of poor medication adherence. The study revealed a significant correlation between respondents' educational level and non-adherence to medication, with low education levels being linked to poor medication adherence (30). Patients without formal education were 2.71 times more likely to be non-adherent to their medications compared to those who attended higher education(31). The younger patients were more likely to be non-adherent to their inhaler therapy, indicating a higher likelihood of medication exposure after treatment, compared to those aged 31-40(28).

Similarly, the family history of asthma is a significant predictor of non-adherence to antiasthmatic medicines in asthmatic patients, with 87% less likely to do so (30). Moreover, patients' monthly income increase positively correlated with medication adherence, with an average increase of one birr increasing the odds of adherence by 92% (33). A study conducted in Eastern Ethiopia found a significant association between patient occupation and medication adherence, with housewives being 4.27 times more likely to follow anti-asthmatic medications compared to government employees (32).

2.2.2 Patient-related factors

Participants' asthma knowledge significantly influences their medication adherence, with those with good knowledge being 2.92 times more likely to use anti-asthmatic medications (32). Previous education about a disease or medication is strongly linked to non-adherence, with patients with prior educational exposure being more likely to adhere (29). Those who did not receive education about inhalational use were approximately eight times more likely to be non-adherent (30). Similarly, a positive attitude towards asthma is linked to increased adherence to antiasthmatic medication, with participants with a positive attitude being 3.13 times more likely to use these medications compared to those with a negative attitude (32).

2.2.3 Disease and medication-related factors

The duration of the disease among respondents was found to be a significant predictor of medication non-adherence in asthmatic patients, with patients with longer durations showing poorer adherence (30). Those who had taken medication for more than four days were 88% less likely to adhere to their medication(32). Co-morbidity negatively impacts asthma treatment outcomes, increasing non-adherence to inhalational medications by 4.6 times(31).

Polypharmacy significantly contributes to poor asthma medication adherence, with patients taking more than four drugs being 6.5 times more likely to become non-adherent (31). Moreover, the type of medication significantly influences patient adherence, with oral corticosteroids showing better adherence rates. Participants on oral corticosteroids had 1.97 times higher odds of good adherence compared to those on other drugs(32). Furthermore, patients with a history of adverse drug reactions are three times more likely to be nonadherent to treatment compared to those without such reactions(29).

2.3 Conceptual framework

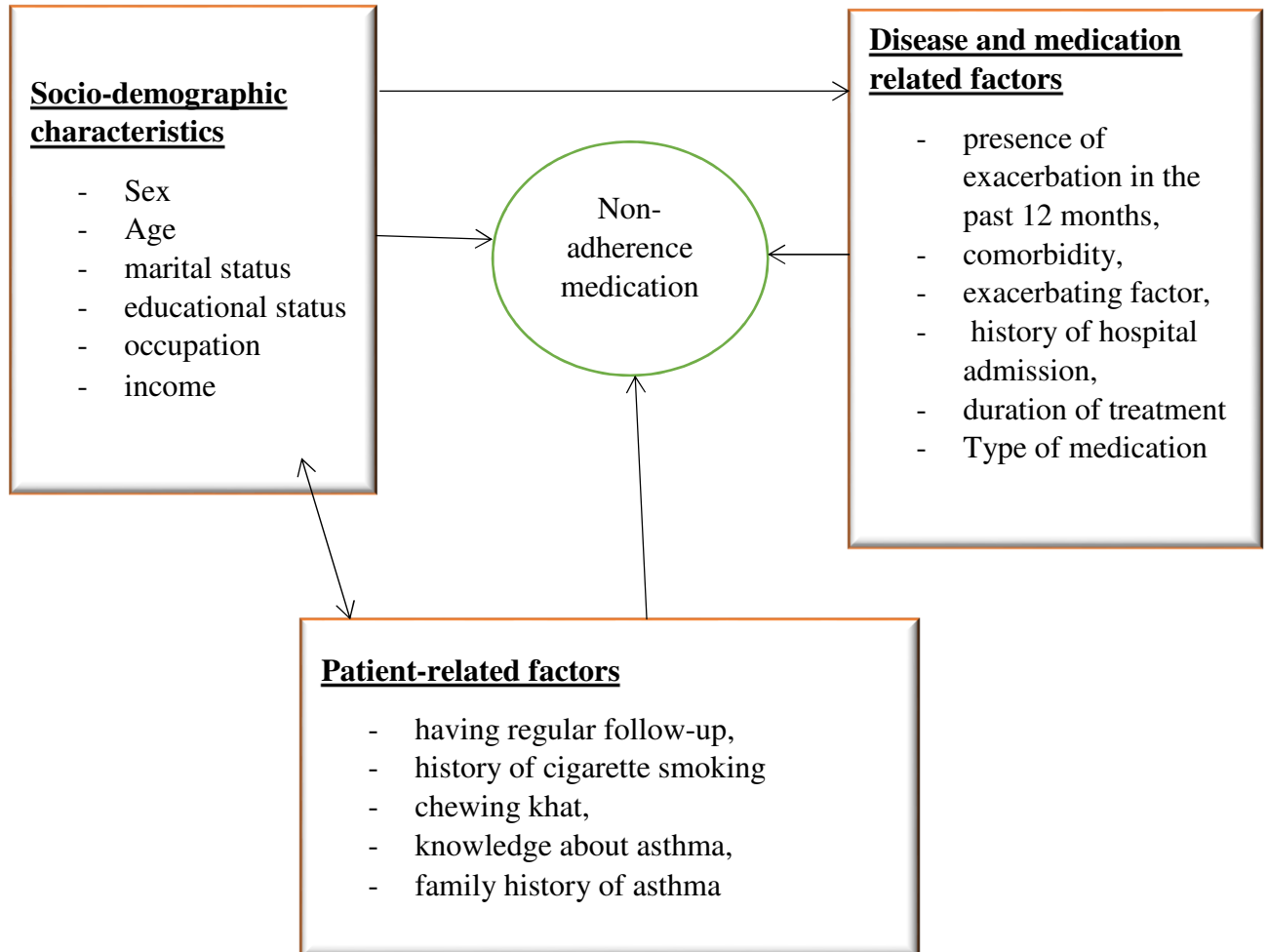


Figure 1 Conceptual framework for the study on non-adherence to bronchial asthma treatment medication and associated factors in selected hospitals in Addis Ababa, 2023, developed from a literature review

3. OBJECTIVES

3.1 General objective

- To assess magnitude non-adherence to bronchial asthma treatment medication and associated factors in selected hospitals of Addis Ababa, 2023.

.2 Specific objectives

- To assess the magnitude of non-adherence to anti-asthmatic medication among asthmatic patients in selected hospitals in Addis Ababa, 2023.
- To identify factors associated with non-adherence to the anti-asthmatic medication among asthmatic patients in selected hospitals in Addis Ababa, 2023.

4. METHODS AND MATERIALS

4.1 Study setting and period

This study was conducted at four selected hospitals (namely St.Paul's Millennium Medical College's Hospital, Yekatit 12 Hospital, Menelik II Referral Hospital, and Alert Comprehensive Specialized Hospital) in Addis Ababa, which is the capital city of Ethiopia.

St Paul's Millennium Medical College was established through a decree of the Council of Ministers in 2010, although the medical school opened in 2007 and the hospital was established in 1968 by the late Emperor Haile Selassie. It is governed by a board under the Federal Ministry of Health. The college has more than 2800 clinical, academic administrative, and support staff that provide medical specialty services to patients who are referred from all over the country, teaching medicine and nursing students and doing basic and applied research. While the inpatient capacity is more than 700 beds, The College sees an average of 1200 emergency and outpatient clients daily and a catchment population of 5 million.

Menelik II Referral Hospital, the first hospital in Ethiopia was established in 1909 and staffed by Russian health personnel. Russia had established ties to Ethiopia during a major battle against an Italian invasion in 1896. It has various professionals including 59 physicians, 203 nurses, 123 other health professionals, and 250 administrative staff, making a total of 635 staff.

Yekatit 12 Hospital Medical College (Y12HMC)- is a national referral and teaching facility located in Addis Ababa city. Y12HMC provides a broad range of medical and dental services to both in and outpatients of all age groups. It provides teaching, general referral, and specialized outpatient, inpatient, and emergence services for more than 10 million people in its catchment areas of Addis Ababa, central Oromia, the northern part of SNNP, southwest afar and south-eastern parts of the Amhara regional states. It has a capacity of 504 beds.

ALERT Comprehensive Specialized Hospital is one of the federal hospitals operating under and controlled by the Minister of Health, Ethiopia. The All African Leprosy Rehabilitation and Training Center (ALERT) was established in 1934 to serve as a specialized

clinical research and training center for Ethiopia, Africa, and beyond on Leprosy, TB, and other relevant infectious diseases. ALERT comprises two big divisions; ALERT Training Division and ALERT Comprehensive Specialized Hospital. Service areas include - Dermatology, Surgery, Internal medicine, Pediatrics, Ophthalmology, Obstetrics & Gynecology and Dental. In 2009 the hospital gave services to 353,975 Outpatient, 7,015 Inpatient, 19,185 Emergency with trauma and 3,129 Delivery among other services provided. The health information management system reports that on average, 470 patients visit the chest clinic and chronic care units in the aforementioned hospitals every month. This study was conducted from November 11, 2023, to January 11, 2024.

4.2 Study design

A multi-centered cross-sectional study was conducted using interviewer questioners.

4.3 Population

4.3.1 Source population

- Asthmatic patients aged 18 years and older who took asthma medication for at least 12 months at health facilities in Addis Ababa were the source population.

4.3.2 Study population

- All asthmatic patients aged 18 years and older who attended follow-up at four selected hospitals during the study duration

4.4 Inclusion and exclusion criteria

Inclusion

- All asthma patients aged 18 years and above and using asthma medicine for at least 12 months were included.

Exclusion

- Asthmatic patients who came with acute exacerbations, have a mental illness or are unable to respond to interviewers, and those with active lung infections and chronic obstructive pulmonary disease, were excluded from the study.

4.5 Sampling size and sampling procedure

The sample size for the first objective was calculated based on a single population proportion formula using EpiInfo version 7 and considering the following assumptions: proportion of non-adherence to antiasthma medication 50.6% at the University of Gondar teaching and referral hospital(31), with a 95% confidence interval, 5% margin of error, and 10% for possible non-response, and the final sample size was 422. All patients will be recruited from each facility until the allotted number is reached

$$n = \frac{(Z_{\alpha/2})^2 * p(1 - p)}{d^2}$$
$$n = \frac{(1.96)^2 * 0.506(1 - 0.056)}{0.05^2}$$
$$n = 384$$

$Z_{(1-\alpha/2)} = 1.96$ confidence level

d^2 = margin of error 5%

p = anticipated proportion of non-adherence (50.6%)

The final sample size was therefore calculated to be 422 after a 10% non-response rate was added.

4.6 Study variables

Dependent variables

- Non-adherence to medication

Independent variable

- Socio-demographic characteristics include (sex, marital status, educational status, occupation, residence, and monthly income)
- patient-related factors (having regular follow-ups, history of cigarette smoking and chewing khat, attitude towards asthma, knowledge about asthma, and family history of asthma)
- Disease-related factors (presence of exacerbation in the past 12 months, comorbidity, exacerbating factor, history of hospital admission, and duration of treatment)

4.8 Operational Definition

Medication adherence: the level of medication use was rated on a five-point Likert scale (1; always; 5; never). Self-reported adherence was reported as the average score of the 13 items (1–5), where higher scores indicate good levels of reported adherence. Non-adherence was defined as an AAMQ-13 score of 13–29 and poor medication adherence (32).

Knowledge: Patients' asthma knowledge was evaluated using 18 items(38), with scores of at least 50% indicating good asthma knowledge, and scores below 50% indicating poor knowledge (32).

4.9 Data collection tool and procedure

The questionnaire was prepared in English and trained personnel was translated accordingly. The questionnaire included items about socio-demographic characteristics, medication adherence, types of medications used, patient-related factors, knowledge about asthma, and disease-related factors.

The Adherence to Asthma Medication Questionnaire' (AAMQ-13), which includes 13 items was used to assess the participant's level of drug adherence (39-41). The tool was used as it

shows good construct, internal, and criterion validity and was employed by previous locally constructed studies. The reliability of the scale was assessed by Cronbach's alpha ($\alpha = 0.8061$)

Data were collected by four trained nurses with bachelor's degrees under the supervision of a nurse with a master's degree. An interviewer-based, structured questionnaire was used. The question was framed as a negative statement to reduce the social desirability bias.

4.10 Data Quality Assurance

A pretest was done on 5% of the study sample patients. Before the data collection period, one day of training was given to data collectors. Onsite supervision was given to solve any doubts with data collection tools and techniques. The collected information was checked for consistency and completeness on the same day by the principal investigator.

4.11 Data process and analysis

Data were collected using an open data kit and exported to IBM SPSS version 25 (SPSS, Chicago, IL) for analysis. Descriptive statistics including frequencies, proportion, mean, and Standard Deviation (SD) were computed. The medication adherence level of the study participants was constructed using principal components analysis. Both bivariate and multivariate logistic regression analyses were done to identify factors associated with non-adherence. Variables having a p-value < 0.25 in the bivariate analysis were candidates for the final multivariate regression analysis. An adjusted odds ratio (AOR) with 95% confidence intervals (CIs) was reported to measure the strength of the association. The model fitness was checked using the Hosmer-Lemeshow test ($p = 0.665$). A p-value of less than 0.05 was considered to declare the presence of statistical significance.

4.12 Ethical consideration

Ethical clearance was obtained from the Department of Emergency and Critical Care Medicine, and the SPHMMC, ALERT, Yekatit 12, and Menelik II referral hospital ethical review committee. The importance of the study will be explained to the participant and confidentiality was reassured through code numbers. Any participant not willing to participate in this study has the right to draw itself at any time.

4.13 Dissemination plan

After completion, the result of this study will be presented in the emergency Medicine and critical care department as a defense. The copies of the final results will be submitted to St. Paul Millennium Medical College and will be distributed to the library, to postgraduate office, and St Paul Hospital administration office, and the Federal Ministry of Health. Lastly, it will be presented at workshops and seminars and will be sent for publication in an international journal.

5. Results

5.1 Sociodemographic characteristics of the participants

A total of 406 asthmatic patients participated in the study, yielding a 96.2% response rate. Nearly one hundred eighty-one (44.6%) of patients aged between 35 and 54 years, with a median age of 49 (IQR = 22) years. About two-thirds (64%) were females, and 368 (90.6%) were married. Sixty-seven (16.5%) had completed college and were above the educational level, while 79 (19.9%) of participants were unable to read and write. Nearly a quarter (22.9%) were government employees, and 117 (28.8%) of participants were unemployed (Table 1).

Table 1 Sociodemographic characteristics of asthma patients at hospitals of Addis Ababa, Ethiopia 2024

Variables	Categories	Frequency	Percentage
Age in years	18–34	64	15.8
	35–54	181	44.6
	>55	161	39.6
Sex	Male	146	36.0
	Female	260	64.0
Marital status	Single	30	7.4
	married	368	90.6
	divorced/separated	3	.7
	widowed	5	1.2
Educational status	Unable to read and write	79	19.5
	Primary education	133	32.8
	Secondary education	127	31.3
	Higher education	67	16.5
Occupation	Government employee	93	22.9
	Private employee	77	19.0
	Housewife	78	19.2
	Unemployed	117	28.8
	Driver	2	.5
	Daily laborer	9	2.2
	Other	31	7.64

5.2 Patient and Disease related factors

One out of every seven (14.3%) of participants chewed khat, and 15 (3.7%) smoked cigarettes. About 363 (89.4%) of the study participants attended their regular medical follow-up as scheduled, and 204 (50.3%) had poor knowledge about asthma. Over half of 185 patients (45.6%) experienced exacerbations in the past year, with 138 hospitalizations (34.0%), with asthma being the primary reason for admission (84.7%). The minimum and maximum disease duration that the patient lived with were 1 and 55 years, respectively, with a median value of 4 (IQR = 8) years. The majority of respondents (91.4%) reported their asthma due to precipitating factors, with cold weather (98.1%) being the most common triggering factor, followed by dyspepsia (19.7%) (**Table 2**).

5.3 Clinical and Treatment Characteristics

Over three-fourths (76.4%) of the respondents had no family history of asthma and 184 (45.3%) of the participants had a comorbid disease. The most frequently encountered comorbid diseases during the data collection period were hypertension (38%), diabetes mellitus (23.9%), and allergic rhinitis (10.9%). The short-acting beta-agonists with inhaled corticosteroids (97.5%) were the most commonly recommended combination for treating bronchial asthma, with 17% of participants taking oral corticosteroids (**Table 2**).

Table 2 Clinical and treatment characteristics of asthma patients at hospitals of Addis Ababa, Ethiopia 2024

Variables	Categories	Frequency	Percentage
Regular flow up	Yes	363	89.4
	No	43	10.6
Smoking	Yes	15	3.7
	No	391	96.3
Chewing khat	Yes	58	14.3
	No	348	85.7
Family history of asthma	Yes	96	23.6
	No	310	76.4
Exacerbation in the past 12 months	Yes	185	45.6
	No	221	54.4
Comorbidity	Yes	184	45.3
	No	222	54.7
Type of comorbidity (n=184)	Allergic rhinitis	20	10.9
	Diabetes mellitus	44	23.9
	Hypertension	70	38.0
	HIV	3	1.6
	Others	118	64.1
Presence of precipitating factors	Yes	371	91.4
	No	35	8.6
Precipitating factors	Dyspepsia	73	19.7
	URTI	21	5.7
	UTI	20	5.4
	Cold weather	363	98.1
Hospital admission in the past 12 months	Yes	138	34.0
	No	268	66.0
Duration of treatment for asthma	1-5 years	254	62.6
	6-10 years	78	19.2
	>10 years	74	18.2
Use of short-acting beta-2 agonists	Yes	396	97.5
	No	10	2.5
Use of Oral corticosteroids	Yes	69	17.0
	No	337	83.0
Knowledge about asthma	Good	202	49.7
	Poor	204	50.3

5.4 Level of asthma medication adherence

The study revealed a medication noncompliance rate of 135 (33%; 95% CI: 28.6, 37.8%) (Figure 2).

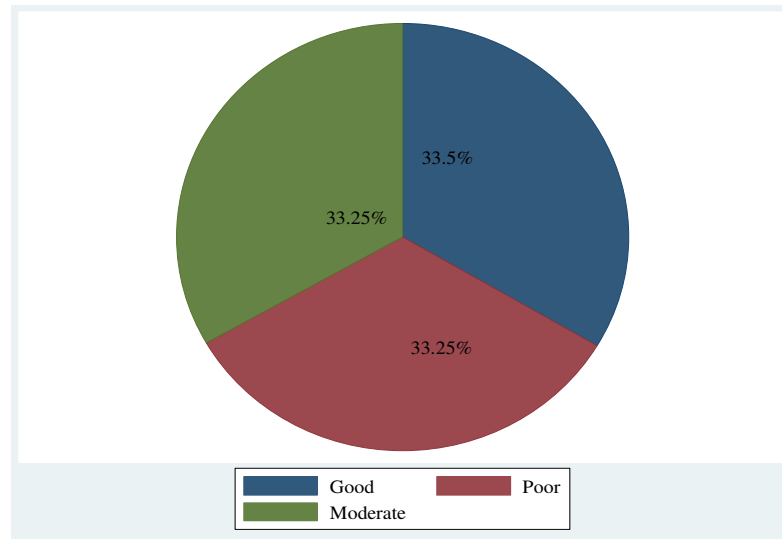


Figure 2 Medication adherence level of asthma patients at hospitals of Addis Ababa, Ethiopia 2024

5.5 Factors associated with nonadherence

In the bivariable logistic regression analysis; age, educational status, regular follow-up, duration of treatment, and knowledge about asthma were found to be a p-value <0.25. In the final model educational status, not attending regular follow up and knowledge were independent risk factors for adherence level of medication.

The likelihood of poor medication adherence was 3.56 (AOR: 3.56; 95% CI: 1.85, 6.88) times higher for those who were unable to read and write compared to those who attended formal education. Likewise, participants who had not attended the regular follow-up as scheduled were 2.77 (AOR: 2.77; 95% CI: 1.37, 5.60) times more likely to be poor adherents compared to their counterparts. The odds of being poor medication adherent were 2.80 (AOR: 2.8; 95% CI: 1.74, 4.50) times higher among those who had poor knowledge about asthma as compared to those with good knowledge about asthma. Moreover, the odds of poor medication adherence were 57% (AOR: 0.43; 95% CI: 0.22, 0.83) and 48% (AOR: 0.42; 95% CI: 0.21, 0.83) less likely for those who were taking medication for 6-10 years and over 10 years, respectively, as compared to those who were taking for less than or equal to five years (Table 3).

Table 3 Factors associated with noncompliance of medication among asthma patients in hospitals of Addis Ababa, Ethiopia 2024

Variables	Categories	Adherence level		COR	p-value	AOR
		Good	Poor			
Age	18-34	44	20	1		
	35-54	135	46	0.74(0.40,1.40)	0.36	0.79(0.40,1.5)
	>55	92	69	1.65(0.88, 3.04)	0.110	1.08(0.50,2.3)
Sex	Male	94	52	1		1
	Female	177	83	0.84(0.55, 1.29)	0.44	
Marital status	Married	251	125	1		
	Currently unmarried	20	10	1.0(0.45,2.20)	0.9	
Educational status	No formal education	33	46	3.72(2.2, 6.20)	<0.001	3.56(1.85,6.88) **
	Attended formal education	238	89	1		1
Regular follow up	Yes	253	110	1		1
	No	18	25	3.2(1.67, 6.09)	<0.001	2.77(1.37,5.60) **
Chewing khat	Yes	41	17	0.8(0.44, 1.48)	0.49	
	No	230	118	1		
Smoking	Yes	8	7	1.79(0.63,5.06)	0.99	
	No	263	128	1		
Family history	Yes	66	30	1		
	No	204	103	1.1(0.67,1.81)	0.67	

Comorbidity	Yes	120	64	1.1(0.74,1.71)	0.57	
	No	151	71	1		
Knowledge about asthma	Poor	109	95	3.5(2.26, 5.49)	<0.001	2.80(1.74, 4.50) **
	Good	162	40	1		1
Use Oral corticosteroids	Yes	48	21	0.85(0.48, 1.49)	0.58	
	No	223	114	1		
Duration on treatment	≤ 5 years	158	96		1	1
	6-10 years	59	19	0.53(0.29,0.94)	0.031	0.43(0.22,0.83) **
	>10 years	54	20	0.6(0.34,1.08)	0.09	0.42(0.21,0.838) **

**significant at a p-value <0.001 AOR; adjusted odds ratio; COR: cured odds ratio

6. Discussion

The study found that the prevalence of nonadherence rate was 135 (33%; 95% CI: 28.6, 37.8%). Factors like not attending formal education, not attending regular follow-up as scheduled, duration of treatment, and knowledge about asthma.

The nonadherence rate was comparable with the national prevalence of Ethiopia (29.95%) (12), Jimma University Medical Center (37.9%) (29), Egypt 34.9% (25), and 32% in Sweden (24). Though the finding was lower than a study done in China, 38.4% (21), in Bangladesh 86% (28), Kenya (51.5%) (26), Bahir-Dar city 55.45% (30), 57.2% in Eastern Ethiopia (11), 50.6% in University of Gondar (31) 59% in Soddo Christian General Hospital Southern Ethiopia (37) and 86.1% in north-western Ethiopia (20). The possible reason for this is a variation in adherence measurement tools, sociodemographic differences, availability of treatment, and proper patient counseling by the treating team. Counseling on proper drug intake and regular follow-up can improve the adherence level, thereby decreasing the risk of exacerbation and death.

The poor adherence to medications has led to life-threatening exacerbations and a significant increase in medical expenses due to frequent and prolonged hospitalization (17). This study revealed that 46.3% of patients experienced exacerbation within the past year, with a third of these patients being hospitalized. The finding was lower than the study done in public hospitals in northwestern Ethiopia (53.1%) (20) and Soddo Christian General Hospital, Southern Ethiopia (60.4%)(37). This might be a difference in knowledge about asthma, medication adherence, and living arrangements; plant and flower seeds and dust are widely available trigger asthma factors for asthma in rural areas that may be attributable to the higher prevalence of exacerbations.

The study found that education level significantly impacts medication adherence, with patients not attended formal education experiencing about fourfold higher rates of non-adherence. The finding is consistent with a study conducted in public hospitals of Bahir Dar City(30) and the University of Gondar Teaching and Referral Hospital (31). This is because individuals' literacy level significantly influences their healthcare-seeking behavior, as

educated individuals are more knowledgeable about uncontrolled asthma complications and drug regimens and are more likely to adhere to their prescribed medications.

Participants' asthma knowledge significantly influences their medication adherence, with those with poor knowledge about three times more likely to be nonadherent. The finding was supported by a study conducted in study conducted in six hospitals in Eastern Ethiopia (32). Patient health literacy significantly influences medication adherence, and counseling has been used as a strategy to improve health literacy. However, other factors like medication regimen complexity or side effects may also contribute to poor adherence, highlighting the need for further education and support. A study in Eastern Ethiopia found that individuals with poor knowledge had a fivefold higher likelihood of uncontrolled asthma(11)

Moreover, longer duration on medication significantly reduced the probability of poor medication adherence by 52% and 53% for individuals on medication for 6-10 years and over 10 years. The finding contradicts a Bahir Dar City hospital study that found patients with prolonged disease durations often exhibit poor medication adherence (30). This may be explained by the fact that people with asthma who regularly interact with healthcare providers are more likely to get repeated advice on medication adherence and become aware of the acute and long-term complications of uncontrolled asthma.

Strengths and Limitations of the Study

The study was the first in Ethiopia to use the AAMQ-13 tool to measure medication adherence. The study has limitations, including the inability to establish a cause-and-effect relationship between the dependent and independent variables due to the study's design.

7. Conclusion and Recommendations

7.1 Conclusion

The study found that a third of asthmatic patients were nonadherent to their medication. A sustainable proportion of participants had experienced exacerbation and were hospitalized due to asthma. Factors like not attending formal education, not attending regular follow-ups as scheduled, duration of treatment, and knowledge about asthma were related to poor adherence.

7.2 Recommendations

Based on the findings of the study the following recommendations were forwarded;

For patients

- The asthmatic should attend their regular appointment as scheduled can aid healthcare workers in providing continuous health education on asthma and its complications, especially when uncontrolled.

For healthcare workers

- Providing counseling, and focusing a special emphasis on those who have poor knowledge and have not attended formal education may aid in boosting adherence rates among asthmatic patients.
- Healthcare providers must address these barriers and develop tailored interventions to improve medication adherence among these patients, ensuring their healthcare needs are met effectively.

For policymakers

- Healthcare systems should prioritize strategies that promote patient education and support, such as providing written materials or utilizing digital tools to enhance health literacy and medication adherence.

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ANNEXES

Annex I: Information Sheet and Consent Form

Title of Study: Non-adherence to bronchial asthma treatment and associated factors in selected hospitals of Addis Ababa, a multicentered cross-sectional study

Principal Investigator: Dr. Adey abebaw 2nd year emergency and critical care resident at St. paul's millennium medical college

Name of the Organization St. Paul Millennium Medical College

Name of the Sponsor: St. Paul Millennium Medical College

Introduction:

This information sheet and consent form are prepared to explain the study. Accordingly, you have requested to join. Please listen carefully and ask any questions about the study before you agree to join. You may ask questions at any time after joining the study. This research team includes one principal investigator and two advisors from St. Paul Millennium Medical College

Purpose of Research Project

The purpose of this research is to assess the magnitude of non-adherence to bronchial asthma treatment and associated factors in selected hospitals of Addis Ababa. This study's results will assess medication adherence and its factors, thereby improving clinical outcomes for patients with uncontrolled or exacerbated asthma, and potentially identifying associated factors. Moreover, this study aims to write a thesis as a partial requirement for Partial Fulfillment of Requirements for Specialty in Emergency and Critical Care Medicine.

Procedure

I will be interviewing the patients using a questionnaire to provide me with pertinent data that is helpful for the study. There are about 50 questions to answer, and I will fill out the

questionnaire by interviewing the patients on follow up. The interview with each patient will take about 45 minutes.

Risk/ Discomfort

The risk of participating in this study is very minimal, taking only a few minutes of patient time.

Benefits

Participation in this research project may not directly benefit you, but it will help assess non-adherence to bronchial asthma treatment and associated factors in selected Addis Ababa hospitals, ultimately aiding in the development of prevention and intervention strategies.

Incentives/Payments for Participating

There would not be any direct payment for participating in this study. However, the findings from this research may reveal important information for policymakers.

Confidentiality

The information collected from this research project will be kept confidential, and information about you that will be collected in this study will be stored in a file without your name but with a code number assigned to it. It will not be disclosed to anyone except the principal investigator and will be kept locked with a key.

Right to refuse or withdraw

Your participation in this study is voluntary, You have the full right to refuse to participate in this research or withdraw from the study at any time without losing any of your rights.

Person to contact:

This research project will be reviewed and approved by the ethical clearance committee of St. Paul Millennium Medical College. If you want to know more information, you can contact the committee at the address below. If you have any questions, you can contact any of the following individuals (investigators and advisors), and you may ask them at any time you want.

Participants agree: 1. Yes_____2 No _____ Sign_____Date_____

Principal Investigator:

Full name: Dr. Adey Abebaw

Cell phone: 0918181082

E-mail: adeyabebaw1@gmail.com

Annex II: Questioner

Part I: Socio-demographic characteristics

S.no	Question	Response	Skip
101	Age	_____ in years	
102	Sex	1. Male 2. Female	
103	Marital status	1. Single 2. married 3. divorced/separated 4. widowed 5. other	
104	Educational status	1. Unable to read and write 2. Primary education 3. Secondary education 4. Higher education	
105	Occupation	6. Government employee 7. Private employee 8. Housewife 9. Unemployed 10. Driver 11. Daily laborer 12. Other	
106	Average monthly income	_____ in birr	
Part II: Patient-related characteristics of study participants			
201	Regular medical follow-up	1. Yes 2. No	
202	Smoking	1. Yes 2. No	
203	Khat chewing	1. Yes 2. No	
204	Presence of family history of asthma	1. Yes 2. No	
Part III: Disease and medication-related factors.			
301	Presence of exacerbation in the past 12 months	1. Yes 2. No	
302	Does the patient have a comorbid illness?	1. Yes 2. No	If no skip to 304
303	If yes 302, Types comorbid illness (multiple response is possible)	1. Allergic rhinitis 2. Diabetes mellitus 3. Hypertension	

		4. Human Immune deficiency virus 5. Others	
304	Does the patient have the precipitating factor?	1. Yes 2. No	
305	If yes 304, Types of precipitating factor	1. Gastroesophageal reflux disease 2. Upper respiratory tract infection 3. Urinary tract infection	
306	Hospital admission in the past 12 months	1. Yes 2. No	
307	If yes 306, the reason for hospital admission	1. Asthma 2. Others	
308	Duration of treatment for asthma	___in year	
309	Use of short-acting beta-2 agonists	1. Yes 2. No	
310	Use of Oral corticosteroids	1. Yes 2. No	

Part IV: knowledge related

	Question	Yes	No
401	Pollen (plant and flower seeds) may trigger asthma symptoms		
402	Wheezing is a common symptom of asthma		
403	Asthma is a non-contagious disease (ie, may not spread between people through contact or touch)		
404	Poor treatment of asthma may lead to severe consequences and possibly death		
405	Taking Ventolin [salbutamol) before exercise will not help in preventing asthma symptoms		
406	Using more Ventolin [salbutamol) puffs alone may improve asthma condition		
407	The long-term use of inhaled asthma medications could lead to addiction		
408	Asthma could affect the person at any age in his/her life		
409	In the absence of asthma symptoms, no need to take any asthma medications		
410	Stress is one of asthma inducers		
411	Asthma is a chronic inflammatory disease of the airways		
412	Occasional stopping of the regularly used steroid inhaler does not affect asthma		
413	The incorrect use of an inhaler could lead to an asthma attack		
414	Rinsing the mouth with water is necessary after using the regular steroid		

	inhaler		
415	Inhalers are essential medicines for the treatment of asthma		
416	Shortness of breath is a common symptom of asthma		
417	Cough is considered a symptom of asthma		
418	Asthma is a widespread condition in the community		

Part V: Medication adherence

This questionnaire will assess adherence to preventive medication for non-inhaler-using patients with asthma. Please answer based on what you actually do, not based on what should be done regarding your use of your daily preventer.

	Question	Always(1)	Often(2)	Sometimes(3)	Rarely(4)	Never(5)
501	I think I do not need my medication.					
502	I think my medication is not effective.					
503	I alter the dose (use less or more than the prescribed dose)					
504	I stopped taking my medication out of fear of potential side effects.					
505	I do not take my medication because I dislike using corticosteroids					
506	I stop taking my medication when I am feeling well					
507	I take my medication only when I feel breathless.					
508	I stop taking my medication because I have multiple medications to take.					
509	I forgot to take my medication.					
510	I cannot afford my medication.					
511	I stop taking my inhaler because I did not understand my doctor/pharmacist instructions on how to use it.					
512	I do not take my inhaler as I find it difficult to use it					
513	I stop taking my inhaler because I am afraid of becoming addicted to it					

Annex III: AMHARIC VERSION

አባሪ I : የመረጃ መመዝገቢያ እና የስምምነት ቅጽ

የጥናቱ ርዕስ: በአዲስ አበባ ከተማ በተመረጡ ሆስፒታሎች ውስጥ የአስም መደኃኒቶችን በትክክል አለመውሰድ እና ተያያዥ ጉዳዮች፣ ዘርፈ ብዙ ጥናት

ዋና አጥኝ:- ዶ/ር አደይ አበበው በቅዱስ ጳውሎስ ሚሊኒየም ሜዲካል ኮሌጅ የ2ኛ ዓመት ድንገተኛ ጽኑ ህሙማን እስቴሻሊቲ ተማሪ

የድርጅቱ ስም : የቅዱስ ጳውሎስ ሚሊኒየም ሜዲካል ኮሌጅ

የስራንበሩ ስም:- የቅዱስ ጳውሎስ ሚሊኒየም ሜዲካል ኮሌጅ

መግቢያ:-

ይህ የመረጃ መመዝገቢያ እና የስምምነት ቅጽ ስለጥናቱ ለመግለጽ ተዘጋጅቷል። በዚህ መሰረት እርስዎ በጥናቱ እንዲሳተፉ ተጠይቀዋል። እባክዎን በጥናቱ ለመሳተፍ ከመስማማትዎ በፊት በጥሞና ያዳምጡ እና ጥናቱ ግልጽ እንዲሆንልዎ ይጠይቁ። በጥናቱን መሳተፍ ከጀመሩ በኋላም ጥያቄዎችን መጠየቅ ይችላሉ። ይህ የጥናት ቡድን አንድ ዋና አጥኝ እና ሁለት አማካሪዎችን ከቅዱስ ጳውሎስ ሚሊኒየም ሜዲካል ኮሌጅ ያካትታል።

የጥናት ፕሮጀክቱ ዓላማ

የዚህ ጥናት ዓላማ በአዲስ አበባ በተመረጡ ሆስፒታሎች ውስጥ የብሮንካይያል አስም ሕክምናን በአግባቡ ያለመከታተል ችግርና ተያያዥ ምክንያቶች በምን ደረጃ እንዳለ ለመገምገም ነው። የዚህ ጥናት ውጤት የመድኃኒት አወሳሰድ ችግሮችን በመገምገም፣ በከፋ ደረጃ በአስም የሚሰቃዩ ታካሚዎችን ህክምና ውጤታማነት ያሻሽላል፤ ታካሚዎች መድኃኒት በአግባቡ የማይወስዱባቸውን ምክንያቶችም የመለየት እድል ይሰጣል። በተጨማሪም ይህ ጥናት በድንገተኛና ጽኑ ህሙማን ህክምና ስቴሻሊቲ ትምህርት መስፈርቶች ከፊል ማሟያ የሚሆን የጥናት ሰነድ ለማዘጋጀትም ያለመ ነው።

የጥናቱ አካሄድ (በዋና አጥኝ)

- ቃለ መጠይቁን በመጠቀም ለጥናቱ አስፈላጊ የሆኑ የታካሚዎችን መረጃ መሰብሰብ፤
- የህክምና ክትትል እየተደረገላቸው ላሉ የጥናቱ ተሳታፊ ተጠያቂዎች ለእያንዳንዳቸው 50 ጥያቄዎችን በቃል በማቅረብ ምላሻቸውን መቀበል፤
- ከእያንዳንዱ ታካሚ ጋር የሚደረገው ቃለ መጠይቅ በአማካይ 45 ደቂቃ ያህል ይወስዳል።

ስጋቶች/ አሳሳቢ ሁኔታዎች

በዚህ ጥናት ለመሳተፍ የሚያሳስብ ነገር የለም። ከታካሚ ጊዜ ላይ ጥቂት ደቂቃዎችን ብቻ የሚወስድ ነው።

ጥቅሞች

በዚህ ጥናት ፕሮጀክት ውስጥ በመሳተፍ በቀጥታ የሚያገኙት ጥቅም ላይኖሮ ይችላል። ነገር ግን በተመረጡ የአዲስ አበባ ሆስፒታሎች ውስጥ የብሮንካይቲስ አስም ህክምናን በአግባቡ አለመከታተል እና ምክንያቶቹን ለማወቅ ይረዳል፣ በውጤቱም የብሮንካይቲስ አስም የመከላከል እና ህክምና ስትራቴጂዎችን ለማዘጋጀት ይረዳል።

ለተሳትፎ ማበረታቻዎች/ክፍያዎችን በተመለከተ

በዚህ ጥናት ውስጥ በመሳተፍ የሚገኝ ምንም አይነት ቀጥተኛ የገንዘብ ክፍያ የለም። ሆኖም፣ ከዚህ ጥናት የሚገኙት ግኝቶች ለፖሊሲ አውጪዎች ጠቃሚ መረጃን ሊያሳዩ ይችላሉ።

ሚስጥራዊነት

በዚህ የጥናት ፕሮጀክት ከእርስዎ የሚሰበሰበው መረጃ በሚስጥር ይጠበቃል። የእርስዎ ስም በዚህ ጥናት ውስጥ ከሚሰበሰቡት መረጃዎች ጋር አብሮ አይቀመጥም። ነገር ግን በስምዎ ምትክ ልዩ ቁጥር (ኮድ) በተሰጠው ፋይል ውስጥ ይቀመጣል። የእርስዎ ማንነት ለማንም ሌላ ሰው አይገለጽም። በዋና አጥኝ በምስጢር ተቆልፎ ይቀመጣል።

አለመሳተፍ ወይም ተሳትፎዎን የማቋረጥ መብት

በዚህ ጥናት ውስጥ የሚሳተፉት በፈቃደኝነት ነው። በጥናቱ ላለመሳተፍ ወይም ተሳትፎዎን ለማቋረጥ ከፈለጉ ማንኛውንም መብትዎን ሳያጡ በማንኛውም ጊዜ ከጥናቱ የመውጣት ሙሉ መብት አለዎት።

ከዚህ ጥናት በተያያዘ ሊያገኙ የሚችሉት ሰው፡-

ይህ የጥናት ፕሮጀክት በቅዱስ ጳውሎስ ሚሊኒየም ሜዲካል ኮሌጅ የጥናት የብቁነት ማረጋገጫ ሰጪ ኮሚቴ ተገምግሞ ይፀድቃል። የበለጠ መረጃ ለማግኘት ከፈለጉ ከዚህ በታች ባለው አድራሻ ኮሚቴውን ማግኘት ይችላሉ። ማንኛውም አይነት ጥያቄ ካሎት ከሚከተሉት ግለሰቦች (አጥኝን እና አማካሪዎች) አንዳቸውን በፈለጉት ጊዜ በማግኘት ሊጠይቁቸው ይችላሉ።

በጥናቱ ላለመሳተፍ ይስማማሉ? 1. አዎ _____ 2 አይ _____ ፊርማ _____
ቀን _____

የዋና አጥኝ ሙሉ ስም፡ ዶ/ር አደይ አበበው

የተንቀሳቃሽ ስልክ ቁጥር: 0918181082

ኢ-ሜይል: adeyabebaw1@gmail.com

አባሪ II ; ጠያቂ

ክፍል I የሶሻል-ዴሞክራሲ ባህሪያት

ተፃቂ	ጥያቄ	ምላሽ	ዝለል
101	ዕድሜ	_____ ዓመት	
102	ጾታ	1. ወንድ 2. ሴት	
103	የጋብቻ ሁኔታ	1. ያላገባ/ች 2. ያገባ/ች 3. የተፋቱ/የተለያዩ 4. መበለት 5. ሌላ	
104	የትምህርት ደረጃ	1. ማንበብ እና መጻፍ 2. የመጀመሪያ ደረጃ ትምህርት 3. የሁለተኛ ደረጃ ትምህርት 4. ከፍተኛ ትምህርት	
105	ሥራ	1. የመንግስት ሰራተኛ 2. የግል ሰራተኛ 3. የቤት እመቤት 4. ሥራ ፈላጊ 5. ሹፌር 6. የቀን ሰራተኛ 7. ሌላ	
106	አማካይ ወርሃዊ ገቢ	_____ ብብር	
ክፍል II: ከታካሚ ጋር የተያያዙ የጥናት ተሳታፊዎች ባህሪያት			
201	መደበኛ የሕክምና ክትትል አለዎት?	3. አዎ 4. አይ	
202	ሲጋራ ያጨሳሉ?	3. አዎ 4. አይ	
203	ጫት ይጠቀማሉ?	3. አዎ 4. አይ	
204	ከቤተሰብዎ አስም ያለበት ሰው አለ?	3. አዎ 4. አይ	
ክፍል III: ህመም እና መድሃኒት-ነክ ምክንያቶች.			
301	ባለፉት 12 ወራት ውስጥ አስም ተነስቶብዎት/ተባብሶ ነበረ?	3. አዎ 4. አይ	
302	ሌላ ህመም አለብዎት ?	3. አዎ 4. አይ	ከሌለ ወደ 304 ይዝለሉ
303	302 አዎ ከሆነ ፣ ያለብዎት ህመም (ብዙ ምላሽ መስጠት ይቻላል)	6. አለርጂክ ረናይተስ 7. የስኳር በሽታ 8. የደም ግፊት 9. አይች አይ ቪ 10. ሌሎች	

304	በእርስዎ ላይ አስም የሚያስነሱ/የሚቀሰቅሱ መንስኤዎች አሉ?	3. አዎ 4. አይ	
305	304 አዎ ከሆነ ፣ የሚያስነሱ/የሚቀሰቅሱ መንስኤ ዓይነቶች	4. 1 የጨጓራ ህምመም 5. የላይኛው የመተንፈሻ አካላት ኢንፌክሽን/ጉንፋን 6. የሽንት ቧንቧ ኢንፌክሽን	
306	ባለፉት 12 ወራት ውስጥ በህመም ሆስፒታል ጉብተው ነበር?	3. አዎ 4. አይ	
307	306 አዎ ከሆነ ፣ ሆስፒታል የገቡበት ምክንያት	3. አስም 4. ሌሎች	
308	ለምን ያህል ጊዜ የአስም ህክምና ላይ ቆይተዋል?	— አመት	
309	የአጭር ጊዜ beta-2 agonists ይጠቀማሉ?	1. አዎ 2. አይ	
310	የሚዋጥ ኮርቲሲቶይድ ይወስዳሉ? (ፕሬዲኒሶሎን)	3. አዎ 4. አይ	

ክፍል IV: እውቀት እና አመለካከት

	Question	አዎ	አይ
401	የአፅዋት እና የአበባ ብናኝ የአስም ምልክቶችን ሊያስከትሉ ይችላሉ		
402	ከመተንፈሻ አካል የሚወጣ ፋጨት የመሰለ ድምጽ የተለመደ የአስም ምልክት ነው		
403	አስም ተላላፊ ያልሆነ በሽታ ነው (ማለትም በሰዎች መካከል በመገናኘት ወይም በመንካት አይተላለፍም)		
404	የአስም ህክምና አለመከታተል ከባድ መዘዝ ሊያስከትልና ምናልባትም ለሞት ሊዳርግ ይችላል		
405	ከአካል ብቃት እንቅስቃሴ በፊት ሳልቡታሞልን መውሰድ የአስም ምልክቶችን ለመከላከል አይረዳም		
406	ሳልቡታሞልን ጥፍ መጠቀም ብቻ የአስም በሽታን ሊያሻሽል ይችላል።		
407	ለረጅም ጊዜ በመተንፈሻ የሚሰጡ(ጥፍ) የአስም መድኃኒቶችን መጠቀም ሱስ ሊያስይዝ ይችላል		
408	አስም በማንኛውም እድሜ ላይ ያለ ሰውን ሊይዝ ይችላል		
409	የአስም ምልክቶች ከሌሉ ምንም አይነት የአስም መድኃኒት መውሰድ አያስፈልግም		
410	ውጥረት/ጭንቀት የአስም በሽታ ሊያስከትል ይችላል		
411	አስም ይሚቆየ(ሥር ሰደድ) ይመተንፈሻ አካል ህመም ነው		
412	በመደበኛነት የሚጥቀሙትን የስቴሮይድ ኢንሄለር አልፎ ማቆም ጉዳት/ህመም አያስከትልም		
413	ትክክለኛ ያልሆነ የመድኃኒት አጠቃቀም የአስም መባባስ ሊያስከትል ይችላል		
414	መደበኛውን የስቴሮይድ ኢንሄለር ከተጠቀሙ በኋላ አፍን በውሃ ማጠብ አስፈላጊ ነው		
415	ኢንሄለሮች ለአስም ህክምና አስፈላጊ መድኃኒቶች ናቸው		
416	የትንፋሽ ማጠር የተለመደ የአስም ምልክት ነው		
417	ሳል የአስም ህመም ምልክቶች ውስጥ አንዱ ነው		
418	አስም በማኅበረሰቡ ውስጥ የተስፋፋ ህመም ነው		

ክፍል V: የመድኃኒት አጠቃቀም

ይህ መጠይቅ አስም ላለባቸው ሕመምተኞች መከላከያ መድኃኒቶችን መከተልን ይገመግማል። እባኩትን የመድኃኒት አጠቃቀምን በሚመለከት ምን መደረግ እንዳለበት ሳይሆን በተጨማሪም በሚያደርጉት ነገር ላይ ተመስርተው ይመልሱ።

	Question	Always(1)	Often(2)	Sometimes(3)	Rarely(4)	Never(5)
501	መድኃኒቱ አያስፈልገኝም ብዬ አስባለሁ					
502	የእኔ መድሃኒት ውጤታማ እንዳልሆነ አስባለሁ.					
503	መጠኑን አቀይራለሁ (ከተጠቀሰው መጠን ያነሰ ወይም የበለጠ አጠቀማለሁ)					
504	ሊከሰቱ የሚችሉ የጎንዮሽ ጉዳዮችን በመፍራት መድሃኒቱን መውሰድ አቆምኩ.					
505	ኮርቲሲቶይድ መጠቀም ስለማልወድ መድሃኒቶቼን አልወስድም					
506	የጤንነት ስሜት ሲሰማኝ መድሃኒቱን መውሰድ አቆማለሁ					
507	መድሃኒቱን የምወስደው የትንፋሽ ማጠር ስሜት ሲሰማኝ ብቻ ነው።					
508	ብዙ የምወስዳቸው መድሃኒቶች ስላሉኝ መድሃኒቱን መውሰድ አቆማለሁ					
509	መድሃኒቱን መውሰድ ረሳሁ					
510	መድኃኒቱን መግዛት አቅሜ አይፈቅድም					
511	እንዴት እንደምጠቀምበት የዶክተራ/የፋርማሲስት መመሪያዬን ስላልገባኝ ኢንሄሊር መውሰድ አቆማለሁ					
512	ለመጠቀም ስለከበደኝ ኢንሄሊሬን አልወስድም					
513	ሱስ እንዳይይዘኝ/ እንዳይለምድ ስለምፈራ ኢንሄሊር መውሰድ አቆማለሁ					

8. Assurance of Principal Investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress reports to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I will communicate timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the student: _____

Signature: _____

Date: _____

Approval of the Primary Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of the Co-Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____