

# Anti- asthmatic Medications Adherence Assessment and Associated Factors among Asthmatic Undergraduates in University of Port Harcourt, Rivers State

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**Abstract— Background:** Evidence revealed that less than half of patients who suffer from asthma are adherent to their medications. Striving for improved adherence and asthma control is of vital concern in today's asthma management. In a recent document, the World health organization recognized lack of adherence as a major problem in management of chronic disease and concluded that improving adherence would have more beneficial impact on health outcome than improving specific treatment, but study findings addressing its magnitude and associated factors are limited in the country hence, current study was aimed to assess the level of medication adherence among asthmatic undergraduates. **Method:** A descriptive cross-sectional study was carried out on a total of 113 asthmatic undergraduates students who gave their consent to participate in the study. Participants recruited were in Faculties of: Law 18, Sciences 38, Agriculture 36, and Pharmacy 21. Data was collected using structured questionnaire to collect information on socio- demographic, type of medication/s used, medication dose miss as a measure of adherence, and factors responsible for the non-adherence. The data was analyzed using Microsoft Excel 2016. The outputs of different study findings were presented using tables, pie and bar charts accordingly. **Results:** Among 113 respondents 68(60.2%) were female and 45(39.8%) were male. Majority 99(87.6%) of the respondents were within the age range of 18yrs-25yrs, and 5(4.4%) were >30yrs. Overall, 80(71%) of the respondents were non-adherent as regards to missing medication doses as only 33(29%) do not miss their medication doses. The adherence level among Faculty of Law asthmatic undergraduates was significantly lowest ( $p<0.05$ ), 3(16.67%), compared to those in Agriculture, 12(33.3%), Sciences 18(47.4%) and Pharmacy, 15(71.4%). The most common factor affecting adherence was, forgetting to take the medications, 30(62.5%) while 15(27.8%) reported that drugs were expensive, yet, most of the respondents source their medications from private pharmacies, and none obtain their medications from government facility (University health center). 9.1% of respondents reported that they use traditional medicine as alternative treatment, and the same proportion use religious (prayers) as alternatives to asthma medications. **Conclusion:** The level of adherence to medications among asthmatic undergraduates was generally low. Adherence level among Faculty of Pharmacy participants was higher when compared to Faculty of Law, Sciences, and Agriculture. The major factors for missing doses were ranked in descending order from forgetfulness, to too many classes or busy, to fear of medication side effects to stigmatization.

**Keywords—** Anti-Asthma Medications, Adherence, Associated factors, Undergraduates.

## I. INTRODUCTION

The word "asthma" is from the Greek word *ἄσθμα*, *ásthma*, which means "panting".<sup>1</sup> Asthma was recognized as early as Ancient Egypt.<sup>2</sup> Asthma often begins in childhood, and the rates have increased significantly since the 1960s.<sup>3</sup> Asthma is a long-term condition affecting children and adults alike. In asthmatic condition, the air passages to the lungs become narrower due to inflammation and tightening of the muscles around the small airways. This causes asthma symptoms such as cough, wheeze, shortness of breath and chest tightness. These symptoms occur intermittently and are often worse at night or during exercise. Asthma "triggers" that can induce the symptoms include viral infections (colds), dust, smoke, fumes, changes in the weather, grass and tree pollen, animal fur and feathers, strong soaps, and perfume.<sup>4</sup> Asthma is a disease that is characterized by the spontaneous occurrence of attacks of breathlessness and wheezing, usually at night. The condition occurs with varying severity over a period of several years and sometimes throughout life. With

good management the symptoms may diminish and even disappear. Asthma is thought to be caused by a combination of genetic and environmental factors. Environmental factors include exposure to air pollution and allergens. Other potential triggers include medications such as aspirin and beta blockers. Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry lung function testing.<sup>5</sup> Asthma is classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate.<sup>6</sup> It may also be classified as atopic or non-atopic, where atopy refers to a predisposition towards developing a type 1 hypersensitivity reaction.<sup>7</sup>

There is no known cure for asthma, but it is easily treatable.<sup>4</sup> Symptoms can be prevented by avoiding triggers, such as allergens and respiratory irritants, and suppressed with the use of inhaled corticosteroids.<sup>8,9</sup> Long-acting beta agonists (LABA) or antileukotriene agents may be used in addition to inhaled corticosteroids if asthma symptoms remain uncontrolled.<sup>10</sup> Treatment of rapidly worsening symptoms is usually with an inhaled short-acting beta-2 agonist such as salbutamol and

corticosteroids taken by mouth. In very severe cases, intravenous corticosteroids, magnesium sulfate, and hospitalization may be required.<sup>11</sup>

Report in 2019 showed that asthma affected approximately 262 million people and caused approximately 461,000 deaths.<sup>12</sup> Rates vary between countries with prevalence being between 1% - 18%. It is more common in developed than developing countries. Thus lower rates are found in Asia, Eastern Europe and Africa.<sup>1</sup> Within developed countries it is more common among those who are economically disadvantaged while in contrast in developing countries it is more common in the affluent. The reason for these differences is not well known.<sup>9</sup> Low and middle income countries make up more than 80% of the mortality.<sup>13</sup> while asthma is twice as common in boys as girls, severe asthma occurs at equal rates.<sup>14</sup> In contrast adult women have a higher rate of asthma than men and it is more common in the young than the old.

Global rates of asthma have increased significantly between the 1960s and 2008.<sup>3</sup> and was recognized as a major public health problem since the 1970s. Rates of asthma have plateaued in the developed world since the mid-1990s with recent increases primarily in the developing world.<sup>15</sup> Asthma affects approximately 7% of the population of the United States<sup>16</sup> and 5% of people in the United Kingdom.<sup>17</sup> Canada, Australia and New Zealand have rates of about 14–15%.<sup>18</sup>

In management of asthma, medication adherence is very important with a view on challenges of medication adherence. Such factors include inadequate health literacy and knowledge, mostly in case of asymptomatic diseases; inability to pay for the medication; side effects of the medicines and poly-pharmacy which poses dosing challenges, and forcefulness. Thus in a study by Sarah Serhal et al; (2020)<sup>19</sup> to assess medication adherence in a community population with uncontrolled asthma and to determine the extent and type of medication-related issues contributing to poor asthma control by profiling medication management in those most at risk population with clinically uncontrolled asthma, Participants' health-care concession status and hospital admissions were linked to higher adherence, according to a logistic regression model. This at-risk population has sub-optimal drug management.

In a similar study by Hugo et al; (2013)<sup>20</sup> to determine the adherence rate and identify the predictors of low adherence to asthma controller therapy, the study identified low adherence rate to asthma controller therapy which could be improved if scheduled visits were respected by patients.

In a study of treatment adherence and factors affecting treatment among adult asthmatic patients at Soddo Christian General Hospital, Southern Ethiopia, the authors found that 59% (139) of asthmatic patients had poor adherence for which the most common factors affecting adherence were, forgetting to take their medications 23.5% (25) and being busy with other tasks 17% (18)<sup>21</sup>

In a survey study in rural Lagos on patient medication knowledge governing adherence to asthma pharmacotherapy undertaken in four pharmacies to determine the level of adherence to the anti-asthmatic drugs by asthmatic patients, participants offered a number of reasons to explain their non-adherence.<sup>22</sup> The most common, 58.5% (24), were those who

forgot to take “prevent-er” medication, 21.9% (9), followed by those who were too busy, then the 12.2% (5) who were concerned about side effects, and 7.3% (3) did not believe it was effective. Based on these findings and the result of hypothesis testing ( $p < 0.05$ ), the study established poor medication knowledge, sub-optimal device technique, and disturbing levels of patients adherence with management recommendations.

This study, therefore, aimed to assess medication adherence among University undergraduates who suffer from asthma condition, and to identify possible factors affecting their adherence to medication/s. University undergraduates by virtue of their status are knowledgeable and by establishment have access to health care including medications hence costs of medication should not be a challenge.

## II. METHOD

**Study setting/area:** The study was carried out in University of Port Harcourt, located at Choba, Obio-Akpor local government area, Rivers State, in Niger Delta region of Nigeria. The study was conducted between April and July, 2021

**Study Population:** The study was carried out among University undergraduates students who suffer from asthma and gave their consent to participate in the study, and are in the Faculties of: Sciences; Law; Pharmacy; and Agriculture in the University of Port Harcourt,

Ethical approval was obtained from the University Ethics committee, before commencement of the study.

**Study Design:** The study was a cross sectional one. Questionnaire was developed, designed, pre-tested and used to collect required data from the recruited participants. The first step of the study used questionnaire to identify students who suffer from asthma. The second step was self administered questionnaire on the identified asthmatic undergraduates who gave their consent to participate, to collect further information. This include: demographic data; medication/s used for the asthma control; missed doses; frequency of missing dose; reason/s for missing dose.

### *Inclusion Criteria*

Asthmatic undergraduates students who are in the Faculties of: Sciences; Law; Pharmacy; and Agriculture and were on anti-asthmatic medications.

### *Exclusion Criteria*

Undergraduates who are not asthmatic, and undergraduates who are not in the Faculties of Sciences; Law, Pharmacy or Agriculture, and undergraduate students who are not in University of Port Harcourt.

### *Sample size and sampling Technique.*

There are 12 Faculties in the University of Port Harcourt. Four Faculties were randomly selected for the study. They include: Faculties of Sciences; Law; Pharmacy and Agriculture. First step in the study was to identify respondents who are asthmatic in these 4 Faculties, using questionnaire. In each of the selected Faculty, all the students suffering from asthma who gave their consent were recruited into the study. All identified asthmatic undergraduates who fill the questionnaire were given the second step questionnaire to obtain further information on

the participants, which include: demographic data, medication/s used, doses missed, and associated factors to adherence. From Faculty Sciences 38 students were recruited; 36 asthmatic undergraduates from the Faculty of Agriculture, 21 asthmatic persons from Faculty of Pharmacy and 18 asthmatic students from the Faculty of Law, giving a sum total of 113 asthmatic undergraduates who agreed to participate.

*Data collection procedures*

Data were collected through structured questionnaire which was made available in goggle forms for respondents’ self-report to collect information on Socio-demographic data, medication/s used and adherence level, measured in terms of dose missing and frequencies of miss over one month. The data was checked and analyzed using Microsoft Excel 2016. The outputs of different study findings were presented using tables, pie and bar charts accordingly.

III. RESULTS

Among 113 asthmatic undergraduates that participated in the study 60.2% (68) were female and 39.8% (45) were male. Majority 99(87.6%) of the respondents were within the age range of 18-25 years, followed by 26-30 years, 9(8%) and those above 30yrs was 5(4.4%). It was also found that all the study participants were single (100%), and, most were Christians, 72 (63.7%).

The result shown in Table 1 indicates that more than half of the respondents, 61 (54.%) reported that they had no family history of asthma.

TABLE 1: Socio-demographic data of respondents N = 113

Socio-demographics	Proportion	Percentage
<b>Sex</b>		
Male	45	39.8%
Female	68	60.2%
<b>Age groups (years)</b>		
18-25 years	99	87.6%
26-30	9	8.0%
>30	5	4.4%
<b>Marital status</b>		
Single	113	100%
Married	0	0%
<b>Religion</b>		
Christianity	108	95.6%
Non-christian	5	4.4%
<b>Family history of asthma</b>		
Yes	43	38%
No	61	54%
Do not know	9	8%

*Treatment-related results*

The results shown in Table 2 indicate that majority, 48 (42.5%), of the respondents used broncho-dialator agents (salbutamol) for the management of the asthma condition. This is followed by 38 (33.6%) who used both the broncho-dialator and additional anti-inflammatory agent.

A good percentage, 98(86.8%) , of the respondents claimed they source their medications from private pharmacies, while none of the respondents source their medication from the University health center.

Majority of respondents were taking two pills per day 36(31.8%), while 16(14.2%) were taking one anti-asthmatic

agent per day as 10(8.8%) take more than three anti asthma agent in a day. 11(9.7%) of respondents reported that they used traditional medicine as an alternative treatment, while 9(8%) employ prayers (religious method), but majority, 86(76.1%), claimed they used only their anti asthmatic medication to manage the asthma condition.

TABLE 2: Medications used by participants in management of asthma

Class of anti-asthmatic agent	Frequency	Percentage
Bronchodilators	48	42.5%
Anti-inflammatory agents	27	23.9%
Both (Bronch-dialator + anti-inflammatory)	38	33.6%
<b>Respondents Source of Medication</b>		
Private hospital	5	4.4%
Mission Hospital	5	4.4%
Private Pharmacy	98	86.8%
Government Health Facility (University Health center)	0	0%
Others	5	4.4%
<b>Number of Drugs taken by respondents per day</b>		
One	16	14.2%
Two	36	31.8%
Three	16	14.2%
More than three	10	8.8%
None	35	31%
<b>Treatments other than anti-asthmatic drugs</b>		
Religious methods	9	8%
Traditional methods	11	9.7%
No other treatment used	86	76.1%
I don't know	7	6.2%

*Results on medication adherence and factors affecting*

As shown in Figure 1, more than half of respondents, 80(71%) admitted that they missed their medication dose (non-adherence), while 33(29%) claimed they were adherent.

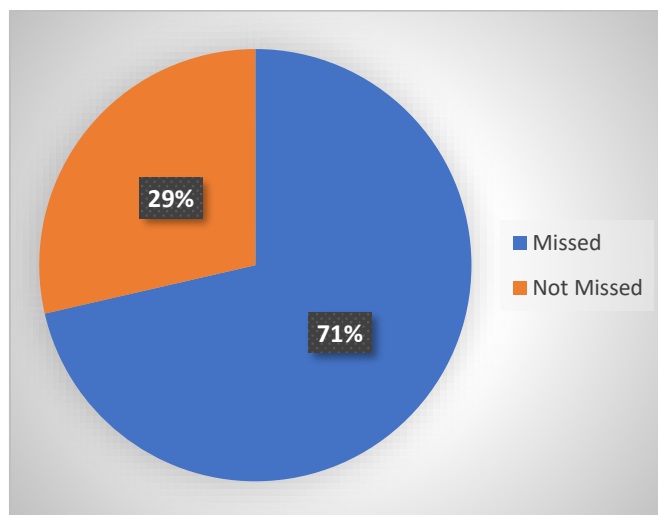


Fig. 1. Respondents’ rate of non adherence (measured as missing doses)

On the other hand, Figure 2 shows the frequency of missing the dose/s over one month period. The result showed that majority of the respondents,53(47%), missed their medication four times or more within one month., while few, 7(6%), missed their medication only once within the month, as 39(35%) missed their medication two times and 14(12%) missed theirs three times within the month.



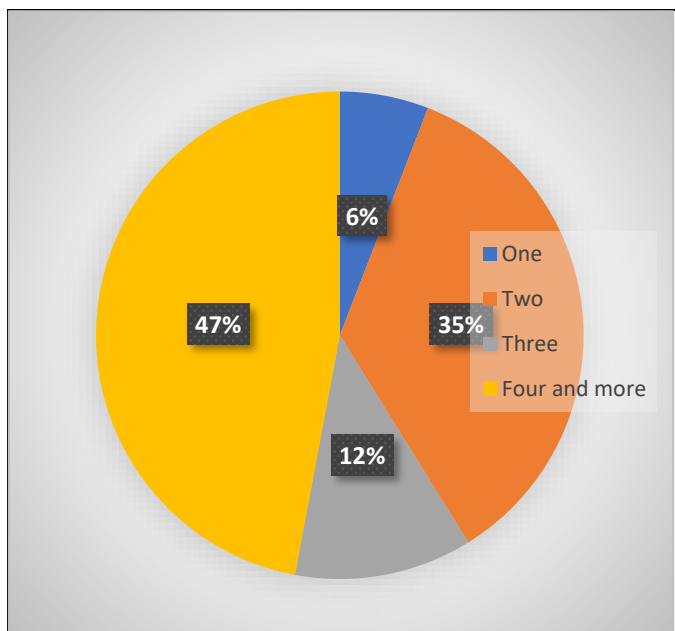


Fig. 2. Respondents' Frequency of missing medication dose over one month

The adherence rate of the respondents according to the Faculty is shown in Figure 3, measured as rate of not missing medication dose within one month.

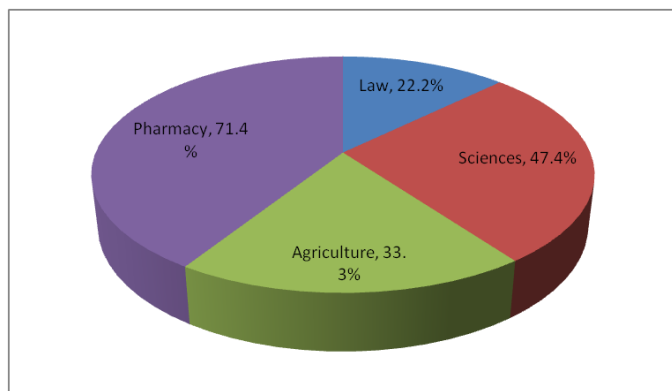


Fig. 3. Respondents' level of adherence according to Faculty, measured as not missing dose over one month

The result showed adherence rate of 4(22.2%) among Faculty of Law; 18(47.4%) in Faculty of Sciences; 12 (33.3%) in Faculty Agriculture; and 15(71.4%) in Faculty Pharmacy.

Adherence level was highest among respondents in Faculty of Pharmacy.

Figure 4 shows the various factors responsible for the non-adherence to asthma medications

The result showed the most common factor for non-adherence was forgetting to take medication. The result showed that most of the respondents, 71(62.5%), forgot to take their medications while 25(22.2%) fear side effects of the medications, as the same number 25(22.2%) fear stigmatization. 31(27.8%) claimed too many classes was responsible for their non-adherence, and the same number 31(27.8%) claimed that the medications are expensive, and 19(16.7%) complained of too many pills and the same number 19(16.7%) claimed clash of

lecture periods as the factor. However, toxicity of drugs, unclear instruction by the service provider, and claim on worsening of condition, did not pose problem on adherence.

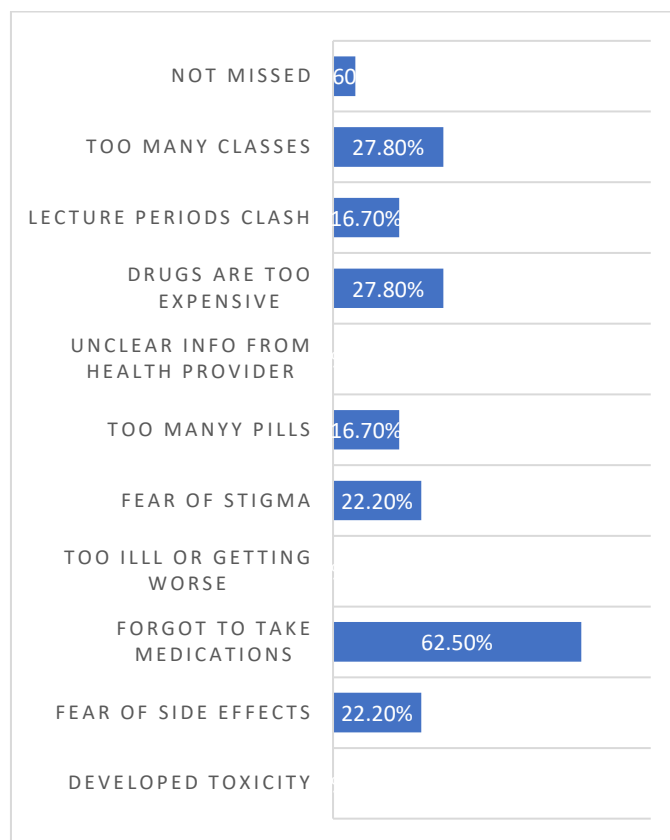


Fig. 4. Factors responsible for Respondents' non-adherence

#### IV. DISCUSSION

This study assessed medication adherence among asthmatic undergraduate students and evaluated the reasons for non-adherence. In management of asthma, improved adherence to enable asthma control is vital to optimize health outcomes and minimize unwanted drug effects, disease progression and health care costs. Non-adherence to treatment program is more common than usually suspected (20-80%) in patients with asthma and other chronic condition<sup>8</sup>

The study population in this work, comprises 45(39.8%) male and 68(60.2%) female and had majority of the respondents within the ages of 18yrs-25yrs, 99(87.6%), which differs from another facility-based study<sup>21</sup> carried out in Ethiopia with more male 62(59%) than female, 38(41%), and majority of the population being within the ages of 36yrs - 45yr, 36(34%), and another study in India<sup>23</sup> with similar age range. Nevertheless, the study population in this work defined the age range.

Overall, adherence rate of the respondents in this study was poor. Non adherence rate was found to be high and consistent with other studies across other populations and areas<sup>21, 23, 24, 25, 26</sup>. Asthma is characterized by spontaneous attack, thus the tendency of the patient to forget that the condition is there, even in the face of asthma triggers, is likely, until the sudden attack. Then the patient remembers to take medication. Little wonder then, that the most common reason obtained in this study for

non adherence was forgetting to take the medication, 71 (62.8%). This is similar to results of work carried in India<sup>23</sup> Ethiopia<sup>21, 26</sup> with possible reason being difference in socioeconomic status of the population, study design and study population. Apart from that, 31 (27.4%) claimed that too many classes (which may be described as being too busy) was the reason for their non adherence. The same number, 31 (27.4%), claimed the drugs were expensive, yet majority 98 (86.7%) of the respondents source their medication from private Pharmacy, and none from University health center. The possible reason may be that the TSHIS (Tertiary Schools Health Insurance Scheme for students do not cover the costs of these anti-asthmatic medications for availability for the students as majority of the respondents use broncho dilator, a likely more expensive anti-asthmatic agent. Furthermore, 25 (22.1%), 19 (16.8%), and 25 (22.1%) of the respondents feared stigmatization, too many pills/clash of lectures, and side effects of the medications, respectively, as reasons for non adherence. This finding is in agreement with the adherence study carried out in Southern Ethiopia<sup>21</sup> which found that the main reasons for missing doses were forgetting to take the medications, 49 (24.5%), being busy with other tasks 38 (19%) and unclear information from the Health care providers about the drugs and their side effects, 29 (14.5%). Adherence level was significantly ( $p < 0.05$ ) lowest among Law undergraduates, 3 (16.7%), while Pharmacy undergraduates had the highest level of adherence 15 (71.4%). This could be related to the result obtained in which Law undergraduates had highest report of too many classes being the reason for missing medication doses. On the other hand, Pharmacy undergraduate program may have placed an advantage on their understanding of the importance of adherence to treatment, hence the Pharmacy undergraduates had the highest adherence level. Again results obtained in this study showed that most of the respondents 61 (54%) claimed not having family history of asthma. Thus, there may be stress-induced asthma playing out more than inherited asthma among the respondents. Improved adherence and asthma control is vital in today's asthma management, as WHO recognized that non adherence is a major problem in management of chronic diseases, and inferred that improving adherence would have more effective impact on health outcome than improving specific treatment.<sup>27</sup>

## V. CONCLUSION

This current study, identified that the level of adherence to asthma medications among asthmatic University undergraduates was generally low. The major reason for missing medication doses was forgetfulness followed by too many classes (which may be interpreted as being busy), Fear of medications side effects and stigmatization were also implicated. Comparing the Faculties, Law had the least adherence level, and most of them complained of too many lectures.

*Conflict of interest:* No conflict of interest is declared

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