HOUSEHOLD ATTRIBUTES IN THE PREVENTION AND MANAGEMENT OF ASTHMA IN CHILDREN ATTENDING SELECTED HOSPITALS IN IBADAN, NIGERIA

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CERTIFICATION

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DEDICATION

Dedicated to the loving memory of my late father **Mr. S.O EJIADE**, thank you for placing me in the path of knowledge, continue to rest in the bosom of God Almighty.

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ABSTRACT

Asthma is one of the most prevalent non-communicable respiratory diseases in less developed countries. Nigeria ranks 49th in asthma prevalence among children worldwide. Previous studies have focused on asthma triggers and the seasonal pattern of asthma in children, yet they have not examined the influence of household attributes and activities on asthma prevention and management among children. This study was, therefore, designed to examine the perceived factors responsible for asthma in children, perceived household attributes and activities influencing its prevention and management, the influence of intergenerational factors and the pathways for seeking care for children living with asthma in Ibadan.

The Health Belief Model served as the framework, while cross-sectional survey design was employed. The University College Hospital (Tertiary Hospital), Adeoyo Maternity Hospital (State Hospital), while Our Lady of Apostles Catholic Hospital (Private Hospital) were purposively selected. A sample of 273 respondents was drawn using Cochran (1977) formula. Purposive sampling was used to administer a structured questionnaire to parents of children aged 6 to 14 years, and physician-diagnosed asthma patients attending asthma clinics comprising UCH (124), Adeoyo Maternity Hospital (84) and Our Lady of Apostles Catholic Hospital (65). In-depth interviews were conducted with 10 children living with asthma in each of the hospitals, while Key Informant Interviews were also conducted with health practitioners in each of the hospitals. Six case studies were conducted with grandparents of children living with asthma to probe the influence of intergenerational factors. The Quantitative data were analysed using descriptive and inferential (chi-square and logistic regression) statistics at $p \leq 0.05$, while the qualitative data were content analysed.

The Respondents' age was 37±5.7years, 87.2% were female, while 63.8% had tertiary education. A majority (67.0%) lived in rented houses, while 69.6% used upholstered furniture and 73.6% used asbestos as roofing material. Nearly half (45.9%) perceived asthma to be caused by environmental factors (dust, smoke and weather conditions), inherited factors (37.5%), spiritual attack (13.0%), and punishment for sin (3.5%). Cooking methods (90.1%), cooking fuel (79.1%) and poor ventilation (72.9%) were reported as household attributes triggering asthma in children. Activities such as frying (χ^2=6.00), baking (χ^2=6.30) and laundry (χ^2=7.14) were significantly associated with regularity of asthma attacks. The respondents' religion (χ^2=10.26), income (χ^2=29.58), family type (χ^2=15.18), ownership of house (χ^2=8.77), type of house (χ^2=23.88), education (χ^2=52.07), household size (χ^2=18.14), age of children living with asthma (χ^2=6.14), occupation (χ^2=18.60) and household decision making (χ^2=4.20) were significantly related to treatment pathways. Family history of asthma was vital in its management in children. Grandparents' experiences of use of natural home remedies such as honey, pawpaw leaves, camphor, mango seeds and turmeric were reported in the management of children with asthma.

Household attributes and activities of children living with asthma in Ibadan influenced the prevention of asthma and was moderated by socio economic status, while natural home remedies were used in the management of asthma. Households with children living with asthma should improve housing conditions and cooking technologies.

Keywords: Children living with asthma, Household attributes and activities, Asthma prevention and management.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Asthma is a chronic health condition and a severe health concern that affects 334 million people throughout the world. The disease is quickly becoming one of the most common conditions around the globe as its incidence rates continue to rise in numerous developing countries (World Health Organization, 2020). Bronchial asthma is a chronic airway inflammatory illness that is characterised by airway hyper responsiveness, which results in airway resistance combined with common yet unpredictable spontaneous or treatment-reversible airflow limits. The symptoms of bronchial asthma include coughing, wheezing, chest tightness, and shortness of breath. The disease is characterised by bronchial hyper reactivity (Global Initiative for Asthma, 2020). Asthma is linked to bronchial hyper responsiveness and fluctuating airflow restriction. It is characterised clinically by recurrent episodes of cough, difficulty in breathing and wheezing which resolve spontaneously or with treatment (Hough, Curtiss, Blain, Liu, Trevor, Deshane and Thannickal, 2020; Garba, Ibrahim and Johnson, 2014).

Asthma is a heterogenous complex chronic respiratory condition with multiple aetiology (McCracken, Veeranki, Ameredes and Calhoun, 2017). The World Health Organization (2020), indicated that asthma affects people from all walks of life, regardless of their economic status. The majority of deaths from asthma, however, are said to occur in low-income and lower-middle-income countries, where asthma is said to account for 15 million disability-adjusted life-years (GINA, 2018). It is therefore one of the fast-rising non-communicable respiratory diseases in developing countries.

Past research has also revealed that asthma is the major cause of hospitalization for children younger than 15 years old in Nigeria, despite the fact that pulmonary tuberculosis is the leading cause of chronic respiratory illness in children in Nigeria, after pulmonary tuberculosis, asthma is the primary cause of chronic respiratory disorder in children. It is also the most common chronic respiratory disorder (AlOtaibi and AlAteeq, 2018; GINA, 2018). It is not known what percentage of children in Nigeria suffer from asthma. However, one thing that can not be disputed is the fact that the incidence rate is on the rise, not just in Nigeria but also across the globe (Kuti, Kuti, Omole, Mohammed, Ologun, and Oso, 2017); Global Initiative for Asthma, 2018; Asher, Montefort, Bjorkstén, Lai, Strachan, Weiland, and Williams, 2006). In the context of Nigeria, Falade, Olawuyi, Osinusi, and Onadeko, (2004), Faniran, Peak, and Woolcock (1999) assert that the burden of asthma in the country is rising, with the prevalence of the condition ranging from 5% to 14.3% of the population. Succinctly, the Global Asthma Report (2011), reveals that asthma is frequently considered to be the form of chronic disease that is most prevalent among children. In agreement to this assertion, the World Health Organization also reports that asthma is also the leading cause of death in children between the ages of 5 and 14, especially in developing countries (Asher and Pearce, 2014). According to the results of a survey that was carried out as part of the International Study of Asthma and Allergies in Childhood (ISAAC) in the year 2003, approximately 14 percent of the children all over the world had symptoms that are consistent with asthma.

The most prevalent clinical symptoms during the incidence of asthmatic attacks include: coughing, shortness of breath, tightness in the chest, and wheezing (WHO, 2020). Not only do these symptoms have a huge impact on the patients, their loved ones, and the caregivers, but it also has a substantial impact on the patients' quality of life, the activities they enjoy doing in their leisure time, and their level of physical activity. According to Samoliński, Fronczak, Kuna, Akdis, Anto, Bialoszewski, Burney, Bush, Czupryniak, Dahl, Flood, Galea, Jutel, Kowalski, Palkonen, Papadopoulos, Raciborski, Sienkiewicz, Tomaszewska, Von Mutius, Willman, Włodarczyk, Yusuf, Zuberbier and Bousquet

(2012), children who have asthma are more likely to have difficulty sleeping, physical constraints, and behavioral or developmental disorders than children who do not have asthma. Over the course of the past two decades, there has been speculation that members of the scientific community have expressed an increasing level of concern regarding the influence that poor indoor air quality has on the health of individuals. The fact that most individuals stay indoors has been cited as a cause for concern (WHO, 2022).

Children are a particularly vulnerable population since their airways are not completely matured, and a sizeable portion of these children spend the majority of their time inside of institutions like schools and homes. As a result, the concentrations of pollutants in the air at these locations are critical considerations for determining children's time-weighted exposure as well as the outdoor contributions they make given how frequently they play outside (Wolfe, McDonald, Arunachalam, Baldauf and Valencia, 2020). This plays a huge toll on the health and wellbeing of children younger than 15 years old who are more susceptible to asthmatic attacks. Also, asthma ranks as the third most prevalent diseases that affect hospitalized child younger than 15 yaers old (AlOtaibi and AlAteeq, 2018).

Evident from existing literature, asthma prevalence is on the rise from 5% to 20% between 2004 and 2014, particularly among children (Ozoh, Aderibigbe, Ayuk, Desalu, Oridota, Olufemi, Egbagbe, Babashani, Shopeyin, Ukwaja and Dede, 2019; Soriano, Abajobir, Abate, Abera, Agrawal, Ahmed and Vos, 2017; ISAAC, 2014). This figure might increase drastically due to westernization and changing household environments (WHO, 2022). The interactions between hereditary and environmental factors can be accountable for the increase (Bijanzadeh, Mahesh and Ramachandra, 2011). In a similar vein, research conducted by Mukherjee and Zhang, (2011), operationalized allergic asthma as an illness that arises as a result of a complicated interaction between hereditary elements and environmental factors. This interaction is thought to play a role in the development of allergic asthma. In addition, other research studies have also revealed that having a family history of asthma is a substantial risk factor for being susceptible to the condition, although the exact origin of asthma is unknown, it is most likely due to a mix of genetic and environmental factors (Mahdi, Mahesh, Mysore, Kumar, Jayaraj and Ramachandra, 2010).

In addition, by Valerio, Andresk, and McGonagle (2010) reported that children of asthmatic parents have a bigger risk of developing asthma than children of non-asthmatic parents. The connection seems to be more powerful if the mother rather than the father is asthmatic. According to Herman (2011), asthma is a disease condition that occurs due to a confluence of many elements, some of which are biological, some of which are environmental, and some of which are social.

More succinctly, asthma is considered to be under control when symptoms are absent or mild throughout the day and night, when lung function is normal or very close to normal, when rescue medication is not required, when there are no limitations on daily activity (including exercise), and when the number of asthma attacks, visits to emergency rooms, and hospital admissions is low or zero (Kuti and Omole, 2016). Hence, to achieve the best possible level of control, active treatment of symptoms is required. The efficacy of this therapy is determined by a variety of criteria, the most important of which is avoiding triggers (Guilbert, Garris, Jhingran, Bonafede, Tomaszewski, Bonus and Schatz, 2011). Also, other research works have revealed that the quality of life and the child's lung function trajectory suffer when asthma is poorly managed and this is mostly associated with restrictions on daily activities, work or school absenteeism, increased health care costs, and an increased incidence of attacks requiring assistance from emergency services and hospital admission (Nagakumar, Davies and Gupta 2020; American Academy of Allergy & Immunology, 2018). The causes of asthma can be broken down into a number of categories. It builds up inside households, and there is a complicated web of connections that links each particular family to the danger. Findings from several research have also suggested that knowing what triggers an asthma attack in a child and how to avoid certain situations can help keep the child's asthma under control (Akhiwu, Asani, Johnson and Ibrahim, 2017; Kuti, *et al.*, 2017). For management to be effective, it is necessary to combine the efforts of children, families, and medical professionals in order to identify and eradicate the agents that are causing the problem.

1.2 Statement of the Problem

Children, a sensitive group with airways that are not fully developed, are highly vulnerable to asthma. Globally, about 14% of children have asthma symptoms. This burden measured by disability and premature death, is greatest in children approaching adolescence (ages 10-14) and the elderly (ages 75-79) (GINA, 2014). Also, Oviawe (2007) documented that asthma affects about 5-10% of school-aged children in Nigeria with another 3-5% probably unrecognized. Nigeria ranks 49 in asthma prevalence among children worldwide and 5.4 percent (about 6 million) of Nigerians suffering from asthma. Studies have shown that the burden of asthma in Nigeria ranged from 5% to 14.3% prevalence (Kuti, *et al.*, 2017; Musa and Aliyu, 2014). According to the International Study of Asthma and Allergies in Childhood (ISAAC), the prevalence of asthma symptoms among Nigerian children has increased from 10.7% in 1999 to almost 20% in 2014. Asthma is among the top 20 chronic conditions for global ranking of disability-adjusted life-years in children (Asher and Pearce, 2014).

Over the past 30 years, the incidence of asthma has increased due to changing environmental factors, especially in low-income and middle-income countries that are least prepared to withstand its impact and by the year 2025, it is projected that an additional 100 million people are likely to be living with asthma (Global Asthma Report, 2011). This makes asthma one of the fast rising non-communicable chronic respiratory diseases in developing countries. This burden remains a public health concern as it is a major cause of illness that depletes limited health resources and consequently reduces the quality of life of the affected person (Onoka, Onwujekwe, Hanson and Uzochukwu, 2010). However, limitations have been established in the asthma data in Nigeria.

Previous studies have examined different aspects of asthma. Scholars have studied asthma in different social groupings and climatic conditions. Specifically, research has been done on asthma and its correlates, prevalence and pattern of its exacerbation in children, burden of individuals with asthma, environmental triggers of asthma, burden of atopy and asthma in children, seasonal pattern of asthma in children (Edelu, Eze, Ayuk and Oguonu, 2016; Musa and Aliyu, 2014; Tosca, Ruffoni, Canonica, Ciprandi, 2014). Despite the large volume of existing literature, much has not been done on household attributes that may influence the prevention and management of asthma in children in Nigeria.

As a result of this, there is a paucity of information regarding the circumstances in which characteristics of households, such as the environment of the home, and how children's asthma prevention and management are affected by production of health in the household. Previous studies have shown that there is a link between the genetic predisposition for asthma and the environmental factors that produce it. According to the findings of these investigations, an individual must come from a family where asthma has been a problem in the past in order for the individual to have an asthmatic reaction to asthma triggers or asthma consequences. Therefore, there is a connection between the aetiology of asthma and one's family history. Although heredity plays a crucial role in the transmission of asthma, the connection between the experiences of previous generations of parents and how it has influenced subsequent generations has not been adequately documented. Despite the availability of literature on the role of genetics on knowledge that genetics play a major part in asthma inheritance, the condition continues to be so widespread.

1.3 Research Questions

The research questions of this study were:

i. What are the perceived factors responsible for asthma in children? This question documented the different factors that are considered as responsible for asthma in children and how they are perceived.

ii. How do perceived household attributes and activities influence asthma prevention and management in children? This question examined the role played by different kinds of household attributes and household activities in the prevention and management of asthma in children and their consequences.

iii. How do parents' asthmatic experiences influence their decisions on asthma prevention and management in children? This question documented the experience of parents' generation and how it has influenced their decisions in asthma prevention and management.

iv. What are the pathways to seeking care for children living with asthma? This question documented the pathway to seeking care for children; the steps taken, movement from a particular health care provider to another; and how the predisposing factors coupled with enabling factors determine the kind of health care to utilise.

1.4 Research Objectives

The general objective was to examine the household attributes in the prevention and management of asthma in children attending selected hospitals in Ibadan, Nigeria

The specific objectives were to:

1. Identify the perceived factors responsible for asthma in children,
2. Explore the perceived household attributes and activities that influence the prevention and management of asthma in children,
3. Examine the influence of intergenerational factors in the prevention and management of asthma in children, and
4. Document the pathways to seeking care for children living with asthma.

1.5 Justification of the Study

It is known that asthma prevalence is on the rise, particularly among children. The increased prevalence may be caused by interactions between inherited and increasing environmental factors. The reason for this is that asthma tends to run in families, and its prevalence may be nearly entirely attributed to genetic vulnerability in conjunction with environmental variables. Effective symptom management depends on multiple factors, including the avoidance of triggers. Asthma tends to run in families, and this fact has been well-documented. However, genetic predisposition is required to respond to such environmental stimuli.

In order to investigate the intergenerational variables and household attributes that influence the prevention and management of asthma in children, it is necessary to comprehend how diverse household activities and parents' sociocultural ideas influence asthma management. If genetic and environmental factors for asthma exacerbations can be demonstrated, the groundwork can be laid for the future; past patterns of asthma episodes experienced by the parents of an asthmatic child can contribute to forecasting and predicting the parents' likely preventive measures and management strategies. Documenting the household characteristics that influence asthma prevention and management is a need that this study aims to fill. Notable characteristics include the role of home activities, the behavior of parents during an asthma attack, and preventative efforts for decreasing these triggers.

The study will identify valuable behaviors for building public health programs aiming at the effective prevention and control of childhood asthma. Understanding the household characteristics may aid in the self-management of the chronic illness. Asthma has been described as manageable but incurable; hence, it may serve as a preventive strategy for lowering asthma triggers and as a source of information for constructing health promotion models.

1.6 Scope of the Study

The study explored the role of household attributes in the prevention and management of asthma. The study focused on children aged 6 to 14 years of both sexes clinically diagnosed with asthma and their care givers. Children aged 6 to 14 were focused on since ages below this category would have other confounders like the transient early wheezing.

For instance, the wheezing could be as a result of small lung capacity and narrow airways infections. On the other hand, above the selected age range, adolescence is fully established during which most asthma symptoms become quiescent due to effect of puberty hormones.

The study recruited children living with asthma and their parents to document the contributions of household members to asthma prevention and management. Medical professionals were consulted for information regarding the prevention and treatment of asthma, as well as access to care.

1.7 Definition of Terms

Intergenerational factors: For this study, intergenerational factors are biological and social characteristics of individuals transmitted across generations. They include physiological factors, genetic factors, socio-economic status, ethnicity, and religion.

Household attributes: These are demographic and non-demographic characteristics as well as the physical and social environments which differentiate households from one another. They include size, sex and age composition, socio economic status (educational level, income, and occupation), decision making process, number of rooms in the house, housing characteristics, type of sanitation facilities, cooking methods, vegetation, pets, type of flooring and roofing materials.

Household activities: Day to day actions that are done in the house. They include dusting, sweeping, preparing meals, washing dishes, physical activity and rearing of pets.

Asthma: A chronic respiratory illness in which the airways suddenly and unexpectedly become constricted, typically in response to allergens, cold air, exercise, or mental stress. There is a strong genetic (inherited) basis for asthma, but environmental factors also play a significant impact.

Children: For this study, persons aged 6 to 14 years of both sexes will be referred to as children.

Prevention of asthma: Prevention of asthma, in the context of this study, refers to what is done in the home to avoid exposure to triggers and most importantly to reduce the risks of developing asthma. These may include exemption from a particular household activity or household chore that could cause attacks such as sweeping, bleaching of oil, using of pesticides and insecticides and rearing of pets.

Management of asthma: In this context, asthma management refers to the measures taken to prevent the condition from worsening. Significant self-care efforts are those targeted at enhancing the health outcomes of asthma and so minimizing future risks of exacerbations.

CHAPTER TWO

LITERATURE REVIEW

This chapter examined relevant literature on the topic of the research, which is mostly based on the study's objectives. The sub-sections provide a comprehensive overview of asthma, its perceived causes, household characteristics and activities that influence asthma, social and biological variables in asthma prevention and management, and care-seeking pathways. Similarly, the theoretical framework upon which the study was grounded was evaluated critically.

2.1 Overview of Asthma

The Greek lexeme aazein, from which modern medical name "asthma" is derived, means "heavy breathing." Prior to Aretaeus' writings in the second century and far into the twentieth century, many clinicians and laypeople used the term "asthma" to describe any condition characterised by acute, non-physiological shortness of breath (Asthma's Global Atlas, 2013). Chronic inflammatory disorders like asthma cause symptoms including wheezing, coughing, shortness of breath, and chest tightness on a regular basis (WHO, 2020).

Bronchial asthma is a chronic inflammatory illness of the airways, characterised by airway hyperresponsiveness leading to airway resistance and linked with extensive but varied airflow limitation that is reversible either naturally or with therapy (Bateman, Hurd, Barnes, Bousquet, Drazen, FitzGerald, Gibson, Ohta, O'Byrne, Pedersen, Pizzichini, Sullivan, Wenzel and Zar, 2018).

It is one of the most commonly reported long term health issues among children (WHO, 2020; Fitzpatrick, Stephenson, Brown, Nguyen, Douglas and Brown, 2017). As the major cause of infant mortality and the costs connected with it, it is the focus of many clinical and public health treatments (Pavone, longo, Taibi, Nunnari, Romano, Passaniti and Falsaperla, 2011). Asthma is defined by Campbell (2016) as a respiratory condition that lasts a person's whole life and is characterised by chronic inflammation and bronchospasm that can be set off by a variety of factors. Other health research has also revealed that inflammation of airway tissues, mucus congestion, or constriction of airway smooth muscles are all symptoms of this chronic respiratory illness with an unclear cause, as is reversible airway blockage. (Akhiwu *et al.*, 2017; Desalu, Onyedum, Iseh, Salawu and Salami, 2011; Kuti *et al.*, 2017).

Some people with asthma report that their symptoms, which include wheezing, shortness of breath, chest tightness, and cough, are worse at night, and that bronchoconstriction occurs in the morning with no apparent cause. However, common (antigenic-antibody reaction) or non-specific elements, such as exercise, mental stress, cold air, or pharmaceutical drugs such as histamine or metacholine, may also play a role (Mayo Clinic, 2018; Bateman, Hurd, Barnes, Bousquet, Drazen, FitzGerald, *et al.* 2018).

In addition to genetic and environmental factors, environmental exposure, comorbidities, age, severity of underlying disease, availability of health care resources, care received, psychological variables, and treatment response all have a role in the severity and frequency of asthma attacks (Bousquet, Mantzouranis, Cruz, Aït-Khaled, Baena-Cagnani, Bleecker, Brightling, Burney, Bush, Busse, Casale, Chan-Yeung, Chen, Chowdhury, Chung, Dahl, Drazen, Fabbri, Holgate, Kauffmann, Haahtela, Khaltaev, Kiley, Masjedi, Mohammad, O'Byrne, Partridge, Rabe, Togias, Van Weel, Wenzel, Zhong, and Zuberbier, 2010). People of all ages can be affected by asthma, which is a chronic respiratory ailment that is regarded to be most prevalent in the Western world (Jackson, Sykes, Mallia, and Johnston, 2011; Vernon, Wiklund, Bell, Dale and Chapman, 2012). The prevalence is influenced by climate, settlement composition, migration type, urbanization, food, genetics, and other socioeconomic variables (Cohen, Blau, Hoshen, Batat, and Balicer, 2014). However, there are several factors that contribute to efficient symptom management, such as avoiding triggers and treating coexisting chronic or acute diseases (GINA, 2018).

Asthma imposes a significant psychological, physical, and social functional impairment on its victims. Those who are afflicted frequently endure sleep disturbances, along with poor focus, hindered everyday activities, and substantial co-morbidities, particularly depression and anxiety (Carpenter, Ayala, Williams, Yeatts, Davis and Sleath, 2013; Kuti & Omole, 2017). However, asthma is a chronic disease that is controllable but incurable and requires constant treatment.

2.2 Asthma Exacerbations

Acute exacerbations of asthma are defined by the Global Asthma Initiative (GINA) as "episodes of persistent cough, wheezing, shortness of breath, throat tightness, or some combination of these symptoms that are usually accompanied by a reduction in expiratory ventilation that can be quantified by a lung function measurement" (GINA, 2019). In addition, exacerbations are indicators of severe control failure and frequently necessitate prompt treatment to avert a disastrous consequence. As a consequence, these exacerbations cause a rapid decline in lung function over time, wreak havoc on patients and their loved ones, and may be the costliest burden on healthcare systems. Exacerbation of asthma is believed to occur when the acute or subacute therapy of symptoms causes distress. It is also known as attacks, episodes, or flare-ups. It can be triggered by allergens and non-allergic stimuli, such as viral infections, toxins, medications, and others (White, Paton, Niven and Pinnock, 2017).

Moreover, when asthma is not managed properly or is aggravated, the patient may experience respiratory symptoms such as "wheezing, coughing, shortness of breath, and chest tightness or pain," which can range in intensity from mild to severe and often require emergency hospitalization (Moorman, Akinbami, Bailey, Zahran, King, Johnson and Liu, 2012). According to GINA (2015), it was observed that acute asthma in youngsters is rather prevalent and is often the first sign of the disease. People with chronic obstructive pulmonary disease often experience a worsening of their symptoms at night, including difficulty breathing, feeling short of breath, and experiencing respiratory failure and insufficiency (CDC, 2018).

One of the most vital parts of asthma management is preventing exacerbations, which are the most dangerous episodes for patients and create the most anxiety for them and their loved ones, as well as a significant financial burden on healthcare systems (Lane, Molina and pulsa, 2006). According to Vernon, Wiklund, Bell, Dale, and Chapman (2012), some of the many risk factors and irritants that can lead to breathing difficulties associated with asthma include physical activity, allergies, pollutants and occupational exposures, virus infections, medicines, and mental stress or previous medical conditions. Asthma is impacted by a number of different things, including viruses, dust mites, environmental dust, and weather events like thunderstorms (D'Amato *et al.*, 2015).

In a similar vein, Jess, Thacher, Anders, Aboi, Madaki, and Tom (2013) assert that asthma is potentially associated with biomass smoke exposure because symptoms such as wheezing, coughing, and dyspnea may be caused by smoke inhalation, resulting in inflammation of the airways and mucus plugging. To better categorise the severity of asthma, ISAAC (1998) adapted the Global Initiative for Asthma (GINA) criteria. Intermittent asthma attack is occurs when a child has had one to three asthma exacerbations in the preceding year but experiences symptoms less than once per week, wakes up from sleep less than twice per month, and is not limited in their ability to participate in regular activities. Second, a child with mild persistent asthma has had four to twelve exacerbations in the previous twelve months, has symptoms several times a week, does not have more than one attack per day, wakes up at night at least twice a month, and the condition sometimes interferes with activities of daily living, while a child with moderate persistent asthma has more severe symptoms. When the child has experienced twelve exacerbations in the preceding twelve months, with intermittent improvement, he awakens 1–2 times per week and is occasionally unable to perform everyday activities. The final classification is severe and chronic, particularly if the child has experienced more than twelve exacerbations in the preceding twelve months, has daily symptoms that do not improve, wakes up at night more than twice per week, and the condition interferes with everyday activities. This child is considered to have severe chronic asthma.

2.3 Perception of Asthma Triggers

Asthma patients' morbidity and mortality rates may rise if treatment delays occur due to patients' lack of comprehension of the disease's severity. It has been argued that pinpointing the precise causes of an asthma attack is essential for effective treatment. A person's asthma triggers can be anything that causes difficulty in breathing. One can see that people have different perspectives on asthma triggers by looking at how they react to them. Asthma triggers causes serious health issues, and asthma triggers are known to react to allergens like pollen and dust mites. Non-allergic asthma triggers include things like environmental toxins, cigarette smoke, perfume, stress, negative emotions, illness, and physical exertion (Gautier and Charpin, 2017). Asthma diagnosis and treatment depend on understanding these factors.

Ritz, Steptoe, Bobb, Harriss, and Edwards (2006) split the impression of asthma by disease into five categories characterised by common sense. Asthma is perceived to be caused by stress, heredity, or the environment, according to sickness perceptions belonging to the dimension of causes. A sense of cure / management of illness creates the idea that the condition can not be improved. Despite the common perception that asthma is not a serious condition, people who agree with statements like "My disease will last just a short time" or "My illness will improve with time" have been found to have poor health outcomes.

The American thoracic society asserts that hereditary and environmental elements are required for the development of asthma, based on epidemiological findings. Thus, both genetic and environmental elements are needed for asthma to manifest; environmental factors alone are not sufficient to produce asthma symptoms. Reed (2006) notes the occurrence of alterations in teenagers with asthma. To begin, some individuals with symptoms will have remission of their disease; however, it is unknown if remission is permanent and which patients are most likely to experience this decrease in symptoms. Asthma, secondly, is a condition that sometimes manifests itself in adolescents. Yet, the causes of a delayed onset of symptoms are poorly understood. Thirdly, during this time of transition, adolescent girls become more preponderant than teenage boys when it comes to having asthma.

Asthma risk factors include family history of a mother who smoked during pregnancy, living in an urban area, having a child who had eczema (atopic dermatitis) at an early age, and exposure to environmental allergens (Gautier and Charpin, 2017). Environmental allergens such dust mites, cockroaches, and molds are closely associated with the onset of asthma in children. Sometimes it's not safe for kids to be around dogs and cats. Animal dander from dogs and cats is being reevaluated, with some research suggesting that, animals such as dogs, depending on the age of exposure, may be more protective than cats against the development of asthma.

Differences in exposure levels to aeroallergens, such as house dust mite, could be a probable reason for the rising incidence of asthma. According to Lehrer, Song, Guardino, and Schmaling (2002), anxiety, stress, depression, environmental irritants or allergens, exercise, infection, and an increase in anxiety and depressive disorders are all potential triggers for an asthma attack. Direct psychophysiological intervention, non-adherence to drug regimes, vulnerability to asthma triggers, and erroneous appraisal of asthma symptoms are all ways in which mental health disorders and asthma can exacerbate one another. Asthma episodes of airway blockage are known to be triggered by numerous reasons.

Nevertheless, allergens, allergies, cold air, physical exertion, and air pollution are the most typical triggers (WHO, 2002). Respiratory infections from viruses and bacteria have been related to severe asthma exacerbations and can remain in the airways long after an attack has stopped. The role of infections in the onset of severe chronic asthma, however, is still up for debate (Maffey, Barrero, Venialgo, Fernández, Fuse, Saia, Villalba, Fermepin, Teper and Mistchenko, 2010). Previous research has linked rhinovirus infections to an increased likelihood of developing asthma; however, it is unknown how these infections contribute to the progression of the disease (Kennedy, Pham and Borish, 2019).

It is impossible to overemphasize the significance of trigger information in asthma diagnosis and management. Different subpopulations of asthma patients may be distinguished by the prevalence of different causes, which may also have different effects on asthma control and overall health outcomes (Charpin, Ramadour, Lanteaume & Vervloet, 2003). However, the identification of triggers varies; some are easy to identify while others are complex. Asthma triggers such as psychosocial stress, air pollution, and airway infections can be difficult to manage or prevent, and as a result, they may place a greater strain on asthma treatment centers, patient self-management, and overall quality of life (Liangas, Morton, Henry, 2003; Plaza, Serrano, Picado and Sanchis, 2002).

Ritz, Steptoe, Bobb, Harriss, and Edwards (2006) identified subscales of the Asthma Inventory measure two types of causes for asthma attacks: first, psychological, such as anger, loneliness, domestic stress, anxiety, depression, social conflict, and heightened apprehension (which is animal hair, feathers from birds or cats). Jogging, cycling, ascending flights of stairs, sports, and overexertion are all examples of allergies, as are pollen from trees, weeds, and grass, as well as general allergens such allergens (from animals) and allergens pollen items. The common cold, influenza, sinusitis, and viruses all play a role in the development of respiratory disorders, as may air pollution/irritants like cigarette smoke, exhaust fumes, some harsh odors, and the smell of paint, perfumes, and sprays.

The onset of asthma in children is strongly linked to environmental and lifestyle variables. Also, a child's susceptibility to asthma may be determined in large part by their early exposure to both indoor and outdoor surroundings (Johnson, Ownby, Zoratti, Alford, Williams and Joseph, 2002). Causes of respiratory distress include exposure to air irritants (such as cigarette smoke, air pollution, charcoal grills, strong odors like perfume or paint, chemicals, dust, wood fires, and so on), respiratory illnesses (such as the common cold, the flu, sinus infections, sore throats, and pneumonia), and strong emotions (laughter, crying, yelling, fear, excitement, fear) were also included in AAFA's (2009) list of common triggers.

2.4 Seasonal trends in Asthma

Asthma follows the same seasonal patterns as other diseases including influenza, heart attacks, and strokes (Crighton Mamdani and Upshur, 2001). Seasonal conditions associated with temperature fluctuations, patterns of viral infections, changes in the pollen count of trees, plants, and weeds, and changes in the amount of fungal spores and house dust mites are all possible causes of variation in asthma morbidity (Harju, Keistinen, Tuuponen, and Kivela, 1997). Asthma mortality rates, hospitalization rates, and emergency room visits have all been found to fluctuate with the seasons (Fleming, Cross, Sunderland and Ross, 2000). Asthma incidence rates have been shown to rise in correlation with exposure to climate extremes such excessive heat and humidity (Villeneuve, Leech, and Bourque, 2005).

Asthma hospitalizations and deaths have been shown to follow seasonal patterns, with winter showing an uptick in both, according to multiple studies (Fleming, Cross, Sunderland and Ross, 2000; Grech, Balzan, Asciak and Buhaglar, 2000; Dunn, Pearce and Beasley, 2000). Pendergraft, Standford, Beasley, Stempel, and McLaughlin found that in the United States, the number of hospitalizations for asthma and ICU admissions was highest between October and January and lowest between June and August.

Second, the percentage of people hospitalized to the intensive care unit because of asthma increased from June through September, with the months of July and August seeing the highest rates. As a third point, the seasonal distribution varied considerably by age, with the highest percentage of intensive care unit admissions occurring between June and August for all age categories. Similar results were found in a time series analysis of hospitalizations for asthma in Ontario, Canada, conducted by Crighton, Mamdani, and Upshur (2001). Furthermore, the study revealed that the rates of hospitalization peaked between September and November, especially among men and the young, then bottomed out in the summer months of July and August.

2.5 Asthma and Family History

Asthma in the family increases the risk that a child will develop the condition. Asthma in children has a strong genetic component. Asthma, which is likely the result of an interaction between genetic and environmental variables, is strongly associated with a person's family history (Kuti, Kuti, Omole, Mohammed, Ologun and Oso, 2017). Asthma is more common in children who have a parent or sibling with the disease, according to research published in 2010 by Mahdi, Mahesh, Mysore, Kumar, Jayaraj and Ramachandra. It was shown in a survey of 334 houses in Arizona that only 6% of children living with asthma came from homes without asthma, 20% had one asthmatic parent, and 60% had two asthmatic parents (Claudia, 2007). Research on asthma and allergies in sets of twins has suggested a genetic component to the disease, but the precise inheritance pattern of asthma is still unknown.

The link between asthma in children, parents, and grandparents were all studied by Valerio, Andresk, and McGonagle (2010). Children of asthmatic parents were found to have a higher risk of developing asthma themselves, and this increased risk was seen regardless of the children's gender, race, or birth order. If one parent has asthma, their child is twice as likely to have the ailment; if both parents and both grandparents do, the risk is four times as high.

There may be more accurate predictors of childhood asthma risk in the intergenerational influences that exist than parental education and socioeconomic level. While living in poverty and being exposed to noxious environments (especially in urban areas) are both risk factors for developing asthma, these factors may not be decisive and may even mask a person's underlying genetic susceptibility to the disease. Even if neither parent has asthma, having an asthmatic grandma increases the risk of developing the condition in their own children. Understanding the prevalence of asthma in first-degree relatives may substantially aid in risk assessment for the development of the condition in children (Trivedi and Denton, 2019).

Furthermore, existing evidence in research show that genetics play a large role in the development of asthma comes from the identification of potential genes and chromosomal regions associated with asthma risk as well as the observation of familial aggregation. To assess the value of family history as a predictor of asthma in children, Burke, Fesinmeyer, Reed, Hampson, and Carlsten employed a population based approach to conduct a systematic review on family history of asthma and atopic disease in children. This research was conducted in 2003. They found 33 studies from all over the world to examine. Asthma prevalence in the study populations varied from 2% to 26%, with certain groups having a higher rate than others. Yet, global health research has revealed that having a parent or sibling with asthma is a well-established risk factor for developing the disease oneself.

Asthma and allergies do not follow typical Mendelian patterns of inheritance (Los, Koppelman and Postma, 1999). Although most cases of atopic asthma are thought to be the result of a complex interplay between genetic and environmental variables, the condition has been documented in only a small number of monogenic forms (Palmer and Cookson, 2000). Multiple studies on asthma families, clustering, and isolation have proven that the condition has a substantial hereditary component (Cookson, 2002). Asthma is an illness that can affect people of all ages and backgrounds differently, and it is strongly influenced by their immediate environment. Hereditary and environmental risk factors both have a role in determining whether or not an individual will develop asthma

(Yeatts, Sly, Shore, Weiss, Martinez, Geller, Bromberg, Enright, Koren, Weissman and Selgrade, 2006).

Asthma is typically thought to be the result of a complex interaction between multiple genes, some of which play a protective role and others of which contribute to the pathogenesis of the disease, with each gene being individually susceptible to environmental influences. Therefore, regardless of the parents' race or socioeconomic status, having a parent or sibling with asthma is a strong indicator that your child will be diagnosed with the condition themselves (Valerio, Andreski, Schoeni and McGonagle, 2010). According to the National Institutes of Health (2009), a child's risk of acquiring asthma is increased if either grandparent has the condition. Therefore, there may be utility in compiling first-degree relatives' asthma histories as a means of predicting how likely a child is to get asthma.

2.76 Asthma Control

GINA (2018) defines well-controlled asthma as the normal or the best possible lung function, the absence of symptoms or reliever use more than twice per week, nighttime awakenings, or activity limitations, and the absence of symptoms or reliever use more than twice per week; and, asthma as the absence of daytime or nighttime difficult respiratory symptoms; the need for little or no reliever medication; the ability to lead normal, productive, and active lives; and, asthma as the absence of symptoms or reliever use more than twice per week. On the other hand, if a patient shows every one of these signs, his or her asthma is considered uncontrolled.

Despite advances in knowledge and the availability of evidence-based management guidelines, and the development of new drugs and technologies, asthma is still frequently misdiagnosed, improperly treated, or uncontrolled. Variability in asthma phenotypic responses to therapy, drug costs, misperceptions of what asthma control entails in practice, and a lack of interest or knowledge of asthma among health care professionals are all contributing issues (Larsson, Kankaanranta, Janson, Lehtimäki, Ställberg, Løkke Høines, Roslind and Ulrik, 2020).

Airway inflammation remains a risk factor for asthma exacerbations and relapses even after the disease has been managed. People with mild or intermittent asthma symptoms might nonetheless experience severe exacerbations (Royal College of Physicians, 2014). In the works of O'Byrne, Jenkinsm, and Bateman (2017), it was discovered that the term "asthma control" might indicate many things to patients and their clinicians. The ability to regulate symptoms at acceptable levels through consistent use of medicine is what most patients mean when they talk about being "under control."

"Controlled" asthma is defined by guidelines as the lack of symptoms and constraints on everyday activities, satisfactory lung function with minimum or no alleviation, and the absence of sleep difficulties (GINA, 2019: Price, Fletcher and van der Molen, 2014). A higher incidence of acute exacerbations of asthma is associated with poorly managed asthma. Uncontrolled asthma, a history of exacerbations and/or hospitalizations, excessive SABA use, increased blood eosinophils, and respiratory viruses are major risk factors for exacerbation infections (Sears, 2019). Most cases of inadequate asthma management can be traced back to issues with the patient, the healthcare system, or the treatment itself.

In the works of Dinakar and Chipps (2017), sleep-related asthma attacks occurring more than twice per week or once per month are indicators of poorly managed asthma. The child's peak flow may be anywhere from 60% and 80%, and he or she may have trouble both in and out of the classroom (Dinakar and Chipps, 2017). Obesity, tobacco use, an overreliance on relief therapy, and an insufficient dose of maintenance controller medication are all patient-related causes of poor asthma control. Improper inhaler use and misinterpretation of asthma symptoms also play a role in limiting patients' ability to maintain adequate asthma management (GINA, 2018).

2.8. Household attributes and activities responsible for asthma prevention and

management

Households are distinctive according to their characteristics. Household attributes or characteristics include demographic (age, sex composition, educational level of members, income of members, and religion) and non-demographic (relationship with household head, occupational distribution, decision-making process, and marriage type) characteristics, as well as the physical environment. Evident examples identified by the National Demographic and Health Survey (2013), are: drinkable water source, dwelling features, sanitation options, flooring, roofing, and primary source of cooking energy. Information regarding the characteristics of the families in which asthmatic patients live is crucial for this study since it intends to document the intergenerational factors that influence the prevention and management of asthma.

Age: To complete this inquiry, age is a crucial factor. Due to differences in disease presentation between age groups. Age has an effect on the phenotype of childhood asthma includes pathophysiological processes, environmental exposure, and the natural history of the disease (GINA, 2020).

Asthma attacks come and go, and growing older has been linked to more severe asthma attacks in some studies; however, some schools of thought hold that asthma symptoms may become dormant at certain ages due to the effect of puberty hormones, as well as at other ages due to other confounding factors. Haruna (2009) claims that 50% of asthma cases appear before the age of 10, with 80% of those appearing before the age of 5. Hence, asthma is the third leading cause of hospitalization for children under the age of five. The typical explanation for this is that their airways are so tiny, and their lungs are so small that they can hardly breathe at all. Under-5 mortality in Lagos State, Nigeria is 0.6% due to acute asthma (Ojikutu, 2008).

According to Zhang, Kong, and Shen's (2020) study, asthma symptoms change with age. Specifically, over 60% of wheezing children also showed indications of another atopic disease in a study done in Ibadan, Nigeria, among kids aged 6-7 years old. Similarly, a 12-

month prevalence of undetected wheeze, rhinitis, among Dutch kids aged 12 to 14 has caused itching rashes with atopic diseases was 12.3%, 28.3%, and 13.5%, respectively, according to a Dutch study on atopic diseases. Concerns, such as underdiagnosis and overdiagnosis, vary by age group in children from infancy to puberty (Lenney, Bush, Fitzgerald, Fletcher, Ostrem, Pedersen, Szefler and Zar, 2018). Therefore, age is a crucial factor in asthma manifestation and diagnosis.

Gender: The disease's effects vary greatly depending on a person's gender. According to previous research on asthma prevalence, it was discovered that before reaching puberty, the disease strikes three times as many boys as girls, but that the incidence rates for both sexes become similar during this time (Wilmott, 2005). Similarly, the majority of studies on childhood asthma indicate that boys are affected more commonly than girls before puberty (Zahran, Bailey, Damon, Garbe andBreysse, 2018). Clark, Dodge, Thomas, Andridge, Awad, and Paton (2010) ascribed hormone shifts, reduced lung function, and environmental factors that differ greatly for boys and girls explain why girls. These environmental exposures include hair dye, perfume, and cosmetics; therefore, the female child is instructed to avoid such triggers as hair color, hairspray, and cosmetics. Intriguingly, in the case of exacerbation, the tendency maintains in early infancy but shifts as children mature to about equal levels between 5 and 10 years, and more girls between 11 and 17 years old have exacerbation than boys in the same age group (Oguonu, Ayuk, Edelu, and Ndu, 2014). This trend reversal has been attributed to hormonal fluctuations (Pauwels, Pedersen, Busse, Tan, Chen, Ohlsson, Ullman, Lamm and O'Byrne, 2003; Oviawe, 2007).

Nevertheless, there have been debates regarding gender and asthma. Studies have demonstrated a correlation (Chatkin, Menezes, Victora and Barros, 2003; Guilbert and Krawiec, 2003). Wickens, Crane, Kemp, Lewis, D'Sonza and Sawyer (2002) and Ece, Ceylan, Saraclar, Saka, Gürkan and Haspolat (2001), discovered no correlation. Thus, the gender disparity in childhood asthma is not well understood. However, cultural norms that confine women to the home and limit their contact with the outdoors could be to blame for these variations. It has also been suggested that female infants and young children who are infected throughout their development may be protected from developing asthma as adults (Wickens et al, 2002).

Socio-economic status: It may be more challenging to diagnose and treat asthma in patients from lower socioeconomic backgrounds. As an environmental risk factor, like passive smoking or high indoor mold and humidity, it may contribute to the development of the disease, its diagnosis and categorization, the course of the disease prognosis, and the quality-of-care patients receive. Substantively, health outcomes, nutritional status, mortality, and morbidity are all strongly linked to one's socioeconomic standing. As a result, it has repercussions on how well quality, access, acceptability, and utilisation of the available healthcare solutions are realised (Agarwal, 2018).

Furthermore, complete health and wellbeing, especially in early life, is a well-established and close cause of fundamental economic outcomes including wealth and educational attainment (as noted by Currie, 2009). As a result, a caretaker's socioeconomic status affects both the likelihood that a kid will get sick and the effectiveness with which they can treat it. However, individual and community-level indicators of socioeconomic status, such as level of education, employment, homeownership, amenity availability, and income, have been used in epidemiological studies, with those lacking any of these factors often being classified as being socioeconomically disadvantaged (Greyer and Peter, 2000).

Numerous studies have examined the link between low socioeconomic position and poor health outcomes. Compared to patients in high-income nations, those in low- and middle-income countries reported more severe symptoms. Possible causes include wrong diagnosis, lack of medical treatment, insufficient medication, exposure to irritants in the environment, and predisposition to develop serious illnesses owing to one's genetic makeup (Lalloo, Walters, Adachi, De Guia, Emelyanov, Fritscher, Hong, Jimenez, King and Lin, 2011).

Asthma in children is poorly understood, there is a dearth of inhaled bronchodilators and corticosteroids, and there is a resource gap in the African health care system, and the outcomes among the poor are disproportionately poorer (Global Asthma Report, 2014). Furthermore, Georgy, Fahim, El Gaafary and Walters (2006) found that asthma is more common and more severe among lower-income groups, with the former being more common and the latter being more severe in populations with lower socioeconomic status.

In a study conducted in Mysore India, it was found that those from wealthier backgrounds were more likely to have an asthmatic relative. Asthma development was linked to higher socioeconomic status (Davoodi, Mahesh, Holla and Ramachandra, 2013). As a result, It' is hard to say for sure if there's a link between socioeconomic status and asthma, with research finding either an increased or decreased risk linked with lower socioeconomic status. Indicators ranging from those at the individual or family level, such as income and education, to those at the community level, such as the proportion of the population living below the federal poverty line, are all useful tools for assessing a region's socioeconomic standing (Kant, 2013).

Children's health care utilisation and outcomes are strongly influenced by a number of other factors, including the educational level of family members (NDHS, 2013). Asthma is a complex disease that, in order to be effectively controlled, necessitates patient and family education. Knowledge about the treatment schedule is required to guarantee patient compliance, but it may not be adequate. One of the most important parts of asthma treatment is parental education level, which is crucial to the success of asthma management in children. Parents play crucial responsibilities in managing the asthma of their children. In younger children, they ensure the absence of environmental triggers, medication adherence, and frequent hospital visits. Parents can watch their older children's behavior, environment, and treatment adherence (Nocum, 1991). Independent of parental education, a smaller number of school years is associated with an increased risk of hospitalization or emergency room visits for children with asthma (Dales, Choi, Chen, Tang, 2002; Maziak, Von Mutius, Keil, *et al.*, 2014).

Asthma and bad housing conditions: Public health workers throughout the 19th century targeted issues including (Krieger and Higgins, 2002). Housing is an important social factor influencing health. Poor housing has been linked to respiratory infections and other health problems (Shaw, 2004). Asthma is a disease with multiple etiologies; a complicated web of risk factors appears to connect households. Residents of substandard housing are more likely to be exposed to asthma triggers, which can lead to asthma attacks. In their article "The Role of Housing Type and Housing Quality in Urban Children with Asthma in New York," Northridge, Ramirez, Stingone, and Claudio (2010) investigated how different kinds and levels of housing affect the rates of asthma in city children. Renters in public housing were shown to have a higher prevalence of current asthma compared to tenants in private housing, suggesting a difference in exposure to asthma triggers between the two groups. The findings suggested that renters' inability to influence the upkeep of common areas where asthma triggers are frequent may be contributing to the rising incidence of asthma in public housing.

Overcrowding, a lack of affordable housing, and noise and other disturbances in the area are all housing-related stresses that can contribute to an increase or decrease in asthma rates (Sandel and Wright, 2006; Quinn, Kaufman, Siddiqi, and Yeatts, 2010). In addition, a home's roof and flooring may increase asthma, and houses with asbestos and rugs may exacerbate asthma owing to dust, which may affect the prevention and management of asthma. Substandard housing has been related to an increased risk of chronic illness in epidemiological studies, even after controlling for factors such as income, social status, smoking, overcrowding, and unemployment. Asthma and other breathing difficulties are correlated with living conditions in houses that are damp, chilly, and moldy.

Household activities: Asthma in children has been linked to both genetic and environmental factors, and it is likely that these factors interact with one another

(Cookson, 1990). Health production mechanisms may differ between parents and offspring, but if they have the same genetic and environmental elements, they will have the same sign. Factors including air pollution (particularly exposure to particle matter), indoor allergens such dust mites or animal dander, cigarette smoke, or industrial pollutants have been linked to asthma in studies (especially volatile organic compounds).

Further, Cookson (1990) established that there are two types of gene-environment interactions at play during the course of asthma development: (1) when certain hereditary traits are combined with a unique mix of environmental stimuli to cause a disorder, and (2) when the child's environment can be a response to genetic predisposition. Parents may take measures to reduce their children's exposure to environmental allergens, for instance, if they have asthma or learn that their child is exhibiting asthma symptoms. Asthma prevention and treatment may involve doing certain things around the house.

Physical activities: Intense exercise, like running, increases the risk of an asthma attack in children. According to Vernon, Wiklund, Bell, Dale, and Chapman (2012), exercise is an exacerbation risk factor. In a similar vein, Ritz, Steptoe, Bobb, Harriss, and Edwards (2006) identified stair climbing, bicycle riding, jogging, sport-related activities, and overexertion as asthma exacerbation causes. In a similar vein, Holohan, Manning, and Nolan (2012) found that most people experience an increase in their asthma symptoms when they engage in physical activity, and in some situations, exercise itself may be the direct source of their symptoms.

Inactive children may be more at risk for Exercise-Induced Bronchoconstriction than more active kids (EIB). It usually happens 5-10 minutes after you've finished doing something and almost never happens while you're working out. Typical asthma symptoms, or possibly an annoying cough, suddenly disappear after thirty-five minutes to an hour. Stimulants like running and other strenuous exercise are more effective. However, other experts view this as a fallacy regarding the amount and sorts of activity in which children with asthma can safely participate. Exercising has been demonstrated to boost lung capacity and is an effective method for managing asthma exacerbations, according to reports (Basaran, Guler-Uysal, Ergen, Seydaoglu, Bingol- Karakoc and Altinas, 2006).

Similarly, in a 2017 study conducted by Kuti, Kuti, Omole, Oso, Muhammed, and Minna on whether children living with asthma should be prohibited from physical exercise, two-thirds of respondents believed that children living with asthma should avoid all physical activity and sport. Despite this, children are expected to participate in some type of physical activity while they are at school. These can be done formally as a part of health and Physical and Health Education classes, or informally as forms of recreation and peer-related activities (Strong, Malina, Blimkie, Daniels, Dishman, Gutin, Hergenroeder, Must, Nixon, Pivarnik, Rowland, Trost, and Trudeau, 2005). On the one hand, such physical activities are frequently a significant cause of childhood asthma exacerbations (Sarafin, Paterson and Murpy, 2009).

Aerobic exercise should not be avoided, however, because it is critical for normal development. The onset of asthma in young adulthood is also linked to a lack of physical activity throughout childhood (Rasmussen, Lambrechtsen, Siersted, Hansen and Hansen, 2000). Excessive protection and exemption from school sports and recreational activities of children with asthma can also cause the kid to feel alienated and shunned, which can lead to melancholy and low self-esteem (Williams, Hoskins, Pow, Neville, Mukhopadhyay, and Coyle, 2010). In addition, children with asthma have a higher risk of melancholy and social isolation than their classmates, and it is widely recognized that a child's avoidance of sports and similar activities contributes to their low self-esteem (clack, 2010).

Household chores: Household chores are routine activities or responsibilities in the home that are frequently shared among family members. Due of the dust that could be inhaled, an asthmatic youngster could be restricted from performing some domestic duties that can trigger asthma attacks, such as sweeping the floor (Ritz, Steptoe, Bobb, Harriss, and Edwards, 2006). As stated by Ritz, allergens may hinder an asthmatic child from taking part in such activities as lawn cutting (pollen). Pollen from trees, grass, and weeds are all exacerbation triggers, and gardening, which is an activity that requires the action of cultivating the soil, particularly in a garden, may hinder an asthmatic child from cultivating the soil or weeding since weed pollen could trigger asthma.

Cooking materials/methods: Due to the gases and smoke produced by burnt food, cooking or just preparing a meal might occasionally trigger an asthma attack. However, smoke from charred food is not the only asthma trigger in the kitchen; gas from gas burners also poses a threat (Health care disclosure, 2018). When compared to using an oven, cooking over an open fire has been linked to a higher incidence of asthma (Po, FitzGerald & Carlsten, 2011; Trevo, Antony and Jindal, 2014).

Asthma and other respiratory issues are common in low and middle-income countries due to air pollution from biomass burners (Po, FitzGerald & Carlsten). Similarly, according to Jess, Thacher, Anders, Aboi, Madaki, and Tom (2013), asthma is likely connected with exposure to biomass smoke since inhaling smoke may cause wheezing, coughing, and dyspnea symptoms, which contribute to airway inflammation and mucus plugging. The rise in asthma rate has also been connected to the use of coal, wood, dried animal excrement, and agricultural leftovers as household cooking fuels.

When comparing homes with and without updated stoves with chimneys, Schei, Hessen, Smith, Bruce, McCracken and Lopez (2004) documented that open fires have been linked to a higher incidence of asthma symptoms overall. As a result, their research indicated that cooking with an open fire may trigger asthma.

Rearing of pets: The Environmental Protection Agency (EPA) of the United States reports that pet dander, vomit, excrement, saliva, and fur can be major asthma triggers. Proteins in the dander, feces, or saliva of warm-blooded animals including dogs, cats, birds, and rodents can cause sensitization, allergic responses, and even asthma in some people (hamsters, guinea pigs, gerbils, rats, and mice). Half of the youngsters surveyed in a national Canadian household study who suffered from asthma blamed dogs and cats in their homes (41% vs. 36%). (LCDC, 1998). However, the effect of pet dander is being reevaluated, with some studies showing that dogs, more so than cats, protect against the development of asthma, albeit the exact mechanism is unclear and depends on the age of exposure (Gern, Lemanske, and Busse, 1999).

Ownby (2002) adds that there is some proof that having a pet in the house can prevent asthma prevalence among children. There is evidence that early exposure to dogs and cats reduces the chance of allergy development in infants, and that early exposure to cats reduces adult sensitivity to cats (Roost, 1999). Additional research has shown that children who were raised on farms with a variety of animals have lower rates of allergy and asthma symptoms (Downs, 2001).

Use of insecticides and pesticides: Asthma episodes may be triggered by pesticides in children because they are more sensitive to environmental contaminants than adults. Exposure to even trace amounts of pesticides can trigger an attack in persons with asthma. Asthma symptoms can be exacerbated by pesticides, which are small chemicals (Salameh, Baldi, Brochard, Raherison, Abi Saleh and Salamon, 2003). In addition, by increasing airway hyperreactivity, pesticides can trigger asthma attacks, which make the airway particularly sensitive to allergens and other stimuli. According to Solomon, Kirsch, and Ogunseitan (2000), children have a higher respiratory rate and air intake per kilo of body weight than adults.

Also, because their organs are still maturing, they are both more vulnerable to and less capable of detoxifying dangerous chemicals. In addition, the respiratory system is particularly sensitive to the effects of chemical irritants, and early-life exposure can have devastating effects. Insecticides are often the first thing people think of when cockroaches are mentioned, and there is some evidence to suggest that certain cockroach antigens might set off asthma attacks in vulnerable children. However, pesticides have an even closer relationship with asthma and can make existing symptoms worse (Plopper and Fanucci, 2000).

2.8 Intergenerational factors

According to Ahlburg (1998), in order to separate the roles of genes and environments in passing on traits from one generation to the next, geneticists have long used twin-based research designs to study the heritability of various health conditions. Asthma is an inflammatory illness of the airways that manifests clinically as wheezing and a persistent inability to breathe correctly in children, and it is widely believed that both hereditary and environmental factors have a role in the development of asthma. As of 2020 (Ochoa-Aviles, Morillo, Rodriguez, Cooper, Andrade, Molina, Molina, Parra, Parra-Ullauri, Mejía, Neira, Rodas-Espinoza and Ochoa-Avilés) found that family members are more likely to share common environmental exposures such as tobacco use, nutrition, occupation, microbiome, and geographical exposures including air pollution and farming areas, all of which contribute to the transmission of disease from generation to generation (Arshad, Karmaus, Zhang, and Holloway, 2018).

Asthma tends to run in families, in agreement to this assertion Palmer and Cookson (2000) discovered that asthma is more likely to manifest in the offspring of parents who suffer from the disease. Yet, unlike classic monogenic illnesses like Huntington's disease or sickle-cell anemia, which are each caused by a single mutation in a single gene, asthma does not follow the basic Mendelian inheritance pattern. Multiple factors, both genetic and environmental, have been implicated in the etiology and progression of asthma. It follows that the illness is due to the interplay of numerous genes operating in response to environmental cues.

In a past research conducted by Van den Berg, Hoefsloot, Westerhuis, Smilde, van der Werf, (2006), it was revealed that adoptees' intergenerational relationships can be explained by a number of reasons despite the absence of genetic ties to their biological parents. In public health and health economics, the association between one's socioeconomic status and one's health is one of the most robust and well-established associations. Parents and children share a home, which increases the likelihood that they may experience similar socioeconomic conditions and health consequences.

Some examples of such socioeconomic factors are the sort of neighborhood in which families live, the quality of the air, or the accessibility and affordability of healthy food options in the area (Chay and Greenstone, 2003; Ludwig, Greg, Duncan, Lisa, Lawrence, Ronald, Jeffrey and Lisa, 2013). Moreover, despite the fact that race/ethnicity and socioeconomic status are related, they can not be treated as interchangeable in social ordering systems that assess health risks. Gold and Wright (2005) showed that there was a correlation between racial/ethnicity and socioeconomic position and the likelihood of a child in the United States having asthma. They discovered that non-white children in urban areas and children living in poverty have a considerably higher risk of asthma than white children, and that black children have a higher prevalence of asthma, hospitalization rate, and mortality rate than white children. Evidence suggests that Puerto Ricans have a higher chance of having asthma than other Latinos.

A study evaluating the incidence of asthma in children under 18 also found that kids from disadvantaged racial and socioeconomic backgrounds had a higher prevalence (Smith, Hatcher-Ross, Wertheimer and Kahn, 2005). There is substantial evidence that environmental markers are positively associated with prevalence and hospitalization rates, as well as an association between SES characteristics at the individual, home, and community levels and a child's chance of developing asthma (Wright and Fisher 2003). Utilisation of health care services is a possible important environmental mediator. Asthma tends to be passed down from parents to children along with their habits of seeking and receiving medical attention.

A group of non-genetic mediators that may be important is often found in people's health-related actions. Health is largely determined by a person's lifestyle choices, including what they eat and how much they exercise, whether they smoke or drink, and how careful they are with their personal safety. The detection and management of asthma triggers and asthma exacerbations are two areas where these healthy behaviors have been found to be passed down from one generation to the next (Göhlmann, Schmidt, Tauchmann, 2010; Göhlmann, Schmidt and Tauchmann, 2010; Loureiro, Sanz-De-Galdeano and Vuri, 2010).

Parents who exhibit healthier habits are more likely to instill those same practices in their children, whether through direct instruction or by setting and enforcing societal standards for how to live. Due to asthma's genetic nature, there is also a hidden tendency for self-medication within the context of asthma therapy at home.

To learn about the genetic basis of intergenerational health transmission, Thompson conducted baseline study in 2014 among parent-child couples. The risk of a chronic disease in offspring is increased by at least one hundred percent if at least one parent has that disease. It was discovered that inherited health problems impede economic mobility from one generation to the next. However, most health problems are passed down because of environmental variables or gene-environment interactions (Thompson, 2014).

Offspring of asthmatic parents had a higher risk of getting the disease in their own children, independent of gender, race, or birth order, and this fact has been highlighted by studies of both Caucasian and African American children, highlighting the importance of grandparents. Nearly four times as many children of asthmatic grandparents developed asthma as children of asthmatic parents (Thomas, Custovic ,Woodcock, Morris, Simpson, Murray, 2006 ; Hao, Chen, Wang, Yang, Fang and Xu, 2005; Mingomataj, Xhixha, Gjata, Hyso and Qirko, 2008).

Weibel did a study in 2013 looking at the first 27 years of life and found that children of asthmatic mothers have a higher risk of developing asthma than children of asthmatic fathers. Although the role of genetics in determining asthma risk decreased with age, it remained significant even in old life. Yet, when both parents had asthma, genetics became an increasingly important factor. When both parents suffer from asthma, it's possible that they take extra precautions to remove known allergens and other environmental factors that could set off their child's asthma. The hereditary risk of having asthma increases with age, and so does the likelihood that a kid will be exposed to allergens and other triggers as they become older.

A contrast to this is that, research by Illi, von, Lau, Niggemann, Gruhn, and Wahn (2006) shows that children with asthma do not have asthmatic parents, and many asthmatic parents do not have children with asthma.

2.9 Pathways to seeking care

One definition of health seeking behavior is the pattern of actions people take to improve their health. It can be broken down into a number of subcategories, including the time period that elapses between the onset of a disease and the first contact with a healthcare provider, the specialty of the doctor sought, the degree to which the patient follows the doctor's prescribed treatment, and the patients' stated reasons for not doing so (Bhuiya, 2009). Health behaviors, as defined by the World Health Organization (1995), include not only the acts one takes to achieve and maintain optimal physical and mental health, but also the thought patterns and values that inform that quest.

Suchman pioneered the use of the route model to explain the steps taken from the onset of symptoms through the selection of a certain healthcare professional. This paradigm examines how social and cultural contexts affect sequence (WHO, 1995). However, there are several theories available to describe the various factors that influence people's decisions to seek medical care. Both Anderson (1963) and Mechanic (1962) demonstrate two distinct perspectives on people's propensity to seek medical attention.

Anderson's decision-theoretic model relies on three pillars: predisposition, opportunity, and necessity. Predisposing variables include things like user age, sex, religion, occupation, and attitudes and beliefs; enabling factors include things like user income, health insurance, and access to and availability of health care. These two factors interact to decide whether or not a person will go to the doctor for help. In addition, Anderson divides need variables into two categories: those that are "perceived" and those that are "appraise."

Significant others, a phrase coined by Jansen in 1978 and crucial to understanding decision-making in therapeutic processes, are given special attention in the pathway model. Anderson, Flora, Archie, Morgan, and McKenzie (2014) add that knowing how people get the care they need when they need it could help in creating programs that shorten the period between the first signs of illness and the start of effective treatment. Rogler and Cortes (1993) stress the importance of an individual's complicated web of contacts with service providers along the way to care. The course and duration of a therapy pathway are heavily influenced by social, cultural, and health services factors.

While later attempts to seek help, engagement with services, and commitment to treatment are all important, the routes to care taken during the initial episode are pivotal. It's also possible that there are ethnic differences in how long it takes from the first episode's commencement to the start of treatment (Marshall, Lewis, Lockwood, Drake, Jones, and Croudace, 2005; Norman and Malla, 2001; Perkins, Gu, Boteva, and Lieberman, 2007).

A patient's "pathway to care" is a detailed and organized explanation of where they can get medical attention. It's a simple method of analyzing where patients and their loved ones go for support (Daisuke, Naoki and Yayoi, 2007). Similarly, health care access pathways include both belief systems and readily available health care services for a given community (Gureje, Lasebikan, Ephraim- Oluwanuga, Olley and Kola, 2005). When people feel unwell, they take steps to improve their health, a process known as health care seeking behavior. It also shows how quickly a patient seeks medical attention after experiencing symptoms and how successfully they adhere to prescribed treatments (Dill, 2012).

Perceived healthcare providers' supportive roles, treatment service quality, and accessibility all interacted to affect asthma patients' health care seeking behavior (Ndarukwa, Chimbari, Sibanda, & Madanhire, 2020). However, asthmatics may reduce their risk of death and illness by adopting beneficial health care seeking practices. What we mean when we talk about someone's "health care seeking behavior" is their propensity to go get checked out when they feel sick. The usage of healthcare facilities and the reasons for their under-utilisation may only be understood through research on health seeking behavior (Shaikh, 2008).

Osungbade and Siyanbade (2011) found that many persons with neuropsychiatric issues do not seek medical attention. Culture has a large role in shaping how people with this condition approach getting medical help. Studies of care pathways in LMICs show that many people experiencing mental health issues first turn to traditional and religious healers, delaying access to more modern therapy (Burns and Tomita, 2015).

In research conducted by sectors Abuduxike, Aşut, Vaizolu, & Cali (2020), it was found that need variables, such as the presence of a chronic health condition and a negative self-perception of health, and enabling factors, such as level of education, income, health insurance coverage, and ability to pay out of pocket, were found to be significant predictors of participants' health care utilisation. As another point, there were notable differences in socioeconomic characteristics of participants between the public and private health. The study found substantial socio-demographic distinctions between users of public and private health care systems. Health care utilisation was significantly influenced by individuals' income, education, age, insurance status, chronic illness, self-reported health, and family size (Abuduxike *et al.* 2020).

More succinctly, the greatest predictors of healthcare consumption patterns included the presence of chronic diseases, challenges with self-care, and poor opinions about one's own health (Abuduxike *et al.* (2020). Self-care is often prioritized over medical attention in developing countries since many people there have been exposed to and are comfortable with traditional treatments, and the vast majority of the population regularly visits easily accessible patent medicine merchants (Ellis, Traore, Doumbia, Dalglish and Winch, 2012). Asthma control has been connected to patients' propensity to seek medical attention (Kuuire, Bisung, Rishworth, Dixon, and Luginaah, 2015).

2.10 Determinants of the use of health services

A multitude of criteria, including gender, age, socioeconomic standing, kind of sickness, availability to services, and perceived quality of services, have been shown to significantly influence an individual's choice of medical pathway (Tipping and Segall, 1995). An individual's healthcare seeking habits are a reflection of the whole healthcare system. Therefore, health service planning should consider information concerning healthcare-seeking behaviors and utilisation, as well as its deciding aspects, in the context of socioeconomic, physical, cultural, religious, societal, and political factors. "(Shaikh and Hatcher, 2005)". Governments, stakeholders, politicians, and providers of health care can better allocate and manage resources when they have a solid understanding of the factors that impact individuals' decisions to seek medical attention (Ngwakongnwi, 2017; Abu Bakar and Samsudin, 2016). Andersen's behavioral models, which propose that many different kinds of predisposing (age, gender, ethnicity, culture, and social status), enabling (financial, insurance coverage, accessibility, and availability), and need factors determine people's healthcare-seeking behaviors, have been used in a wide variety of studies on healthcare utilisation (health perceptions and medical conditions) (Sozmen and Ünal, 2015).

O'Donnell (2007) analysed healthcare utilisation and highlighted barriers to healthcare access in underdeveloped nations. It was discovered that socioeconomic gaps in healthcare consumption in emerging nations were substantial. Significant variables were discovered, including but not limited to: level of education, income, knowledge, cultural and gender norms, proximity to health care facilities, and the cost of health services. The physical, interpersonal, societal, political, economic, and cultural factors of a population all influence its health-seeking behaviors (Abuduxike *et al.* 2020).

The National Institute for Clinical Excellence (NICE) in the United Kingdom states that patients' perceptions, including their beliefs about and experiences with the illness and treatment, and practicalities such as resources and access to treatment are significant determinants of healthcare seeking behaviors (UK, NICE, 2017). Households' health care-seeking patterns are influenced by a variety of circumstances. Considerations such as sociocultural taboos, the availability of traditional healthcare, the scarcity of good healthcare services in low-income areas, the level of education in the household, the size of the family, and the severity of the illness all play a role in the healthcare decisions made by poor households, especially those in rural areas (Adedokun, MorhasonBello, Ojengbede, Okonkwo, and Kolade, 2012; Masiiwa, Makoni, Mahomva, Mucheto, Chikosi and Mahachi, 2016; Marume, January and Maradzika, 2018; Chadoka-Mutanda and Odimegwu, 2017; Maguranyanga, 2011).

Unhealthy people don't get the care they need, which leads to unnecessary suffering and death (Ellis, Traore, Doumbia, Dalglish, and Winch, 2012; NDHS, 2013). Adam and Aigbokhaode (2018) identified significant determinants of healthcare utilisation, including marital status, education, and income. However, the likelihood that medical emergencies would be attended to quickly in a hospital setting was significantly linked to demographic parameters such as the age, gender, and marital status of household decision-makers.

Ethnicity and cultural factors

It's common for a person's ethnicity to shape the way they approach care and the kind of assistance they receive (Anderson et. al., 2014). Language, religion, and place of birth are only a few indicators of a person's ethnicity (Porta, 2008). An individual's ethnicity affects his/her decision to seek assistance and the breadth of services and supports accessible to him/her (Cauce, Domenech-Rodriguez and Paradise, 2002; Commander, Conchrane, Sashidharan, Akilu and Wildsmith, 1999). Furthermore, perceived distinctions between ethnic groups may influence relationships with service providers (McGovern and Hemmings, 1994).

Culture involves belief systems, which in turn influence how cultures perceive and interpret disease. Whether a person's conception of sickness is based on germ theory or on magic and religion will impact how illness is viewed, evaluated, and treated. Furthermore, Kleinman, Eisenberg, and Good (1978) thought that patients' attitudes and actions have a role in spotting and responding to illness, and these attitudes and actions may differ consistently across cultural groups. Many individuals' approaches to illness incorporate elements of both biomedical science and alternative therapies. Disease genesis, pathophysiology, symptomatology, risk, and treatment are all shaped by patients' sociocultural contexts (their explanatory model of disease).

Beliefs and habits regarding asthma control and management can have a significant impact on how asthmatic individuals manage their condition. Ethno-cultural ideas in a group can influence asthma self-management and control more than physician suggestions (Krine, Bernal, Binggeli and Ornelas, 2003). Similarly, Enarson and Ait-Khaled (1999) stated that the attitudes, beliefs, and behaviors of asthmatic patients have a crucial role in comprehending, defining, and responding to sickness, as well as in forming a diagnosis, comprehending the disease, and understanding the treatment.

Parental views and knowledge regarding asthmatic treatment are crucial because they influence parental attitudes regarding acute care and preventative control for their children. In turn, the social and cultural setting in which an illness develops affects several aspects of its care, including preventative measures, diagnosis, social meaning, symptom expression, doctor-patient communication, and treatment (Pachter, 1994; Guarnaccia, Pelto and Schensul, 1985). According to experts in the field of health, the efficient management of asthma can be hampered by several factors, including patient misunderstandings, physician shortages of time and resources, and incorrect diagnosis of the disease's complexity (Roberts, Younis, Kidd and Partridge, 2013). Health care utilisation in Nepal was significantly correlated with patient's ethnicity, religion, and the type of illness (Baral and Sapkota, 2018).

Economic factors

Ethnicity tends to affect the nature and direction of the path to caring (Anderson et. al., 2014). Considering a person's language, religion, and country of birth might help narrow down their potential ethnicities (Porta, 2008). Ethnicity influences a person's decision to seek assistance and the range of services and supports available to him or her (Cauce, Domenech-Rodriguez and Paradise, 2002; Commander, Conchrane, Sashidharan, Akilu and Wildsmith, 1999). Moreover, perceived differences between ethnic groups may impact service provider relationships (McGovern and Hemmings, 1994).

Belief systems are a part of culture, and they impact how cultures view and interpret disease. Whether a person's notion of illness is grounded in germ theory or in magic and religion affects how illness is viewed, evaluated, and treated. Patients' beliefs and behaviors, according to Kleinman, Eisenberg, and Good (1978), play a role in the recognition, identification, and response to sickness, and these beliefs may vary systemically among ethnic groups. When people are sick, they often combine the best of both conventional treatment and alternative therapies. Patients' understandings of their diseases' causes, mechanisms, symptoms, risks, and treatments are shaped by their cultural backgrounds (their explanatory model of disease).

Beliefs and routines surrounding asthma control and treatment can have a substantial effect on how asthmatics manage their illness. Self-management and control of asthma may be affected more by ingrained ethnic and cultural ideas inside a community than by external guidelines (Krine, Bernal, Binggeli and Ornelas, 2003). Similarly, Enarson *et al.* (1999) noted that asthmatic patients' attitudes, beliefs, and actions play an essential role in grasping, defining, and responding to illness, as well as in developing a diagnosis, understanding the disease, and comprehending the treatment. Parental perspectives and information regarding asthma treatment are vital because they influence parental attitudes toward acute care and preventive control for their children. Thus, the sociocultural context in which a disease arises affects the prevention measures taken, the sickness identification, the social meaning of the illness, the expression of symptoms, the efficacy of doctor-patient communication, and the therapeutic options available (Pachter, 1994; Guarnaccia, Pelto and Schensul, 1985).

Some barriers to effective asthma therapy may come from patients' lack of knowledge or their doctors' lack of time or resources, according to medical experts (Roberts, Younis, Kidd and Partridge, 2013). In Nepal, ethnicity, religion, and the type of the ailment were significantly related to health care utilisation (Baral and Sapkota, 2018).

Educational factors

According to Erinoso (1998), officially educated Nigerians are more likely to engage cosmopolitan western-style health care facilities at the outset and during illness than those who are illiterate. Due to the bureaucratic character of cosmopolitan western-style health care facilities, illiterate Nigerian patients prefer to seek treatment from traditional healers rather than cosmopolitan western-style health care institutions. A 2019 study by Hannane, Misane, Devouassoux, Colin, and Letrilliart on the perspectives of French adult asthma patients towards their care route found that asthma management during the diagnosis and follow-up phases was unstructured and related with inadequate patient education. Patients' ambivalence (regarding their illness and treatments), doctors' and patients' inability to effectively communicate (due to the former's poor listening skills and the latter's use of medical jargon, and the latter's patients' tendency to underreport their use of alternative treatments), and the latter's failure to work together all contributed to this conclusion (restricted to discussions between your family doctor and your pulmonologist or allergist).

Geographical factors

Geographic location is another determinant of health service utilisation. Health services that are closer to a patient's typical residence are used more frequently than those that are further away since the patient spends less time traveling and less money on transportation and other expenditures associated with getting to and from the facility (Erinoso, 1998). To sum up, asthma control is at its best when the individual in question experiences no symptoms, enjoys night after night of uninterrupted sleep, never has to visit the emergency room, has otherwise normal lung function, and is unrestricted in their participation in regular daily activities like going to class or playing a sport (CDC, 2018).

2.11 Theoretical Framework

This research investigation was theoretically grounded in the health belief model.

Health Belief Model

To explain and predict health-related behavior, the Health Belief Model (HBM) considers an individual's attitudes and beliefs on preventive. The health belief model was created in the 1950s by social psychologists working for the United States Public Health Service to examine the reasons why so few people participate in preventative health care activities (Rosenstock, 1974). Since then, the health belief model has been used to examine numerous long- and short-term health behaviors, including those associated with sexual risk and security. The HBM's mission is to assess people's health-related actions by probing their ideas and beliefs about illness and the consequences of their choices. The HBM is a paradigm that places an emphasis on caregivers' motivation to avoid negative health outcomes as a means of inspiring them to take good health-related actions and make healthy decisions.

An individual's likelihood of engaging in a preventative health measure, such as asthma care, is predicted by their attitudes about the following characteristics, as laid out in the Health Belief Model: (1) their susceptibility to the disease, (2) the seriousness of the disease (i.e. the expectation that the disease would have severe consequences), (3) the advantages of taking the prescribed action to avoid or control the disease, (4) the barriers to taking action against the disease, and (5) the cues to action.

The model's focus on the role of individual beliefs in shaping health behavior is fundamental to the questions being asked here. Prevention of symptoms, monitoring of symptoms, management of acute symptoms, and social interaction are all part of asthma self-management (Heinrichs, Vu-Eickmann, Hummel. et al 2018).

Asthma preventive and management strategies among parents of children with asthma were analysed using the HBM components. Parents and other adults in care of children with asthma should be familiar with the symptoms of an asthma exacerbation (or attack) and the mechanisms that make these episodes possible. It is imperative that caregivers understand the importance of maintaining stable asthma levels and are equipped to handle any concerns that may arise in this area. Caregivers need self-assurance in their ability to perform effective asthma management activities to reduce their children's risk of asthma exacerbation (attacks). This strategy has been the impetus for a plethora of health promotion and illness prevention studies.

2.12 Application of Health Belief Model to the Study

Perceived susceptibility: A person's perceived susceptibility to disease or illness is their own estimation of how likely it is that they would experience symptoms from an illness because of a given set of physical traits or patterns of behavior. Perceived susceptibility is a component of the HBM that assesses an individual's perception in the chance that their behaviors will result in a negative health consequence. According to existing literature, it has been found that children of asthmatic parents are more likely to develop the condition themselves; if the parents of an asthmatic child believe that their child is susceptible to asthma because one of the parents, had it in the past, caregivers are more inclined to take actions that will improve the child's health. A person's propensity to take preventative measures against a medical ailment increases when they are aware of their own vulnerability to that sickness. The caretaker can keep the child away from asthma-inducing dust, pollen, and airborne irritants including cigarette smoke, odors, and other household activities.

Perceived severity: The perceived severity construct includes the individual's perspective on the severity of a condition. The patient's preconceived assumptions about the disease's progression and the impact it will have on his or her everyday life may also contribute to this attitude (McCormick-Brown, 1999). Emotions about the seriousness of getting sick or not getting treatment are involved (including evaluations of both medical and clinical consequences and possibly social consequences). In addition, Tinuola (2006) argued that one's own outlook on the seriousness of a health problem can have an impact on how seriously others take it. It does, however, highlight how people's perceptions of the psychological, relational, and monetary costs of unhealthy choices can vary widely. Therefore, the severity of asthma attacks in children will suggest whether preventative measures should be implemented promptly; for example, if attacks result in more hospitalizations or deaths, these criteria will dictate the scheduling of preventative medications.

Perceived barriers: What prevents people from engaging in a certain healthy behavior are these barriers. What the person sees as the social, physical, psychological, and financial costs and challenges of following the recommended action. Changes in behavior are slowed by obstacles. However, people are more likely to adopt a new health practice when those benefits surpass the costs of continuing the status quo (CDC, 2004). Adherence to a medical regimen and the expenses of medications, as well as religious beliefs, cultural barriers, and the poor attitude of health care professionals towards asthmatic patients, could be significant obstacles. A child with asthma may face emotional resistance to change because of the restrictions placed on him or her because of his or her condition.

Perceived benefits: One can say with this level of assurance that measures taken to prevent sickness work. One's estimation of the favorable outcomes of adopting the habit (one's belief in the efficacy of the advised action to lessen the risk or severity of the impact). Positive parental beliefs about the helpfulness of asthma management behaviors may be associated with fewer days of wheezing and better health status, and better asthma management, in terms of better integration of asthma into the family's daily life and more timely responses to symptoms, may reduce asthma morbidity in children.

Cues to action: Anything that causes a person to alter their actions is an indicator of action. This may include the media, concerned loved ones, the surroundings, or even the observable symptoms of a health problem. Many different socioeconomic, psychological, and structural elements have a role in shaping people's perspectives and, in turn, their health-related actions. Children with asthma may be influenced by their own beliefs, the beliefs of others, health education campaigns, asthma clubs that provide health care information about effective asthma management, and most importantly, the advice of family, friends, and health professionals.

Self-efficacy: An individual's health-related behaviors are affected by their belief in their own ability to take the steps necessary to achieve their goals. Belief in one's own ability to engage in asthma-management behaviors has been linked to a lower risk of asthma-related morbidity. Successfully recognizing asthma triggers and monitoring symptoms, using an inhaler and nebulizer to deliver medication, going to asthma clinics and communicating with health care providers are all examples of self-efficacy and the value of asthma management that patients may ascribe to.

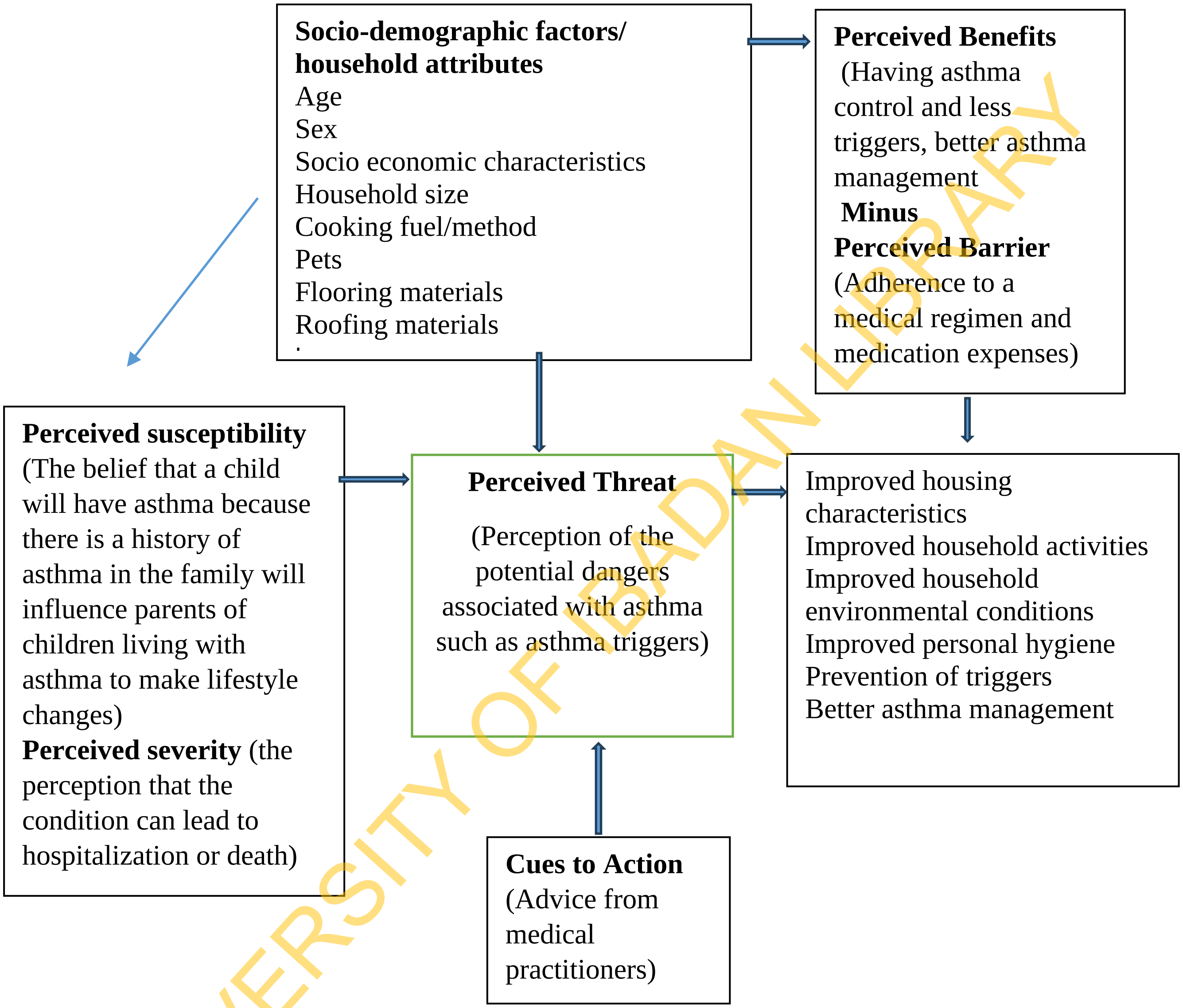

Figure 2.1: Conceptual framework: Adapted from Health Belief Model

CHAPTER THREE

METHODOLOGY

This chapter covers an in-depth discussion of the procedures that were utilised in this research. Details are provided regarding a variety of topics, including ethical considerations, techniques of data gathering, and analysis.

3.1 Research Design

The research was descriptive in nature and was of a cross-sectional design. By conducting interviews with former asthma sufferers and documenting their past experiences, this study was able to provide an in-depth understanding of the experience of living with a chronic illness within the context of three generations and the medical records of the patients who had been chosen for the study. In addition, this study included both quantitative and qualitative approaches to data collection and analysis.

Asthma triggers and modifiable family factors were identified using the quantitative method. This method involved the administration of questionnaire by an interviewer. The qualitative method included in-depth interviews, interviews with key informants, and case studies. Three generations of intergenerational relationships were investigated through in-depth interviews. As the demographic, social, and economic circumstances in which families exist change from generation to generation, it was crucial to comprehend intergenerational relationships. The case studies provided a comprehensive insight and comprehension of how asthma has been handled throughout the years, as well as the many home factors that have influenced management.

3.2 Study Area

Ibadan, a city in southwestern Nigeria, served as the study's location. Ibadan city is Oyo State Capital and it is located on seven hills (average elevation: 200 meters), roughly 100 miles (160 kilometers) from the Atlantic coast, and is home to about 3 million people. It is one of the most populated cities in Nigeria and is widely regarded as the largest indigenous metropolis south of the Sahara. Yoruba people make up the vast bulk of the city's population. Aside from Lagos and Kano, it is the second-largest city in Nigeria in terms of land area. Ibadan's economic activities include agriculture, commerce, manufacturing, handicrafts, and service industries. University College Hospital (UCH), which offers a wide variety of health services, and other hospitals (administered by the state government): Adeoyo Maternity Hospital, Oni memorial children's hospital, and Our Lady of Apostles Catholic Hospital, Oke Ofa, are among the major health institutions in Ibadan. Additionally, each of the eleven local government areas (LGAs) has an average of three to four primary health institutions. Several private hospitals, such as Group Medical Central Hospital, Molly Specialist Hospital, and Alafa Hospital, are also located in the city. Due to the existence of University College Hospital, a prominent referral center for asthmatic patients in Ibadan, this study region was chosen on purpose.

University of Ibadan, Lead City University, Kola Daisi University, The Polytechnic Ibadan, Federal School of Statistics, Oyo State school of Hygiene, and School of Nursing are the major educational institutions in Ibadan. The International Institute of Tropical Agriculture (IITA), the National Horticultural Research Institute (NIHORT), the Institute of Agricultural Research & Training (IAR&T), the Nigerian Institute of Social and Economic Research (NISER), and the Cocoa Research Institute (CRIN) are among the major research institutes.

Brief history of the selected hospitals

University College Hospital (UCH)

By an act of parliament passed in November 1952, University College Hospital was established to meet the growing demand for medical and healthcare training in the West African Sub-Region. UCH was located in Ibadan, Nigeria's first University City and the largest metropolis in West Africa at the time. The hospital originally started in 1948 with two clinical departments: medicine and surgery. A first for Nigeria, the hospital is home to the country's first Department of Nuclear Medicine, one of more than sixty clinics and services offered.

It is not possible to imagine either the University of Ibadan or the Hospital without the other when it comes to health manpower training, research, and clinical service. The hospital has 96 outpatient clinics open each week, serving 50 different specialties and sub-specialties (including an asthma clinic). Follow-up care for children with asthma is available in a clinic staffed by pediatric pulmonologists. People with acute bronchitis and pneumonia are also present. A group of doctors, including a pediatric pulmonologist, hold a weekly asthma clinic, which is the main point of contact for children with asthma who need further medical attention.

Adeoyo Maternity Hospital

The government runs and owns Adeoyo Maternity Hospital, which provides general medical care. The Oyo state capital of Ibadan is home to the Adeoyo Maternity Hospital. The hospital provides a number of medical services, including those for expectant mothers and children. The hospital is the largest and oldest of four secondary health institutions maintained by the government in Ibadan that offer maternal and childcare to different socioeconomic groups in the state. In addition to providing primary care and specialty services, it also acts as a referral hub for private clinics in the city's eleven wards and beyond the state.

Our Lady of Apostles Catholic Hospital

This hospital is located in Ibadan Northeast Local Government. Our Lady of the Apostles Catholic Hospital is often known as Oluyoro Catholic Hospital (or just Oluyoro). The hospital building belongs to the Catholic Mission. On May 12th, 1959, construction began on what would become the hospital. Both the private and public sections of the hospital provide patients with access to medical care. With a focus on pediatric care, the hospital offers a wide range of medical services.

3.3 Study Population

This study included children ages 6 to 14 and their parents or guardians. Asthma in younger children may have various complicating factors, such as temporary early wheeze due to small lung capacity and infections of narrow airways, hence this age group was chosen. In contrast, above this age range, puberty is fully developed and the majority of asthma symptoms subside due to the action of puberty hormones. The study also sought the carers' perspective within the framework of the family. These groups comprised the study's population.

From children with asthma and their carers, both qualitative and quantitative data were collected. Interviews with key informants (KIIs) were performed with health care professionals. There were case studies for grandparents. University College Hospital, Adeoyo Maternity Hospital, and Our Lady of the Apostles Catholic (Oluyoro) Hospital served as the study sites.

3.4 Sample Size Calculation for Quantitative Data

For the study population, this research we used the formula established by Crochran (1977) to determine how large a sample to take. The result was the study's required minimum sample size. That equation looks like this:

$$N= \frac{Z^2 P(1-P)}{d^2} \qquad (3.1)$$

Where,

N = total population

P = estimated prevalence rate of childhood asthma. While some studies (Falade *et al.*, 2004; Faniran *et al.*, 1999) have reported a prevalence of 5% to 14.3% in Nigeria, others (Isaac, 2014) have reported a prevalence of 20% among Nigerian children with asthma, while others (conducted in Ibadan) have reported prevalence rates of 5.5% and 13% among children aged 6-7 and 13-14, respectively (Falade et al, 2009). Based on these estimates, the highest estimated prevalence was set at 20%.

Z = 95% Confidence Interval Standard Deviation (1.96).

d = precision, or the desired degree of accuracy, is set at 0.05.

=3.8416[0.2 (0.8)] = 3.8416[0.16] = 0.614656/0.0025 = 245.8app 246

To account for the inevitable number of people who will not respond, we built in a 10% attrition rate. Children with asthma who were included in this study's sample were = 246+ 24.6 + 2= 273.

3.5 Inclusion Criteria

Below are the Inclusion criteria of the study population:

- Parents of children clinical diagnosed of asthma aged 6 to 14.
- Parents of children who had episodes of asthma attack and were receiving treatment at the hospital at the time of the study.

- Eligible participants included: children with a clinical diagnosis of asthma made at least one month and who were regularly attending asthma clinics.

3.6 Sampling Procedure

The sampling procedure for this research was the multi-stage sampling procedure. The procedure is described below.

First stage: Asthma clinics in Ibadan were purposively selected which included the University College Hospital (UCH), Adeoyo Maternity Hospital and Our Lady of Apostles Catholic Hospital, Oluyoro. UCH was selected because it is a tertiary hospital that has an asthma clinic. Also, Adeoyo Maternity Hospital was selected because it is owned by the state government and it is a leading paediatric clinic which offers its service exclusively to children while Our Lady of Apostles Catholic Hospital, Oluyoro was selected because it is a private hospital with specialized healthcare services for children, including asthma clinics.

Second stage: This stage entailed reviewing registers of children aged 6 to 14 who were clinically diagnosed with asthma in each of the selected hospital.

Third stage: A child that met the selection criteria was selected after which the details of the parents were got and then appointments were made with the parents. Written assent was obtained from the children while informed written consent was obtained from the parents. The parents' residences were used as venues for the interviews.

Table 3. 1. Sampled Size for Quantitative Data Collection

S/N	Location	Quantitative sample size
1	University College Hospital	124
2	Adeoyo Maternity Hospital	84
3	Our Lady of Apostles Catholic Hospital	65
	Total	**273**

3.7 Research Instruments and Procedure for Administration

The acquisition of primary and secondary data involved the triangulation of quantitative and qualitative research instruments. The primary data was collected by a semi-structured questionnaire, in-depth interviews, key informant interviews, and case studies. The secondary data included documentation of clinical records that were obtained from the clinics used by the children living with asthma. In the sequential procedure of administering the instruments, the qualitative method (key informant interviews) preceded the quantitative (questionnaire), while case study was the last in the process of instrument administration.

Table 3. 2. Objectives matrix showing instrument for data collection

Research instruments	Perceived factors responsible for asthma in children	Perceived HH attributes & activities influencing asthma prevention/ Management	Intergenerational factors influencing asthma prevention and management	Pathways to seeking care for children living with asthma
Questionnaire	•	•	•	•
IDI	•	•	•	•
KII	•	•	•	•
Case study	•	•	•	•
Hospital record				•

Questionnaire

In total, 273 copies of questionnaires were distributed to parents at the three clinics where children living with asthma were being treated. Section A of the questionnaire focused on distinctive household attributes. Section B was designed to address the perceived factors responsible for asthma. Section C addressed the influence of household attributes and activities in asthma prevention while section D addressed the influence of intergenerational factors in asthma prevention and management biological. Section E addressed pathways to seeking care for children living with asthma.

In-depth Interview (IDI)

To fully understand the nuances of human behavior, research methodologies need to go beyond simple quantitative analysis. Ten IDIs in each of the selected clinics were conducted, making a total number of 30 IDIs. The IDIs were conducted among children living with asthma in order to elicit robust information as well as clarify statements regarding asthma prevention and management strategies. The IDI discussed how various household activities are geared towards asthma prevention and management, and the major pathways to seeking care.

Key Informant Interview (KII)

Key informant interviews were performed with pediatricians, who have extensive experience treating children with asthma and first-hand knowledge of the disease. It helped to generate information which other instruments were not be able to get from respondents. Key health personnel were interviewed on childhood asthma hospitalizations. Information on treatment pattern during exacerbations and outcome were elucidated. Four KIIs in each clinic were conducted, making twelve KIIs altogether.

Case Study

Case studies were purposively conducted on grandparents. The case studies helped to document the life experiences of grandparents of children with asthma. They also helped to uncover family history of asthma, parents' description of their experiences and how they have influenced their decision in asthma management. Ultimately, case studies were conducted to help understand the dynamic effect of grandparents' experiences on the current decision on childhood asthma prevention and management within their households.

Household Observation

The observation method was used to get first-hand information on the factors in the household that could influence asthma exacerbations. A checklist was drawn to gather information on the environmental conditions in and around households. Environmental conditions such as roofing and flooring materials, cooking materials, flight of stairs, presence of household pets, kitchen location, vegetation etc. were observed.

3.8 Study Variables

The independent variables are household attributes which include housing characteristics, cooking materials and exposure to household chores while the dependent variable is asthma health outcome.

Objective	Variable specification	Level	Measured variables
1	Perceived factors responsible for asthma	Episodes of asthma, frequency of occurrence, duration of	House dust, pollen from trees, grass, molds, smoke, smell of paints, perfumes, weather conditions

Table 3. 3. Table of measurement of variables

		episodes	
2	Household attributes and activities influencing prevention and management	Practices and activities	Housing characteristics, cooking materials and methods, age, gender, use of insecticides & pesticides, vegetation, pets, exercises such as running, cycling climbing flights of stairs, sport activities, overexertion, and household chores.
3	Intergenerational factors influencing prevention and management of asthma	Practices	Role of culture, genetics, ethnicity, religion, socioeconomic status
4	Pathways to seeking care for children living with asthma	First point of call	The role of medical advice, perceived severity of asthma, ethnic group, social class, accessibility (opinions and attitudes towards traditional and modern medicine), acceptability, cost, quality, gender, education, significant family me mbers, economic factors

3.9 Validity and Reliability of Research Instruments

Validity

The term "validity" describes how well the study measures and answers the questions it sets out to. The instruments which were designed in English were translated to the local language by experts who are proficient in both English and Yoruba. It was decided to use content validity to ensure the reliability of the data collection tools.

Reliability

The research instruments were validated by administering them to a sample population that was statistically similar to the intended sample population. Specifically, this was done before any data were collected. Twenty-five (25) copies of questionnaire were administered to children living with asthma. At the end of the pretest, lessons learnt were incorporated in the final instruments and methods.

3.10 Methods of Data Analysis

In this research, both quantitative and qualitative approaches to data analysis were utilised.

Quantitative data analysis

Statistical Package for the social sciences (SPSS) version 20 was used to code, enter, and analyse the data gathered through the questionnaire's (close and open-ended questions). The analysis showed the relationship between household attributes and asthma prevention and management among children. Household attributes were categorised to generate household typologies. Regression helped focus on each household attributes and how they influence asthma prevention and management. It showed the extent to which an attribute contributes to exposure to triggers.

Qualitative data analysis

The interviews were tape recorded. Written notes were also used to document the aspects of the interview (e.g., facial expressions or gestures) that were not captured by the audiotape. Such aspects were considered while transcribing**.** Data was organised by transcribing notes from tape recorder. Judgments regarding what amount of information to include (e.g., leaving out non-verbal dimensions of interaction) and understanding non-verbal cues, factors, such as interviewees' tone of voice and facial expressions, were essential for precise transcription. Transcription was done verbatim, that is, word for word. All filters, reported words and phrases and truncated words were also transcribed. The Atlas ti version 8 software was used for analysing the qualitative data.

Table 3. 4. Table of Data Analysis

	Instrument for data collection			**Variable for analysis**		
Objective 1	Quantitative Questionnaire	Qualitative In-depth Interviews, Key	Independent Socio demographics, Household	Dependent Asthma outcome	Quantitative Logistic regression	Qualitative Content analysis

		informant interviews	activities, housing characteristic			
2	Questionnaire	In-depth Interviews, Key informant interviews	Household attributes and activities	Prevention and manageme nt options	Chi square Logistic and regression	Content analysis
3	Questionnaire	In-depth Interviews, Key informant interviews and case study	Belief system	Prevention and manageme nt options, treatment pattern	Logistic regression	Content analysis
4	Questionnaire	In-depth Interviews, Key informant interviews and hospital records	Belief system	Asthma treatment pattern	Chi square and Logistic regression	Content analysis

3.11 Ethical Considerations

The research protocol was reviewed and accepted by the UI/UCH Ethics Committee (UI/EC/18/0086), Oyo State Ethics Review Committee (AD/13/479/764), and Our Lady of Apostle Catholic Hospital Ethical Review Board (OCH/EC/18/03) in accordance with the standards regulating human research. The following basic ethical considerations necessary for good research were observed:

Confidentiality of data: The data obtained was made anonymous as possible. Because the instrument did not ask for personally identifying information (such as names, addresses, or phone numbers), none of the collected data can be traced back to an individual respondent. Individuals who took part in the survey were each given a unique identifier based on numbers used for the research instrument and the geographical location of the study. As a result, the obtained data was unrecognizable by anyone save the original researchers. Only the signatures of participants were indicated on the consent form, which was collected and stored in a safe place.

Beneficence to participants*:* Respondents were told that the study's findings might be important for the management of asthma patients, but that they would receive no immediate benefits or financial compensation for their participation.

Non-malfeasance to participants*:* At any point, participants were free to stop participating in the study without any consequences. Being a part of this study did not put anyone at danger in any way physically. There was no use of physical or mental coercion or force during the research.

Voluntariness*:* Respondents' participation in the survey was entirely voluntary. The study's participants were not coerced or forced into taking part in any way, and the researcher made no such attempts. They were assured that there would be no repercussions for deciding to leave the study early.

3.12 Limitations of the Study

The limitations of the study occurred during the data collection phase of the research study, and they are as follows:

- The recruitment of children living with asthma was extremely difficult.
- Adeoyo Maternal Hospital and Our Lady of Apostles Catholic Hospital do not have specific dates for asthma clinics, so it was difficult scheduling appointments with children and parents of children living with asthma

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter analyses the most significant findings in light of the study's stated aims. The study uncovered the elements that people believe contribute to children's asthma, and it looked at the characteristics of homes and family routines that people believe have an impact on asthma prevention and treatment. The study also yielded hard data on the role that grandparents play in keeping their grandchildren from developing asthma. It was also recognised as important to track how children with asthma made their way to medical intervention.

4.1 Socio-demographic characteristics of respondents

In terms of socio-demographic characteristics, Table 4.1 revealed that respondents who were parents of children living with asthma in the study area belonged to various social categories. They, therefore, possessed a wide range of socio-demographic, cultural and economic attributes: age, gender, marital status, ethnic origin, religion and family type. The age distribution revealed that majority of the respondents belonged to the age bracket of 31-45years. This falls well within the socio-economically active population age range in Nigeria.

In terms of sex distribution, a vast majority (87.2%) of the study participants were females, with only 12.8% being males. This may not be separable from the expressive role of women as care givers who operate mostly from the private sphere, as opposed to the publicly-domiciled gender role of men which is usually instrumental (Amzat and Razum, 2018). Respondents' marital status revealed that large majority (91.6%) of them were married; 4.8% were single; 0.3%, divorced; while 2.2% were separated and 1.1% were either widows or widowers. The fact that respondents were mostly married suggested that majority of the children affected by Asthma lived in home/family context, a factor that could affect access to care and the associated pathway. Family members constitute significant others in Africa, that most children lived in the context of family, who initiated and took charge of their health seeking behaviour.

The ethnic affiliation revealed that a large percentage (87.9%) of the respondents were Yoruba while few (12.1%) were Igbo. The preponderance of Yoruba participants in the study may be attributed to the location of the study area Ibadan, a major city in south-western Nigeria. On the religion of the respondents, 52.4% were Christians, while 46.9% are Muslims and few (0.7%) practised the traditional religions. The family-type of the respondents revealed that most (91.9%) of the respondents belonged to nuclear families, while the other (8.1%) were members of extended families.

Table 4. 1. Socio-demographic Characteristics of Respondents (N=273)

Demographic Characteristics	Frequency	Percent
Age		
21- 25	3	1.1
26 – 30	31	11.4
31 – 35	70	25.6
36 – 40	81	29.7
41 – 45	71	26.0
46 – 50	17	6.2
Gender		
Male	35	12.8
Female	238	87.2
Marital Status		
Single	13	4.8
Married	250	91.6
Divorced	1	0.3
Separated	6	2.2
Widow/widower	3	1.1
Ethnic Origin		
Yoruba	240	87.9
Igbo	33	12.1
Religion		
Christianity	143	52.4
Islam	128	46.9
Traditionalist	2	0.7
Family Type		
Nuclear	251	91.9
Extended	22	8.1

The foregoing was further supported by the social characteristics of respondents which provided greater bases for sociological inferences as presented in 4.2

4.2 Socio-economic characteristics of respondents

Information on respondents' educational qualification, and occupation was categorised under socio-economic characteristics, due to their distinctiveness from the purely demographic characteristics. These are presented in table 4.2 (below). In terms of educational qualification of the respondents, majority (63.7%) had tertiary education, while one-third (31.4%) only attained secondary education and a marginal minority (0.4%) had no formal education. The high level of tertiary education among the respondents may be indicative of the fact that study was conducted in an urban area, and among the most educated in Nigeria, the south west geo-political zone. More than half (56.8%) of the respondents were self-employed, while 35.9% were civil servants; 3.3% worked in private organisations and 4.0% were unemployed. Data on income revealed that half (54.2%) of the respondents earned below ₦50,000 monthly, slightly above one-third (34.4%) of the respondents earned between ₦ 50,001-–₦ 100,000, 8.8% earned between ₦100,001-–₦150,000, 2.6% earned above–₦150,000. The implication of this is that majority of the respondents earned more than the ₦18,000.00 national minimum wage in Nigeria.

Table 4. 2. Distribution of respondents by socio-economic characteristics (N=273)

Socio-economic Characteristics	Frequency	Percentage
Highest Educational Qualification		
No formal Education	1	0.4
Primary school leaving certificate	5	1.8
SSCE	93	34.1
Tertiary	174	63.7
Occupation		
Unemployed	11	4.0
Self-Employed	155	56.8
Private Organization Employee	9	3.3
Civil Servants	98	35.9
Average Monthly Income		
Below ₦50,000	148	54.2
₦50,001-₦100,000	94	34.4
₦100,001-₦150,000	24	8.8
₦150,001 and above	7	2.6

4.3 Household census

A household census was carried out to document the number of household members, the number of children that had exhibited asthma symptoms in the household, age of children living with asthma, sex of children living with asthma, number of household members that slept in a room a day prior to the study and the frequency of asthma attacks among children in the household. As presented in Table 4.3, majority (64.1%) of the households comprised between 4 and 6 members, followed by 30.0% with 1-3 members and 5.9% with more than 6 household members. Similarly, the study considered the number of adult males, adult females, male children and female children in the households. Most households (98.9%) had 1-2 adult males, while only 1.1% had 3-4 adult male members. Similarly, virtually all (97.1%) the households had 1-2 adult females, while few (2.9%) of them had 3-4 adult females in their household. The availability of 1-2 adult males and females in about 98% of all household considered suggested that most of the families were nuclear in nature, typical of urban centres, so that father and mother constituted the adult heads in most cases.

In terms of children, majority (96.3%) of respondents had 1-2 male children in their household; 3.7% had 3-4 male children in their household while 31.1% of the respondents had no male children in their households. For females, majority (94.3%) had 1-2 female children in their household, few (5.7%) of them had between 3-4 female children. The study further documented the ages of children living with asthma as falling below average – 44.0% fell within the age bracket of 6-8 years; one-third (32.2%) were within the age bracket 9-11 years, while (23.8%) fell within the age bracket 12-14 years. As noted by Banta, Ramadan, Alhusseini (2021), age is a major predictor of asthma disease, and a possible determinant of prognosis, depending on the extent and quality of care. This may be attributed to the fragile nature of respiratory tract in children, which may, interacting with environmental, social and hereditary factors, render them vulnerable to being violated by the asthma disease. This is similar to the findings of Havstad, Sitarik, Kim, Zoratti, Ownby, Johnson, Wegienka (2021) which also emphasised the role of age in asthma epidemiology among children.

The study established that more than half (54.6%) of the children living witrh asthma were females while 45.4% were males.

Gender disparity was well established in asthma which was often subject to change as a result of several factors (Zein and Erzurum, 2015). Furthermore, majority (63.4%) of the respondents reported that 1-2 members of household slept in a room a day prior to the study, (35.9%) claimed that 3-4 of its members slept in a room while few (0.7%) respondents indicated that 5-6 household members slept in a room. On the regularity of asthma attack among children, above average (59.3%) reported to having asthma exacerbation once in a month, one third (33.3%) reported exacerbations twice in three months, about (4.0%) reported asthma exacerbations weekly while only (3.4%) reported asthma exacerbations to be once in six months.

Table 4. 3. Household census of respondents

Household Size	Frequency	Percent
1 – 3	82	30.0
4 – 6	175	64.1
More than 6	16	5.9
Mean household size (4.3)		
Adult Male Size		
1 – 2	270	98.9
3 – 4	3	1.1
Adult Female Size		
1 – 2	265	97.1
3 – 4	8	2.9
Male Child		
1 – 2	181	96.3
3 – 4	7	3.7
Female Child		
1 – 2	200	94.3
3 – 4	12	5.7
Age of asthmatic child		
6 – 8	120	44.0
9 – 11	88	32.2
12 – 14	65	23.8
Mean age (9.4)		
Sex of asthmatic child		
Male	124	45.4
Female	149	54.6
Household Members that slept in a room		
1-2	173	63.4
3-4	98	35.9
5-6	2	0.7
Frequency of asthma attacks		
Weekly	11	4.0
Once in a month	162	59.3
Twice in three months	91	33.3
Once in six months	9	3.4

4.4 Perceived factors responsible for asthma in children

There were different factors considered to be responsible for asthma in children and how they were perceived. The discussion in this part provided an understanding of the perceived factors responsible for asthma in children. Also, it was important to first describe the general perception of asthma. This idea conveys what respondents perceive asthma to be and the factors responsible for such perceptions. Parental perceptions about asthma were important for improving the asthma outcomes in children because parents of children living with asthma had different perceptions about the disease. Misperceptions in asthma were directly responsible for inefficient and inadequate practices taken for asthma control (Abu-Shaheen, Nofal and Heen, 2016). Also, patients' asthma self-management is influenced by their perceptions of the condition and its treatment (Bidad, Barnes, Griffiths and Horne, 2018).

4.5 Perception of asthma as a disease

Beliefs of caregivers contributed to gaps in knowledge about asthma symptoms, diagnosis, and treatment (Bellin, Land, Newsome, Kub, Mudd, Bollinger and Butz, 2017; Marsden, Somwe, Chabala, Soriano, Vallès and Anchochea, 2016). However, relevant asthma management can not be realised without knowledge of the condition, identification of asthma symptoms and possible asthma exacerbation causes, regular monitoring, and adherence to effective asthma preventive and management steps, such as appropriate asthma medication use, use of quick-relief drugs for early asthma symptoms when required, and frequent monitoring (Kuti and Omole, 2016).

Quantitative data showed that almost half (45.9%) of the respondents perceived asthma to be caused by environmental factors, 37.5% of the respondents perceived asthma to be an inherited disease, 13.0% of the respondent's associated asthma to spiritual attack, while 3.5% of the respondents reported asthma to be caused as a result of punishment for sin.

Perceptions on asthma were sought from children clinically diagnosed of asthma because asthma management starts from symptom monitoring, since inaccurate perception can lead to poor asthma control. Findings from the study showed that majority of the children living with asthma interrogated understood what the condition was about, the causes and the symptoms associated with asthma. According to an 11-year-old asthmatic child,

> Asthma is a medical condition that affects the lungs especially the bronchial tubes lungs, it is a situation whereby the bronchial tubes react to an allergen that enters into the lungs when you breathe in, then the bronchial tubes now constrict together and becomes tightly packed. Asthma is caused by several factors called allergens such as pollen, winds, dust, smoke then change in temperature **(IDI, Asthmatic, Male, 11years)**.

Such a perception implicated pollens, extreme weather condition, and allergens as possible causes of asthma in children. Similarly, a nine-year old asthmatic girl described asthma as:

> An abnormal cough that makes my chest to pain me and also makes a wheezing sound which most times occurs at night. This type of cough is painful and if a person suffering from it is not supported by other, he or she may lose his/her life by it **(IDI, Asthmatic, female, 9years).**

The foregoing reveals the attribution of asthma to abnormal cough which was also symptomatic of asthma but often caused sleep disturbances to persons affected. Thus, children living with asthma seemed to possess a fair knowledge of asthma as a respiratory-tract condition. As noted by Jegede (2002), perceived etiology of a disease is critical to prevention, cues to action and healthcare utilisation.

Furthermore, environmental pollution was perceived to be one of the causes of asthma especially when it can not be traced to heredity. At age 10, an asthmatic girl perceived asthma to be caused by environmental pollution since her parents do not have the condition, she pointed that:

Asthma is not an inherited disease because my parents don't have it so they didn't transfer it to me. I believe it is caused by environmental pollution, my parents didn't give it to me **(IDI, Asthmatic, Female, 10years)**.

Also, another asthmatic child asserted his belief about asthma to a treatable disease. As regards asthma being a treatable disease, an 11 years old asthmatic child was interviewed, he did not believe it is curable but believed in the fact that those living with it outgrow it at a particular stage in their lives; he said:

I can not say asthma is curable but I have seen cases of people who had it when they were little children, and it left at a particular time. So I think asthma leaves at a certain age in people's life **(IDI, Asthmatic, Male, 11years)**.

Against the aforementioned, it was revealed by previous studies that asthmatics with mild asthma can outgrow the condition. According to James (2019), asthma symptoms that start in childhood can disappear later in life but sometimes go away temporarily only to return a few years later whereas those with severe asthma never outgrow it. Persistent wheezing and a history of allergies, especially to furry animals increase the odds that the child will not outgrow it.

Also, other participants spoke about the importance of prayers, following of doctor's instructions, checking of peak flow rate regularly in the curability of asthma. They believed it is curable and that there is nothing God can not do. Their perception on curability of asthma is that God can cure asthma through prayers. The extraction below describes their belief about the condition:

Asthma is a curable disease, it can be cured by God through prayers, following doctor's advice and checking of peak flow rate regularly **(IDI, Asthmatic, Female, 10years).**

The importance of prayers and the use medications was emphasized in asthma curability.

Asthma is curable with prayers and medications, there is nothing impossible for God to do. Therefore, God can cure asthma (**1DI, Asthmatic, Male, 12years).**

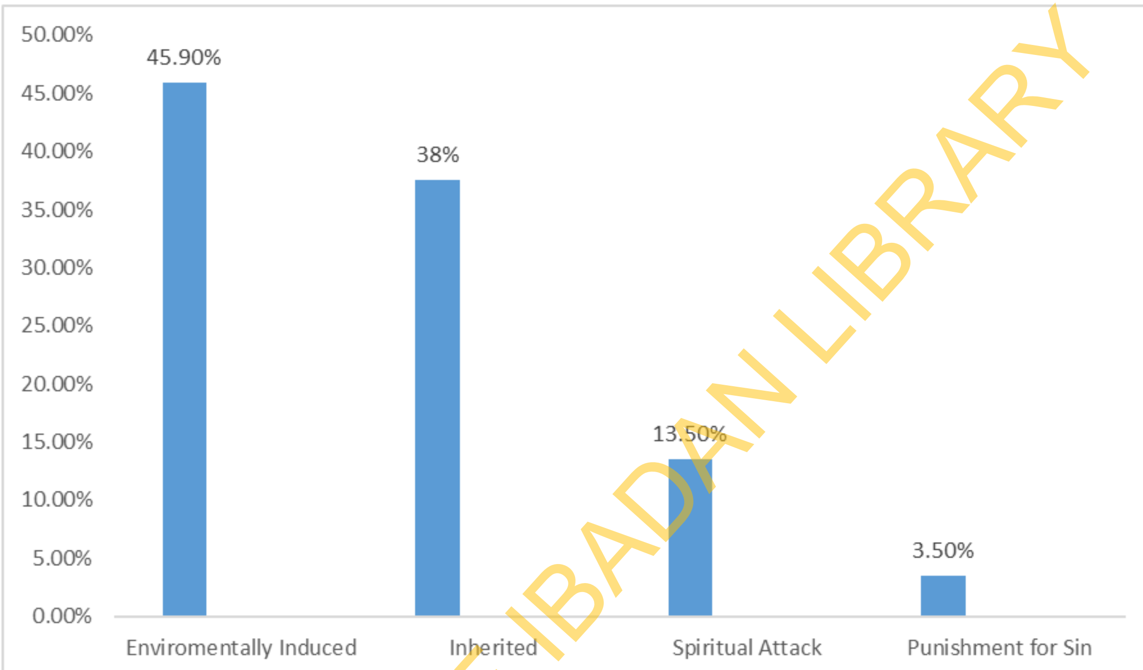

Figure 4. 1. Perceptions on factors responsible for asthma

Beyond the general perception of asthma by children living with asthma and their parents, the medical explanation seemed to offer a more scientific explanation on the etiology of asthma. According to a senior registrar in family medicine, asthma is an inflammation due to oversensitivity of the airway. In her scientific submission, the senior registrar noted that:

> Asthma is a condition of the respiratory tract, it has to do with overreaction or over reactivity of the airway, airway over sensitivity such that the airway reacts to something and then it constricts which causes the symptoms that the patient presents, so there have to be an inflammation or oversensitivity or over reactivity of the airway for the patient to have asthma (**KII, Female, Oluyoro, Senior Registrar of Medicine)**.

Thus, the clinical explanation of asthma was that there had to be an inflammation or oversensitivity or over-reactivity of the airway for asthma to manifest. Similar to the explanations, the airway reacted to allergens which constrict the airways and cause symptoms that patients manifested. Qualitative findings revealed asthma, being a chronic inflammatory condition, was characterised by three components. These were elucidated in the perspectives of a medical practitioner who explained that

> Asthma is a chronic inflammatory condition affecting the airway of respiratory tract and it's characterised by chronic insufficient air getting into the lungs and when this happens there is usually inflammation, increased mucus production and increased sensitivity. A patient who has asthma must have those three components such as difficulty in getting air into the airway, lots of mucus being produced and increased sensitivity to things in the environment **(KII, Female, Oluyoro, Senior Registrar of Medicine)**.

4.6 Social factors influencing respondents' perception of asthma as an inherited disease

On the perception of asthma as an inherited disease, a logistic regression was run, using selected socio demographic information. It was revealed that only education was significant, as respondents with tertiary education were three times more likely to perceive asthma as an inherited disease than the reference category without tertiary education. This showed that education had a significant role to play on the perception of asthma as an inherited disease. Those with higher level of education are likely to perceive the condition as an inherited disease. This could be attributed to their exposure and knowledge about the condition which may have influenced their perception. This is in line with the findings of Abu-Shaheen, Nofal and Heena (2016) which established educationally-informed discrepancies in the perception of asthma etiology among parents of children living with asthma.

However, gender, occupation, monthly income, family-type, marital status, ethnicity and house ownership did not have any significant relationship with the perception about asthma etiology. This implied that respondents' perception of asthma as an inherited disease can not be predicted by gender, occupation, monthly income, family type, marital status, age, ethnicity and house ownership. As noted by scholars (Amzat, 2018; Jegede, 2005), the perception about disease etiology is a multiple determinant of response and course of action as well as health-seeking behaviour. With regard to asthma, there was, therefore, the need to promote health education as a tool for preventive healthcare especially among the uneducated who have misconceptions about the treatability of the asthma disease. Table 4.4 presents further findings on the social factors influencing respondents' perception of asthma as an inherited disease.

Table 4. 4. Social factors influencing respondents' perception of asthma as an inherited disease

Demographic Characteristics	Sig.	Exp(B)
Gender		
Male		
Female	0.096	2.278
Occupation		
Self-employed		
Civil Service	0.806	1.115
Average Monthly Income		
Below ₦10,000		
₦10,000 - ₦50,000	0.498	1.583
₦50,001 - ₦100,000	0.227	2.556
₦100,001 - ₦150,000	0.881	1.151
Above ₦150,000	0.999	0.000
Family Type		
Nuclear		
Extended	0.621	0.713
Marital Status		
Single		
Married	0.659	0.777
Education		
Without Tertiary Education		
With Tertiary Education	**0.008**	**3.310**
Ethnic Affiliation		
Yoruba		
Igbo	0.231	1.989
Religion		
Christian		
Islam	0.316	1.398

House Ownership		
Self-owned		
Inherited	0.560	0.639
Lease	0.228	0.522

4.7 Social factors influencing respondents' perception of asthma as a spiritual attack

In this category of respondent's perception of asthma as a spiritual attack, Table 4.5 revealed a significant relationship between family type and perception of asthma as a spiritual attack. The study found out that respondents belonging to an extended family were 18 times more likely to perceive asthma as a spiritual attack than the reference category (nuclear). This may be understood from the rivalry and 'cold war' situation in which most extended families are enmeshed, mostly among the peoples and cultures of Africa where alliances are usually formed along various lines of loyalty. Extended families are characterised by communal sort of living among people with familial affinity beyond the nuclear (Tanga, 2013). A situation where asthma is hereditary in a family, without the acceptance of this fact by members, a simplistic explanation would be that due to their experiences over the years, those who practice extended family type are likely to perceive the condition as spiritual attack especially when the condition is being managed by all the members of the family.

Furthermore, there was a significant relationship between education and perception of asthma as a result of spiritual attack. Specifically, respondents with tertiary education were less likely to perceive asthma as a spiritual attack than the reference category (without tertiary education). This may be attributed to the seemingly high level of education of the respondents which made them more knowledgeable about the condition. Hence, they were less likely to perceive asthma as a spiritual attack than those with lower levels. Nevertheless, there was no significant relationship between gender, occupation, monthly income, marital status, age, ethnicity, religion and house ownership. This showed that the perception of respondents on asthma as being caused by spiritual attack could be predicted by gender, occupation, monthly income, marital status, age, ethnicity, religion and house ownership.

A more holistic account of asthma etiology was attributed to genetic and environmental factors as offered by a healthcare worker who noted that etiology of asthma can only be ascertained scientifically:

> Exposure and literacy play a huge role in the perception of asthma, it is obvious that genetic factors and environmental are the major drivers of asthma which is rooted in science so the perception that asthma is as a result of spiritual attack has no science backing so its false **(KII, Female, Nurse, Adeoyo)**.

Following the above position, the belief that asthma can be caused by spiritual attack is invalid, as this contradicts science. In accordance with this, the role of exposure and literacy is paramount in such perception of asthma. The statement below is embedded in the perception that genetic and environmental factors are the major drivers of asthma.

Table 4. 5. Social factors influencing respondents' perception of asthma as a spiritual attack

Demographic Characteristics	Sig.	Exp(B)
Gender		
Male		
Female	0.436	0.563
Occupation		
Self-employed		
Civil Service	0.492	0.656
Average Monthly Income		
Below ₦10,000		
₦10,000 -₦ 50,000	0.390	0.503
₦50,001 - ₦100,000	0.230	0.321
₦100,001 - ₦150,000	0.998	0.000
Above ₦150,000	0.999	0.000
Family Type		
Nuclear		
Extended	**0.004**	**18.839**
Marital Status		
Single		
Married	0.652	0.725
Education		
Without Tertiary Education		
With Tertiary Education	**0.000**	**0.144**
Ethnic Affiliation		
Yoruba		
Igbo	0.998	0.000
Religion		
Christian		
Islam	0.655	1.203

House Ownership		
Self-owned		
Inherited	0.770	0.778
Lease	0.996	1.003

4.8 Social factors influencing respondents' perception of asthma as a punishment for sin

In this category of factors influencing perceptions of asthma as a punishment for sin, there is a significant relationship between income and the perception that asthma is caused by punishment for sin. Table 4.6 shows that respondents with monthly income of ₦10,001-₦100,001 are less likely to perceive asthma as a disease caused by punishment for sin than the reference category (below ₦10,001).

However, there was no significant relationship between gender, occupation, family type, marital status, education, ethnic, religion and house ownership. This shows that the perception of respondents on asthma as being as a result of punishment of sin can not be predicted by gender, occupation, family type, marital status, education, ethnic, religion and house ownership. This may be understood from the overwhelming influence of culture and socialization which may subsume these other socio-demographic dimensions.

Table 4. 6. Social factors influencing respondents' perception of asthma as a punishment from sin

Demographic Characteristics	Sig.	Exp (B)
Gender		
Male		
Female	0.280	0.402
Occupation		
Self-employed		
Civil Service	0.415	1.931
Average Monthly Income		
Below ₦10,000		
₦10,000 - ₦50,000	**0.013**	**0.119**
₦50,001 - ₦100,000	**0.030**	**0.095**
₦100,001 - ₦150,000	0.998	0.000
Above ₦150,000	0.549	0.300
Family Type		
Nuclear		
Extended	0.584	1.750
Marital Status		
Single		
Married	0.998	0.000
Education		
Without Tertiary Education		
With Tertiary Education	0.912	1.093
Age of Last Birthday	0.515	0.964
Ethnic Affiliation		
Yoruba		
Igbo	0.998	0.000
Religion		
Christian		
Islam	0.589	0.728

House Ownership		
Self-owned		
Inherited	0.095	8.856
Lease	0.217	4.136

4.9 Social factors influencing respondents' perception of asthma as an environmentally-induced disease

Findings revealed that there is a significant relationship between education and perception of asthma as being environmentally induced. Specifically, the study found out that respondents with tertiary education were less likely to perceive asthma as an environmentally-induced disease than those without tertiary education. This could be attributed to the fact that those in this category are likely to perceive asthma as an inheritable disease.

Also, there is a significant relationship between the use of public incinerators and perception of asthma as an environmentally-induced disease. Respondents who made use of incinerators for disposing their refuse were 20 times more likely to perceive asthma as a disease caused by environmental factors than the reference category (burning). This explains the reason for the use of public incinerators, because the condition is perceived by them to be caused by environmental factors so they tend to engage in preventive measures to lower the risk of attacks, hence the use of public incinerators.

Similarly, there is a significant relationship between the location of respondent's generators and perception of asthma as an environmental induced disease. Specifically, respondents with generator in their houses are less 10 times more likely to view asthma as a disease caused by environmental factors than the reference category (back of the house). This explains the use of a separate house for their generators to reduce triggers caused by smoke from generators which is likely to cause exacerbation.

However, there is no significant relationship between gender, occupation, monthly income, family type, ethnic affiliation, religion, house ownership and number of households in the compound. This further explains that the perception of respondents on asthma being environmentally induced can not be predicted by gender, occupation, monthly income, marital status, age, ethnicity, religion and house ownership.

Table 4. 7. Social factors influencing respondents' perception of asthma as an environmentally-induced disease'

Demographic Characteristics	Sig.	Exp(B)
Gender		
Male		
Female	0.542	1.652
Occupation		
Self-employed		
Civil Service	0.214	2.332
Average Monthly Income		
Below ₦10,000		
₦10,000 - ₦50,000	0.376	0.251
₦50,001 - ₦100,000	0.256	0.138
₦100,001 - ₦150,000	0.911	0.789
Above ₦150,000	0.999	0.000
Family Type		
Nuclear		
Extended	0.077	10.824
Marital Status		
Single		
Married	0.827	1.299
Education		
Without Tertiary Education		
With Tertiary Education	**0.007**	**0.073**
Ethnic Affiliation		
Yoruba		
Igbo	0.492	2.540
Religion		
Christian		
Islam	0.349	0.578
House Ownership		
Self-owned		
Inherited	0.223	0.256
Lease	0.961	1.042

Table 4. 7 Social factors influencing respondents' perception of asthma as an environmentally-induced disease' (Cont'd)

Method of Dumping Refuse	**Sig.**	**Exp(B)**
Burning		
Drums	0.147	3.622
Public Incinerator	**0.019**	**20.020**
Thrown in the Bush	0.465	0.533
Trucks	0.344	2.208
Number of Generator		
1 –2		
3—4	0.140	0.336
No generators	0.105	0.279
Location of Generator		
Back of the House/Room		
Front of the House/Room	0.062	0.156
Generator House	**0.054**	**10.147**
Number of Households in the Compound		
1 –2		
3 –4	0.975	1.023
5—6	0.578	0.452
More than 6	0.044	0.064

4.10 Respondents' perception on preventability, manageability and curability of asthma

Perception on preventability, manageability and curability of asthma was sought. Majority (80.2%) of the respondents perceived asthma as a preventable disease. They believed that abstaining from triggers, engaging in preventive measures, use of natural home remedies such as honey, garlic, turmeric, ginger, taking steam baths and use of medications can actually prevent exacerbations. On the other hand, 19.8% of the respondents believed it is a non-preventable disease, probably because they may have tried all means to prevent its occurrence without positive results. On the perception of asthma as a curable disease, more than half (61.2%) of the respondent's believed asthma is not a curable disease, while 38.8% of the respondents believed it is a curable disease. Also, almost all (98.9%) of the respondents perceived asthma to be a manageable disease while very few (1.1%) of the respondents perceived asthma as a disease that is not amenable to management.

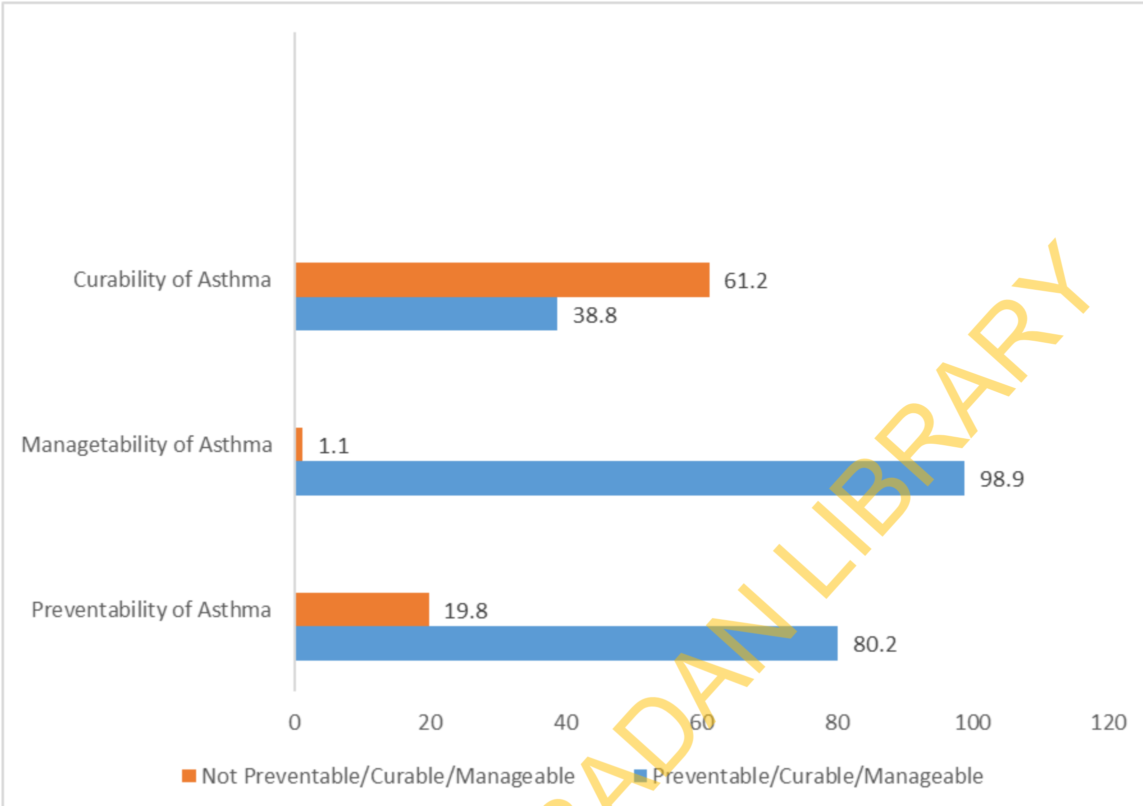

Figure 4. 2: Perception on preventability, manageability, and curability of asthma

4.11 Relationship between perception on preventability of asthma and socio-demographics

The degree of association between gender, ethnicity, religion, income, family type, ownership of house, age, marital status, education and occupation and perception on preventability of asthma was examined. Majority (80%) of both male and female respondents perceived asthma as a preventable disease while below average (20%) of male and (19%) of female perceived asthma as an unpreventable disease. There is however no significant relationship ($P>0.05$) between gender and perception on preventability of asthma

Likewise, there is no significant relationship ($P>0.05$) between ethnic affiliation and perception on preventability of asthma, majority of the Yoruba respondents (79.6%) perceived asthma as a preventable disease while only one-out-of-five (20.2%) perceived it not to be a preventable disease. Also, for Igbo respondents, large majority (80.2%) perceived asthma to be a preventable disease while 15% perceived asthma not to be preventable.

However, there is a positive association between religion and the perception on preventability of asthma, large majority (86%) of respondents practising Christianity perceived asthma to be a preventable disease, while one out of five (20%) of the respondents practising Christianity perceived it not to be preventable. Large majority (73.8%) of respondents practising Islam perceived asthma to be a preventable disease while 26.2% of them perceived it to be non-preventable disease. Large majority of respondents of both religions' affiliation was of the view that asthma is a preventable disease. What influenced their decision is their knowledge of the fact that asthma prevention such as avoiding things could trigger the condition, abstaining from triggers, avoiding strenuous activities and having an asthma action plan while those who perceived it as non-preventable disease were of the opinion that they had engaged in certain practices towards prevention of the disease which proved abortive. Hence, that influenced their decision on asthma preventability.

Similarly, there existed a relationship between income and respondents' perception on preventability of asthma, that is, respondents with higher income perceived asthma to be preventable than those with lower income. However, this could be linked to the affordability of asthma care and accessibility to knowledge and exposure. Pointedly, majority (63.6%) of respondents with monthly income below ₦10,000 perceived asthma to be preventable while respondents about one-third (36.4%) of the respondents with income below ₦10,000 perceived it to be a non-preventable disease. Majority (71.5%) of respondents with income of ₦10,001-₦ 50,000 perceived asthma to be preventable, while the rest (28.5%) perceived it to be a non-preventable disease. Large majority (89.4%) of respondents with average monthly income of ₦50,001-₦100,000 perceived asthma to be preventable while 10.6% perceived it to be a non-preventable disease. Almost all (95.8%) of respondents with monthly income of ₦100,001-150,000 perceived asthma to be a preventable disease while only 4.2% perceived it to be a non-preventable disease. Lastly, all respondents with monthly income of ₦150,001 and above perceived asthma to be a preventable disease. Hence, this result shows that the higher the income the higher the perception that asthma is preventable. This could be attributed to the fact that people with higher income will find it easy to limit triggers, they could afford to change furniture, flooring materials and adapt a cooking method that can limit the occurrence of exacerbations.

As regards family type and perception on preventability of asthma, there was an association between family type and perception on preventability of asthma; large majority (83.7%) of respondents from the nuclear family type perceived asthma to be preventable while (16.3%) perceived it to be a non-preventable disease. Below average (40.9%) of respondents practising the extended family type perceived asthma to be preventable, while above half (59.1%) perceived asthma to be a non-preventable disease. This shows that those who practise the extended family type due to experience and some other factors perceived asthma as non-preventable disease.

Also, Table 4.9 showed that there was an association between ownership of house and perception on the preventability of asthma. Almost all (93%) of respondents living in houses owned by them perceived asthma to be a preventable disease while only few (7%) of them perceived it to be a non-preventable disease. Slightly above half (55.9%) of respondents living in inherited houses perceived asthma to be a preventable disease while 44.1% of them perceived it to be a non-preventable disease. This shows that those in inherited houses have little control on how household attributes could be manipulated to suit them. For instance, certain household attributes like roofing materials, flooring methods, vegetation, type of ventilation among others have been linked to asthma exacerbations. Hence, parents/ caregivers of a child that lives in an inherited house might be forced to accept the kind of flooring materials used in the house and the flooring method since it is an inherited house while those who live in houses owned by them could design the house in such a way that it takes cognizance of the child living with asthma thereby limiting exposure to triggers. In a report on the relationship between housing and asthma among school-age children in America, house renters are particularly vulnerable because rental house inspections, federally mandated housing-quality inspections of assisted housing, smoke- free policies and integrated pest management may reduce exposure to asthma triggers but renters have fewer means to address these issues on their own because of lease restrictions (Ganesh, Scally, Skopec and Zhu, 2017).

In support of this, a respondent identified that part of the strategies adopted by his parents was limitation of exposure to dust in the home by making use of appropriate flooring material, he explained that:

Asthma is indeed preventable just that it is not curable. In my house, my dad made sure the floors are tiled. Also, we have interlocking stones in the compound just to prevent dust ***(IDI, Male, 11years, Asthmatic)***.

This is similar to the report by scholars (Mammen, Turgeon, Philibert, Schoonmaker, Java, Halterman, Berliant, Crowley, Reznik, Feldman, Fortuna, and Arcoleo, 2020).

Table 4.8. Relationship between perception on preventability of asthma and socio-demographics

Socio-demographic variables	Preventability of asthma: Preventable	Not preventable	Total	Test of Association
Gender				$\chi^2 = 0.001$
Male	28(80.8)	7(20.0)	35(100.0)	df =1
Female	191(80.3)	47(19.7)	238(100.0)	P.value= 0.972
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	Phi = -0.02
Ethnicity				
Yoruba	191(79.6)	49(20.4)	240(100.0)	χ^2 = 0.507
Igbo	28(84.8)	5(15.2)	33(100.0)	df =1
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.477
				Phi = -0.43
Religion				
				χ^2 = 6.354
Christianity	123(86.0)	20(14.0)	143(100.0)	df =1
Islam	96(73.8)	34(26.2)	130(100.0)	P.value= 0.012
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	Phi = 0.153
Average Monthly Income				
Below ₦10,000	7(63.6)	4(36.4)	11(100.0)	χ^2 = 18.786
₦10,001-₦50,000	98(71.5)	39(28.5)	137(100.0)	df =4
₦50,001-₦100,000	84(89.4)	10(10.6)	94(100.0)	P.value= 0.001
₦100,001-₦150,000	23(95.8)	1(4.2)	24(100.0)	Cramer's V=
₦150,001and above	7(100.0)	0(0.0)	7(100.0)	0.262
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	
Family Type				
Nuclear	210(83.7)	41(16.3)	251(100.0)	χ^2 = 23.303
Extended	9(40.9)	13(59.1)	22(100.0)	df =1
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value = 0.000
				Phi = 0.292
Ownership of House				
Self-owned	53(93.0)	4(7.0)	57(100.0)	χ^2 = 18.577
Inherited	19(59.9)	15(44.1)	34(100.0)	df =2
Rented	147(80.8)	35(19.2)	182(100.0)	P.value= 0.000
Total	**219(80.2)**	**54(19.8)**	**273(100)**	Cramer's V=
				0.261

Findings further revealed that there was a significant relationship between age and perception about the preventability of asthma. Majority (66.7%) of the respondents within the age bracket 21-25 were of the opinion that asthma can not be prevented while 33.3% believed it can be prevented. Majority (66.7%) of the respondents within the age bracket 26-30 opined that asthma can be prevented while the remaining 32.3% believed the disease can not be prevented. Furthermore, majority (75.5%) of the respondents within the age bracket 31-35 were of the opinion that asthma can be prevented while about one-fourth (24.3%) held a contrary view. Large majority (81.5%) of the respondents within the age bracket agreed to the fact that asthma can be prevented while (18.5%) reported that it can not be prevented. Almost all (93%) of the respondents within the age bracket 41-45 claimed asthma can be prevented while very few (7.0%) claimed that it can not be prevented. Lastly, the majority (70.6%) of respondents who held the opinion that asthma can be prevented were within the age bracket 46-50. Evidently, the Table showed that as the ages of the respondents increase, their perception about asthma as a preventable disease also increase. This shows that age is very crucial when it comes to knowledge and perception of asthma and this could be attributed to experiences and exposure gathered over the years on asthma prevention. That is, older respondents are more knowledgeable about the condition, hence, their perception that asthma can be prevented. Similarly, Al-Binali, Mahfouz, Al-Fifi, Naser, and Al-Gelban (2010), in their study identified illiteracy and young age as risk factors for poor knowledge and behaviours among mothers of children living with asthma

In terms of marital status, there was no relationship between marital status and perception on asthma preventability. It was showed that 69% of respondents who are single perceived asthma to be preventable while 30.4% of them perceived it to be a non-preventable disease. Also, large majority (81.2%) of the respondents who are married perceived asthma to be a preventable disease while 18.8% of them perceived it to be a non-preventable disease. Hence, findings showed that the marital status of the respondents did not determine their perception about the condition.

There was a significant relationship between education and perception on preventability of asthma. Specifically, 65.7% of the respondents without tertiary education perceived asthma to be preventable while 34.3% perceived asthma to be a non-preventable disease. Majority (88.5%) of the respondents with tertiary education perceived asthma to be a preventable disease while the rest (11.5%) perceived asthma to be a non-preventable disease. This shows that those with higher level of education (tertiary education) perceived asthma to be a preventable disease than those with lower level of education (without tertiary) and this can be attributed to their level of exposure and knowledge about the disease condition which is greatly influenced by their level of education. This is in line with the CDC that identified parental education as risk factors for asthma and asthma attacks (Standards, 2016). Perception of asthma preventability is important because such perceptions can lead to behaviours targeted towards better asthma control in children.

Lastly, there was a significant association between occupation of respondents and the perceived preventability of asthma. Majority (72.2%) of respondents that are unemployed perceived asthma to be a preventable disease, while slightly above one quarter (27.3%) of the respondents perceived asthma to be a non-preventable disease. Also, 74.2% of the respondents that were self-employed perceived asthma to be a preventable disease, while (25.8%) perceived it to be a non-preventable disease. Large majority (89.7%) of respondents either working in private or public organisation perceived asthma to be preventable while few (10.3%) perceived it to be a non-preventable disease. Specifically, majority (89.7%) of respondents who work in private or public organization (89.7%) alleged that asthma is preventable. Hence, the result showed that the occupation of the respondents influenced their perception on asthma preventability.

Socio-demographic class was found to be a significant predictor of asthma control, which has also been found in other studies (Awan, & Munir, 2015; Kuti *et al.*, 2017; and

Bloomberg *et al.*, 2009). Findings revealed that caregivers' low income and unemployment status were important predictors of poor asthma control.

Table 4.8. Relationship between perception on preventability of asthma and socio-Demographics (Cont'd)

Socio-demographic variables	Preventability of asthma		Total	Test of Association
	Preventable	**Not preventable**		
Age				
21-25	1(33.3)	2(66.7)	3(100.0)	χ^2 = 16.429
26-30	21(66.7)	10(32.3)	31(100.0)	df =5
31-35	53(75.7)	17(24.3)	70(100.0)	P.value= 0.006
36-40	66(81.5)	15(18.5)	81(100.0)	Cramer's V=
41-45	66(93.0)	5(7.0)	71(100.0)	0.245
46-50	12(70.6)	54(29.4)	17(100.0)	
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	
Marital Status				
Single	16(69.6)	7(30.4)	23(100.0)	χ^2 = 1.797
Married	203(81.2)	47(18.8)	250(100.0)	df =1
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value = 0.180
				Phi -0.81
Education				
Without tertiary education	65(65.7)	34(34.3)	99(100.0)	χ^2 = 20.761
With tertiary education	154(88.8)	20(11.5)	174(100.0)	df =1
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value = 0.000
				Phi = -0.276
Occupation				
Unemployed	8(72.7)	3(27.3)	11(100.0)	χ^2 = 10.22
Self-employed	115(74.2)	40(25.8)	155(100.0)	df =2
Either private or public employee	96(89.7)	11(10.3)	107(100.0)	P.value= 0.007
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	Cramer's V= 0.192

4.12 Social factors influencing the perceived curability of asthma

Table 4.9 showed the social factors influencing the perceived curability of asthma among children. There was a significant relationship between gender and perceived curability of asthma. Specifically, the study found that female respondents were 2.781 times more likely to perceive asthma as a curable disease than their male counterparts. Hence, the curability perception of females regarding asthma portrays a critical feature regarded as "abiyamo", which simply means motherhood in Yoruba land. Similarly, there was a significant relationship between average monthly income of respondents and perceived curability of Asthma. Pointedly, respondents that earned between 50,001 and 100,000 and between 100,001 and 150,000 were 8.531 and 82.060 times more likely to perceive asthma as curable when compared with those that earned below 10,000. This is an indication that respondents that earn more perceived asthma as curable than those that earn less. This could be linked to the perceived affordability of asthma treatment among families of different economic class.

Furthermore, there was a significant relationship between family type and perceived curability of asthma. The table showed that respondents from an extended family type were 0.249 times less likely to perceive asthma as a curable disease when compared with those from a nuclear family. This means that a significant number of respondents from a nuclear family type believed that asthma is a curable disease. However, there is no significant relationship between marital status, ethnic affiliation, religious affiliation, ownership of house, education, occupation and perceived curability of asthma. This implies that the perception of respondents on curability of asthma can not be predicted by their marital status, ethnic affiliation, religious affiliation, ownership of house, education and occupation.

Table 4. 9. Social factors influencing the perceived curability of asthma

Demographic Characteristics	Sig.	Exp(B)
Marital Status		
Single		
Married	0.108	0.381
Gender		
Male		
Female	**0.038**	**2.781**
Age	0.625	0.986
Ethnic Affiliation		
Yoruba		
Igbo	0.105	2.309
Religious Affiliation		
Christianity		
Islam	0.730	0.899
Average Monthly Income		
Less than 10,000		
10,000 - 50,000	0.337	2.103
50,001 - 100,000	**0.010**	**8.531**
100,001 - 150,000	**0.001**	**82.060**
More than 150,000	0.124	7.168
Family Type		
Nuclear Family		
Extended Family	**0.054**	**0.249**
House Ownership		
Self-Owned		
Inherited	0.083	3.354
Rented	0.953	1.026
Education		
Without Tertiary Education		
With Tertiary Education	0.496	0.754
Occupation		

Unemployed		
Self-Employed	0.394	0.529
Public or Private Employee	0.442	1.363

4.13 Respondents' perceived triggers of asthma

Respondents' perception on possible triggers of asthma was very critical to the study, as recent studies suggested that persons with limited knowledge about asthma symptoms, common triggers and risk factors were at a heightened risk of poor asthma control (Majellano, Clark, Winter, Gibson and McDonald, 2019). Addition ally, identifying asthma triggers has been linked to the basis of environmental secondary prevention. Asthma triggers may be allergenic or non-allergenic. Allergenic triggers include indoor allergens, such as house dust mites, molds, pets, cockroaches, and rodents, and outdoor allergens, such as pollens and molds while non-allergenic triggers include viral infections, active and passive smoking, meteorological changes, occupational exposures, and other triggers that are less commonly involved (Gautier and Charpin, 2017).

Almost all (93.4%) of the respondents identified dust as a possible trigger, a large majority (88.6%) reported smoke as a trigger of asthma. This corroborated the findings of Zaraket, Al-Tannir, Bin Abdulhak, Shatila, and Lababidi (2011) which implicated dust as the most important trigger of asthma in children, and almost an equal proportion (86.6%) indicated weather conditions. In addition, a significant number (71.1%) of respondents reported air pollution, as about two-third (67.7%) indicated insecticides, and half (50.2%) reported physical activities as triggers of asthma. Slightly below average (46.9%) indicated stress, and almost an equal proportion (42.5%) of respondents indicated negative emotions. About one-third of the respondents considered the roles of exercise (38.8%), pollens (35.9%), and pets (32.3%) as triggers. A few others described perfumes (27.1%), poor hygiene (26.7%), molds (24.5%), air-fresheners (24.5%), poor nutrition (23.8%), and hairsprays (22.2%) as triggers. Also, much fewer regarded fresh paint (19.4%), spiritual attack (17.9%) and infections (11.7%) as triggers of asthma. Only a handful reported food (8.4%) and medications (4.4%) as triggers of asthma.

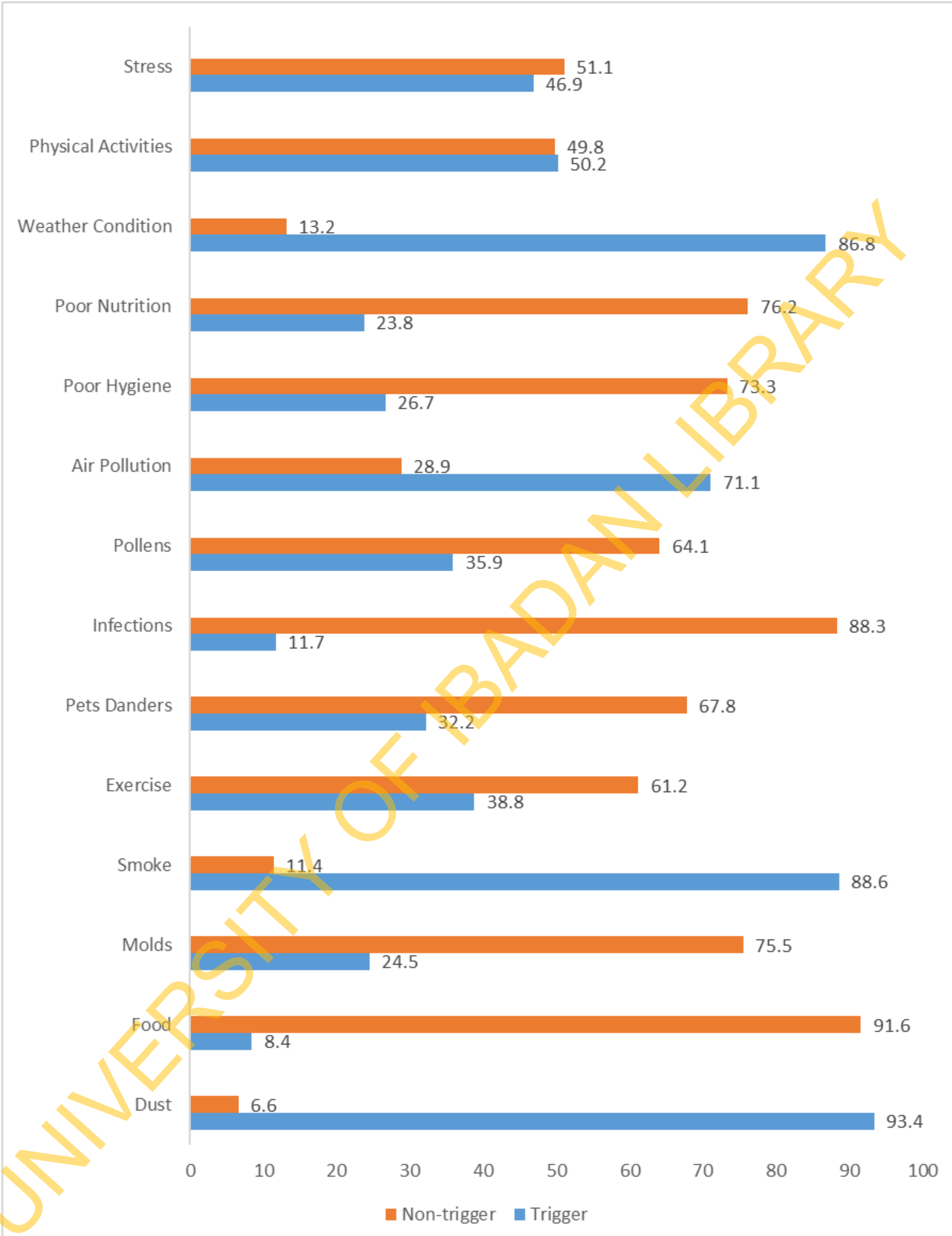

Figure 4.3: Perceived triggers of Asthma

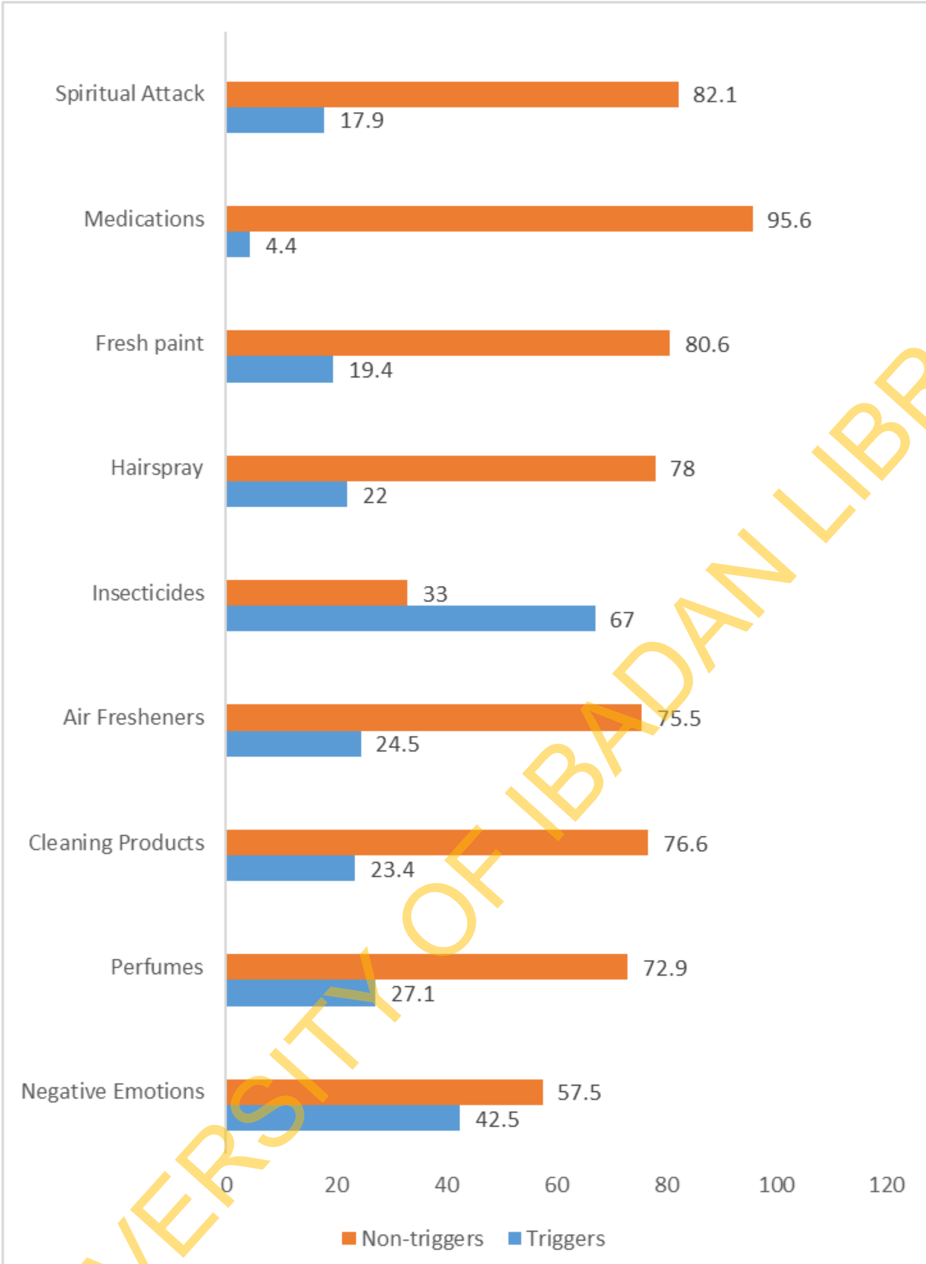

Figure 4.3: Perceived triggers of Asthma (Cont'd)

Narratives from qualitative findings revealed that participants related their experience of asthma attack to inhaling of dust, smoke or anything gaseous. In the opinion of a participant, playing too much, which in turn makes his heart to beat fast, and exposure to cold weather were major triggers for him. Another participant was of the opinion that too much work, stress, carrying heavy load and dust were the causes of asthma in children. Asthma was reportedly triggered by exposure to smoke and dust. Other triggers reported were excessive play, extreme weather conditions and participation in strenuous activities. However, susceptibility to asthma attack was attributed to fragile lungs of children which were not fully developed. A participant commented thus:

> Asthma is caused by several factors called allergens such as pollen, winds, dust, smoke and change in temperature. However, children are more vulnerable to asthma attack because their lungs are still very fragile and they are not yet fully developed **(IDI, 11 years, Boy, Asthmatic).**

Expert reportage by a senior registrar in family medicine, however, suggested that asthma can only be understood in terms of predisposing factors, and not in terms of "causes". She stated that patients only become predisposed to the condition due to exposure to dust, excitement, mites, stress, and pets. She maintained that the main cause of asthma is unknown. However, exposure to dust, mites and excessive exercise are predisposing factors:

> We can not say what causes asthma; we can only talk about predisposing factors, which are things that predispose the patient to having complications, such as exposure to dust, mites, pets, excessive exercise, even excitement, negative emotions, and stress. These aren't causes, but they are things that predispose the patient to having complications (**KII, Oluyoro, Female, Senior Registrar**).

Previous research also revealed that stress, strong/ negative emotions are triggers of asthma. According to Ritz, Wittchen, Klotsche, Mühlig and Riedel (2016), stress enhances airway inflammation by modulating immune cell function through neural and hormonal pathways. Psychological triggers have been consistently associated with exacerbations and emergency treatments. Another respondent describes her asthma triggers to be mainly caused by negative emotions as against the conventional triggers of asthma. She retorts:

I have asthma attacks majorly due to anxiety, when I am afraid or worried, but sometimes I have asthma die to smoke but my major trigger is fear **(IDI, Female 10years, asthmatic)**.

The foregoing suggests that stress and anxiety can trigger asthma symptoms. This may be attributed to the fact that, change in breathing during negative or strong emotions causes muscles to tighten up. In fact, in Puerto Rican children, perceived stress, and child's negative life events were associated with high triggering factors in the respiratory tract of children, a factor that fluctuates the velocity of air-flow (Martin, Thomas, Mosnaim, Greve, Swider and Rothschild, 2013; Daniel, Boergers, Kopel, Koinis-Mitchell, 2012).

4.14 Seasonal patterns of asthma

Asthma is a disease very much influenced by weather (D'Amato, Vitale, De Martino, Viegi, Lanza, Molino, Sanduzzi, Vatrella, Annesi-Maesano and D'Amato, 2015). Also, due to climate change, caused by increased atmospheric concentrations of carbon dioxide (CO_2) and other greenhouse gases, is likely to result in changes in temperature and humidity, and may relate to the increased burden of asthma (Reid and Gamble, 2009). Asthma has been generally established to have seasonal variations. Children are more likely to have the condition at a particular time of the year. To investigate the seasonal pattern of the asthma, respondents were asked questions about the season of the year when their asthmatic child had the most exacerbations. Majority (76.2%) of the respondents indicated the rainy season; 4.0% identified dry season while 19.8% reported harmattan. Hence, most respondents were of the opinion that their children living with asthma had the highest exacerbations during rainy season. This may be attributed to the cold weather as well as damp that characterises the rainy season, compared to other seasons. Harmattan season, being the second highest period in which respondents experienced exacerbations, is also characterised by cold but dry weather. Zhang, Peng, Kan, Xu, Chen, Liu, and Wang (2014), in their study, established that cold temperature was associated with the risk of asthma and may trigger asthmatic attacks. However, warmer temperatures were not associated with asthma hospital admissions. In line with this, studies (Guo, Jiang, Peng, Zhang, Geng, Xu, Zhen, Shen, X. and Tong, 2012; Campbell, 2016) had revealed that several climate and weather elements were known to trigger asthma including particulate matter, extreme temperatures and temperature fluctuations. These, alongside extremely hot and cold temperatures, changes in barometric pressure, humidity, wind, can trigger asthmatic attacks (Lin, Luo, Walker, Liu, Hwang and Chinery, 2009; Abe, Tokuda, Ohde, Ishimatsu, Nakamura and Birrer, 2009).

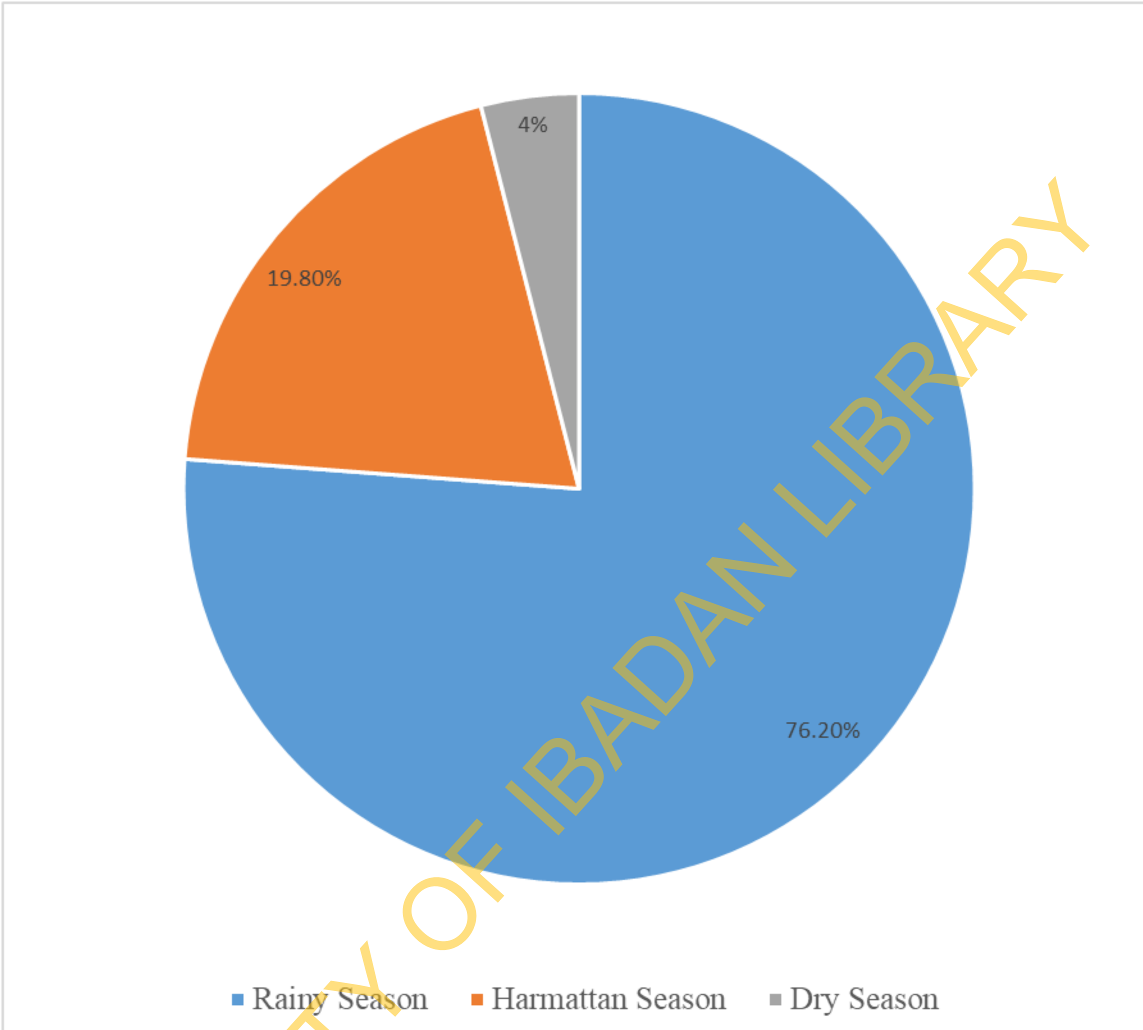

Figure 4. 4: Chart showing seasonal patterns of asthma

Implicating the role of weather in asthma etiology, a participant noted that:

> Extreme weather condition is a major trigger of asthma for me. I have attacks mostly in cold seasons, so I always carry my sweater with me. In hot weather, I wear light clothes, more of cotton material. For example, I can not wear wool in hot weather because it causes heat rashes and triggers asthma attacks **(IDI, Male, 10years, Asthmatic, UCH)**.

This is similar to the findings of Akinso, Adhikari, Ying, Shah and Chopak-Foss (2023) which revealed that children were often prone to asthmatic attacks during cold weather, harmattan or rainy season. This justified the widespread use of warm clothing in children, during cold weather as exacerbations peaked during cold weather. However, another participant traced her asthmatic attacks to dry season and the reason for such explanation was that usually during the dry season, everywhere becomes dusty and dust is a major trigger for her. Also, dry season could exacerbate asthma because warm temperature has been said to be associated with increased asthma prevalence, perhaps due to higher levels of exposure to allergens which in turn leads to asthma attack. She stated further:

I have attacks during the dry season. This is because everywhere becomes dusty at this time of the year. I inhale dust everywhere I go which irritates my lungs and blocks air from entering **(IDI, Female, 12 years, Asthmatic, UCH)**.

Thus, it may not be valid to conclude that a particular season exclusively triggers asthma attacks, while the other seasons do not. The exacerbation of asthma could depend on a number of factors including biological as well as social. The asthma exacerbation due to dry season may be due to the higher preponderance of dust and tendency for dryness that characterise that season.

Likewise, studies have identified seasonal trends in asthma hospitalizations and mortality, and the findings showed an increase in hospitalizations in the winter months and higher mortality rates in the summer months (Crighton, Mamdanni and Upshur, 2001; Fleming, Cross, Sunderland and Ross, 2000; Grech, Balzan, Asciak and Buhaglar, 2000; Dunn, Pearce & Beasley, 2000). Contrarily, Won, Hwang, Roh and Chung (2016), in their study on seasonal patterns of asthma in children in Korea, found out that the monthly numbers of emergency visits for asthma varied according to the season, with high peaks from September to November, and low levels from June to August. However, distinct differences were evident in the seasonal patterns of asthma exacerbation in children and these patterns can assist in monitoring children who are at high risk during the season when asthma exacerbations are predicted which will in turn improve the management of the disease.

A further probe into the month of the year when children living with asthma had exacerbations the most, 6.6% of the respondents reported January, 0.4% reported February, 0.4% reported March, 1.1% reported April, 9.9% reported May, 31.9% reported June, 7.3% reported July. 21.6% reported August, 4.8% reported September, 2.2% reported October and 13.9 % reported December. Specifically, June has the highest number to be reported by respondents to have the highest exacerbations followed by August and then December. However, distinct differences were evident in the seasonal patterns of asthma exacerbation in children and these patterns can assist in monitoring children who are at high risk during the seasons when asthma exacerbations are predicted which will in turn improve the management of the disease.

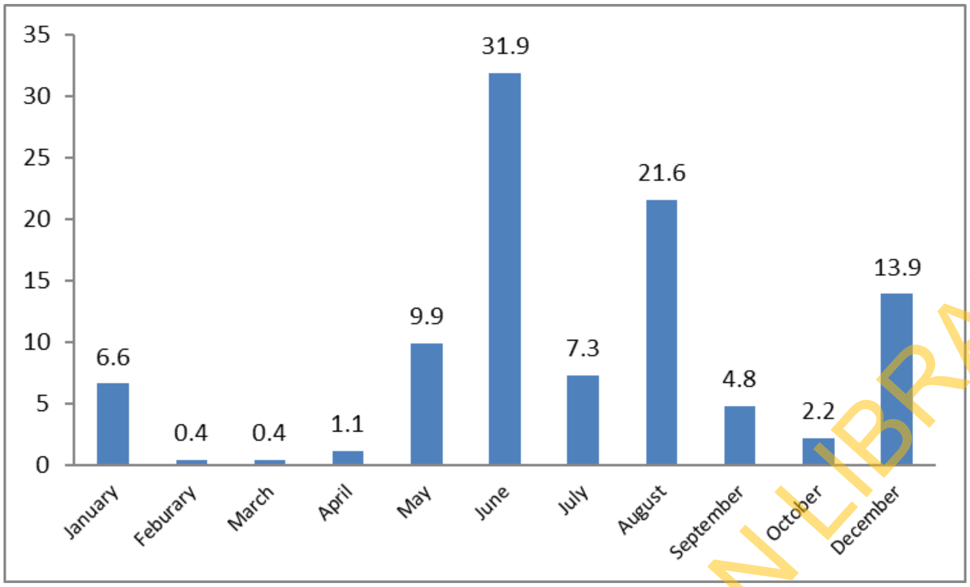

Figure 4.5: Distribution of asthma exacerbations by months of the year

Seasonal change corresponds with progressions in the months of each year, as some months of the year are known to be dryer, wetter, colder or hotter than others, even with climate change. Thus, change in month indirectly implicates change in season.

4.15 Observed symptoms of asthma in children

As can be inferred from the health belief model, the perceived symptom of a disease is a major predictor of the perceived severity as well as cues to action, and other associated responses. As presented below, participants were asked to identify the signs and symptoms observed in their children whenever they experienced attacks. Respondents observed that during attacks, children mostly experienced cough (97.8%), wheeze (93.4%), breathlessness (97.1%), and chest pain (80.6%). Other respondents reported catarrh (17.2%), and fever (9.9%) as the symptoms observed in children during asthma attack experiences.

Above all, it is evident that majority of the respondents perceived cough, wheeze, breathlessness, and chest pain to be the most common symptoms of asthma. In line with scientific evidence, therefore, these perceived symptoms suggest that respondents generally perceived asthma as a disease of the respiratory tract. The major symptoms of asthma are wheezing, shortness of breath, chest tightness, and cough that may vary over time in their occurrence (Global Initiative for Asthma Report, 2020).

Table 4. 10. Symptoms of asthma in children

Symptoms	**Response**	Frequency	Percentage
Cough	A symptom	267	97.8
	Not a symptom	6	2.2
Wheeze	A symptom	255	93.4
	Not a symptom	18	6.6
Breathlessness	A symptom	265	97.1
	Not a symptom	8	2.9
Chest Pain	A symptom	220	80.6
	Not a symptom	53	19.4
Catarrh	A symptom	47	17.2
	Not a symptom	226	82.8
Fever	A symptom	27	9.9
	Not a symptom	246	90.1

The experience and severity of acute asthma symptoms varies among children. Wheezing, chest tightness, breathlessness and cough were reported as observed symptoms of asthma. An asthmatic child related his experience of asthma symptoms as wheezing, chest tightness and coughing that occur at night and accompanied with sleep disturbance. He explained that:

Inhaling dust and smoke and anything gaseous can make one have symptoms like chest tightness, severe cough which usually occur at night and one will not be able to sleep again **(IDI, Male, 10years, Asthmatic, Adeoyo)**.

Incessant dry cough, wheezing and difficulty in breathing were reported by an expert in Peadiatrics as symptoms of asthma. Extract from one of the narratives is shown:

> The symptoms of asthma in children are difficulty in breathing, especially when there is an exposure, and a cough that will not just go away. Most of the time, the cough is not a productive cough; it is a dry cough; it's not a cough that brings out sputum. In children, it is even difficult because they will not even bring out anything even if they have something to bring out. You will know that it is a chesty cough; it is usually as a result of exposure to fumes or dusts. Sometimes, if you put your ear near the chest of the patient, usually, we use stethoscope to listen to it but the parent will actually tell you that the chest is noisy, giving a sound, when we listen to it, you can hear with your ears. Usually it is called wheezing, the child finds it difficult to take in air. So those are the two commonest symptoms: cough that will not go away and difficulty in breathing (**KII, Female, Adeoyo, Nurse)**.

From the narrative above, it is imperative to note that the commonest symptoms of asthma in children are difficulty in breathing, persistent cough, wheezing and chest pain. It was revealed that most children living with asthma present dry cough without sputum that is, chesty cough. Also, when a stethoscope is placed on their chest, it gives a noisy sound usually called wheeze thereby making it difficult for the child to breathe in air.

Furthermore, findings showed that the frequency of symptoms was relevant in determining the severity of the attack.

> It is not everybody that have severe attack, some have mild attack, some of them their attack is not frequent while others they come with frequent attacks that's why when you see patient you classify them, is it persistent mild asthma, persistent moderate asthma is it severe kind of asthma. The frequency of the symptoms, night attacks, do they have night attacks? Is it acute or mild? Also, some will not have attack in another six months intermittent maybe just mild, so it depends on the patients **(KII, Female, Oluyoro, Pediatrician)**.

In addition to identifying symptoms, majority of the respondents saw the need to prevent symptoms by monitoring the way the condition is managed because usually, patients exhibit a pattern of symptoms before exacerbations and if properly monitored, the impact will be less pronounced. He stated that:

> I have been able to identify my symptoms, I noticed I cough persistently and later I find it difficult to breathe when I am about to have an attack, but now once I start coughing persistently, I use the peak flow meter **(1D1, Asthmatic, Male 11years, UCH)**.

Wheezing, coughing, shortness of breath, and chest tightness or pain can be very mild, sub-acute or acute in severity, and can often lead to an emergency respiratory symptom that individuals experience when their asthma becomes uncontrolled or exacerbated (Moorman, Akinbami, Bailey, Zahran, King, Johnson & Liu, 2012).

According to a KII respondent, regular hospital check-ups are considered to be a way of monitoring symptoms in children as they are mandated to visit the hospital on appointments even without signs of symptoms. She pointed out that asthma is a chronic condition which requires frequent hospital visits, and the use of preventer and reliever medications

> Asthma is a chronic condition just like hypertension and diabetes even if you have a normal blood pressure, buy over the counter drugs, you still have to visit the hospital for check- ups, it is more than using drugs, you run tests, sometimes you have to adjust

> dose to suit the patient, it is more than using the inhaler even the inhalers are not the same, they contain different things, there are different kinds, there are some that you use when you have an attack, there are some that you use every day with or without attack just to prevent an attack, so it is not just taking drugs **(KII, Female, Nurse, Adeoyo)**.

This implies that, beyond the personal efforts to manage the disease, patients necessarily need to utilise professional care in order to achieve the desired health states.

4.16 Time of occurrence and duration of symptoms

The time of occurrence and duration of disease episode are important factors in the prevention and management of asthma. To investigate this, respondents were asked questions bordering on the time difference between the appearance of symptoms and the very incidence of asthma exacerbation. Majority (88.6%) of the respondents had symptoms 24 hours or less before the attack while 11.4% had symptoms more than 24hrs before the attack. Thus, there seems to be a proximal relationship, time wise, between the appearance of symptoms and the incidence of asthma attacks. The observation of such pattern has implication for preventive action against asthma as well as the range and timely deployment of health-seeking activities. As established by the health belief model, this further implicates the role of belief about precursors of asthma attacks and the very experience of asthma problems.

Identifying one of the major symptoms of the disease, qualitative data elicited from an asthmatic respondent identified wheezing at nights as a major symptom for him. This according to him makes him wake up at night, without being able to sleep again. He reported:

When I cough, I know that I am about to have an attack, it usually occurs at nights and early in the morning **(IDI, Female, 12years, asthmatic)**.

As noted by the Center for Disease Control and Prevention (2018), symptoms such as repeated episodes of wheezing, breathlessness and nighttime or early morning cough are significantly associated with asthma in children.

Table 4.13 further revealed that few (5.9%) of the respondent had symptoms in the morning, while (79.5%) of the respondents had symptoms in evening/night, few (11.7%) had symptoms both in the morning and night while (2.9%) had theirs anytime of the day. Pointedly, majority of the respondents could attribute their children asthma symptoms to evening/ night. These are times of each day that seem cooler than the afternoon. Thus, asthma attacks may have occurred more at such times due to the possible clogs and irritation to the respiratory track that result from low temperature, including triggering of allergies.

Table 4.11. Distribution of duration of symptoms/time of occurence

Duration of symptoms before attack	Frequency	Percent
24 hours or less	242	88.6
More than 24 hours	31	11.4
Time of the day of symptom occurrence		
Morning	16	5.9
Evening/night	217	79.5
Morning and night	32	11.7
Anytime	8	2.9

4.17 Housing Characteristics

The extent of control that participants had over their home environment, including the right to modify and/or effect desired changes had important implications for the course and outcomes of their asthmatic condition. This, largely, was determined by whether they owned the house in which they lived, a factor which affected their ability to effect renovations and other similar modifications such as tiling the compound floor to minimize dust. Thus, respondents were asked if they owned their houses, inherited it or rented.

The study found out that majority (66.7%) of respondents lived in rented houses, while 22.7% of respondents owned the houses they lived in and (12.5%) of respondents inherited the houses they lived in. Studies have shown that those who live in rented houses were more than twice as likely to be exposed to smoke in the home, to have evidence of roaches or rodents in the home at least monthly than those who live in houses owned by them, those who live in rented houses were more likely to report exposure to musty smells in the home, exposure to leaks, and exposure to mold in any room. These disparities in exposure may be related to their inability to make changes to their home because of lease restrictions (Gruber *et al.* 2016). In addition, some conditions, such as pests, leaks, or mold, may be present in the building, making it difficult to control the condition. In sum, managing asthma for those who live in rented houses may be difficult due to restrictions to make certain changes in the home.

Respondents were also asked if they reared pets, 17.2% of the respondents' reared pets at home, out of which majority (63.3%) of them reared dogs, 29.8% rear cats and 6.4%

reared rabbits. Dogs, cats and rabbits are furry animals and are known to exacerbate or worsen asthma conditions.

As regards roofing materials, majority (73.6%) used asbestos as a form of roofing material followed by PVC, 24.5%, 0.7% used wood shakes 1.1% used ceramic tiles. In terms of flooring materials, which is also an important attribute because children by virtue of their behavior are likely to spend time playing on the floor. 118 (43.2%) of the respondents used ceramic tiles, followed by rug (24.9%), carpet (14.7%), cement (13.6%), polished wood (0.7%), wood plank (0.4%), earth (1.5%) and sand (1.1%). As regards the kind of furniture used in the house, majority (69.6%) used upholstered furniture, 6.2% used wooden, 3.7% used plastic chairs, 20.5% used leather chairs.

Table 4.12. Characteristics of respondent's houses

Household attributes	Frequency	Percent
Ownership of House		
Self-Owned	57	20.9
Inherited	34	12.5
Rented	182	66.7
Pets		
Cats	14	29.8
Dogs	30	63.8
Rabbits	3	6.4
Roofing Materials		
Asbestos	201	73.6
PVC	67	24.5
Wood shakes	2	0.7
Ceramic tiles	3	1.1
Flooring materials		
Rug	68	24.9
Polished Wood	2	.7
Ceramic Tiles	118	43.2
Cement	37	13.6
Carpet	40	14.7
Wood Plank	1	.4
Earth	4	1.5
Sand	3	1.1
Type of Furniture		
Upholstered furniture	190	69.6
Wooden	17	6.2
Plastic	10	3.7
Leather	56	20.5
Total	**273**	**100.0**

Furthermore, an investigation was also carried out on the type of amenities available within respondents' houses and the range of materials available for their everyday use.

As presented in Table 4.13, cooking fuel was classified into biomass (firewood and charcoal) and non-biomass fuel (kerosene, Gas and Electric cooker), more than half (62.3%) of the respondents used gas cookers for cooking, while 21.6% used charcoal; 9.2%, kerosene; 5.5%, firewood, and 1.5% used electric cookers. Additionally, majority (96.3%) of the respondents had their kitchens located inside their houses while 3.7% had it outside their houses. Both the location of the kitchen, and the materials used in cooking had implications for the incidence of asthma and respondents were also asked how they disposed of their refuse. 28.2% claimed they burn them, 1.8% bury their refuse, 6.6% throw into the bush, 17.2% dispose of in public incinerator, 44.7% dispose them of in state trucks, 1.5% used private means of disposing of their refuse. Furthermore, respondents were asked if they owned generators and the location of the generator. Majority (67.0%) of the respondents claimed to own generators while (33%) did not own. When further asked the location of the generators, 7.7% claimed to have theirs in front of the room, 1.1%, had theirs inside the room, 57.4% at the back of the house, 33.9% had theirs in a generator house. Also, respondents were asked if they had flight of stairs at home; few (13.9%) of the respondents claimed to have stairs while majority (86.1%) did not have stairs. Furthermore, (26.4%) of the respondents had garden/vegetation in their houses while 73.6% do not have garden/vegetation

In terms of numbers of households in compound, 31.1% of the respondents had 1-2 households in their compound, 59.7% had 3-4 households in their compound, 6.2% had 5-

6 households in their compound while 2.9% had more than 6 households in their compound. As regards the type of house they lived in, 15.4% of the respondents lived in bungalow, 1.5% lived in duplex, 17.2% lived in face me while 65.9% lived in flats.

Table 4. 13. Household supporting facilities

Household attributes	Frequency	Percent
Cooking fuel		
Biomass		
Charcoal	59	21.6
Firewood	15	5.5
Non biomass		
Kerosene	25	9.2
Gas	170	62.3
Electric Cooker	4	1.5
Kitchen Location		
Inside the house	263	96.3
Outside the house	10	3.7
Method of dumping refuse		
Burning	77	28.2
Burying	5	1.8
thrown into the bushes	18	6.6
Public incinerator	47	17.2
State Trucks	122	44.7
Collected	4	1.5
Location of generator		
In front of the room	14	5.1
Inside the room	2	0.7
At the back of the house	105	38.5
In a generator house	62	22.7
No generator	90	32.9
Flight of stairs		

Presence of stairs	38	13.9
Not present	235	86.1
Garden		
Presence of garden	72	26.4
Not present	201	73.6

Table 4. 13. Household supporting facilities (Cont'd)

Household attributes	**Frequency**	**Percent**
No of households in compound		
1-2	85	31.1
3-4	163	59.7
5-6	17	6.2
More than 6	8	2.9
Type of house		
Bungalow	42	15.4
Duplex	4	1.5
Face me	47	17.2
Flat	180	65.9

4.18 Age of asthma onset, associated symptoms, and regularity of attack

Table 4.14 revealed the age at which asthma was first noticed in the child, the symptoms noticed and regularity of attack. Respondents were asked the age asthma was noticed in their child, 16.5% of the respondents' children noticed asthma in their children between ages 1- 2, 33.7% said ages 3-4, 43% of the respondent's noticed asthma in their children between ages 5-6 while 6.6% of the respondent's noticed asthma in their children when they were above 6years. This indicates that almost half of the respondents noticed asthma in their children within the age range 5-6 years. When asked about the symptoms they noticed, 43.6% of the respondents noticed incessant coughing, 26.7% noticed difficulty in breathing, while 29.7% noticed both incessant cough and difficulty in breathing. On regularity of asthma attack, 4.0% had exacerbations weekly, 59.3% had exacerbations once in a month, and 33.3% had exacerbations twice in a month while 3.3% had theirs once in six months.

Table 4.14. Age of asthma onset, associated symptoms, and regularity of attack

Age asthma was noticed in child	Frequency	Percent
1-2	45	16.5
3-4	92	33.7
5-6	118	43.2
above 6 years old	18	6.6
Symptoms noticed		
Coughing issues	119	43.6
Breathing issues	73	26.7
Coughing and breathing issues	81	29.7
Regularity of asthma attack		
Weekly	11	4.0
Once in a month	162	59.3
Twice in three months	91	33.3
Once in six months	9	3.3

4.19 Respondents' sources of domestic energy supply

The sources of energy that respondents utilised in their homes were viewed from three major dimensions: electric power, cooking fuel and lighting. In terms of electric power, three sources of power supply that were used by respondents included public electricity, generator sets and solar energy. As can be observed from Table 4.15, almost all (98.2%) made use of public electricity as a source of power supply in their houses. On regularity of use, large majority used it frequently that is, more than three times in a week. Few (3.7%) made use of generator as a source of power in their houses, on regularity of use 60% of them used it more than three times in a week. Very few (0.7%) made use of solar and they regularly made use of it as a source of power supply.

Table 4.17 further revealed the nature of household cooking fuel used by respondents. Few (4.4%) of the respondents used wood for cooking, and on regularity of use, they used it regularly. For charcoal, 61(22.3%) currently used charcoal as a source cooking fuel and out of this number, majority (95%) used it regularly. Less than half (50.0%) of the respondents made use of LPG; while almost all respondents frequently used it in their household. Furthermore 5.9% made use of biogas with 87.5% of them using it more than three times a week, while 10.6% made use of kerosene and all of them used it regularly. For electricity, 7.3% of the respondents made use of electricity for cooking and all that used it, did so more than three times in a week. According to Health Care Disclosure

(2018), a major trigger of asthma in the kitchen is not just smoke from burnt food but gas from gas stoves. Indoor biomass smoke has been reported to affect more than half the children in the world, mainly in developing countries. Approximately half of the world's population and up to 90% of rural households in developing countries still rely on unprocessed biomass fuels in the form of wood, dung and crop residues. These are typically burnt indoors in open fires or poorly functioning stoves, often causing extreme pollution (Schei *et al.*, 2004). In a study conducted by Oluwole, Arinola, Huo and Olopade (2017), it was reported that children from households using biomass fuel for cooking exhibited more severe symptoms of asthma compared to children from households using cleaner fuels.

The kind of lighting device used in the home can exacerbate asthma attacks. Few (2.2%) of the respondents used candle for lighting their houses and they used it frequently. Majority (74.0%) of the respondents currently use electric bulbs for lighting with almost all using it frequently that is more than three times in a week. Few (1.5%) of the respondents made use of gas lamps with one third of them making use of it more than three times in a week. 17.2% made use of open fire with majority of them using it frequently. Few (9.5%) of the respondents made use of rechargeable lamps with slightly above average using it more than three times in a week. Lastly, (1.8%) of the respondents made use of lantern as a means of lighting their houses with majority (80%) using it more than three times in a week.

Table 4.15. Sources of domestic energy

Power supply	**Use among respondents**
Public electricity	268
Generator sets	10
Solar energy	2
Cooking fuel	
Biomass fuel	
Wood	12
Charcoal	61
Non biomass fuel	
LPG	131
Biogas	16
Kerosene	29
Electricity	20
Lighting	
Candle	6
Electric bulb	202
Gas lamps	4
Open fire	47
Rechargeable lamps	26
Lantern	5

4.20 Household attributes and asthma triggers

On household attributes that are related to asthma attack in children, majority (90.1%) of the respondents reported the type of cooking method as a trigger, and 79.1% of the respondents reported that cooking fuel could trigger the occurrence of asthma. 72.9% of the respondents reported poor ventilation as a trigger, half (50.2%) of the respondents indicated rearing of pets as a trigger, 44.0% of respondents reported the type of sanitation facilities used in the home, 45.1% indicated household size, 41.8% reported the type of flooring materials, 37.0% of respondents indicated roofing materials as a major trigger of asthma in children. 22.7% of the respondents reported vegetation, 17.6% reported smoke as a trigger of asthma, while one out of twenty (4.4%) indicated sex distribution as being a trigger of asthma in children.

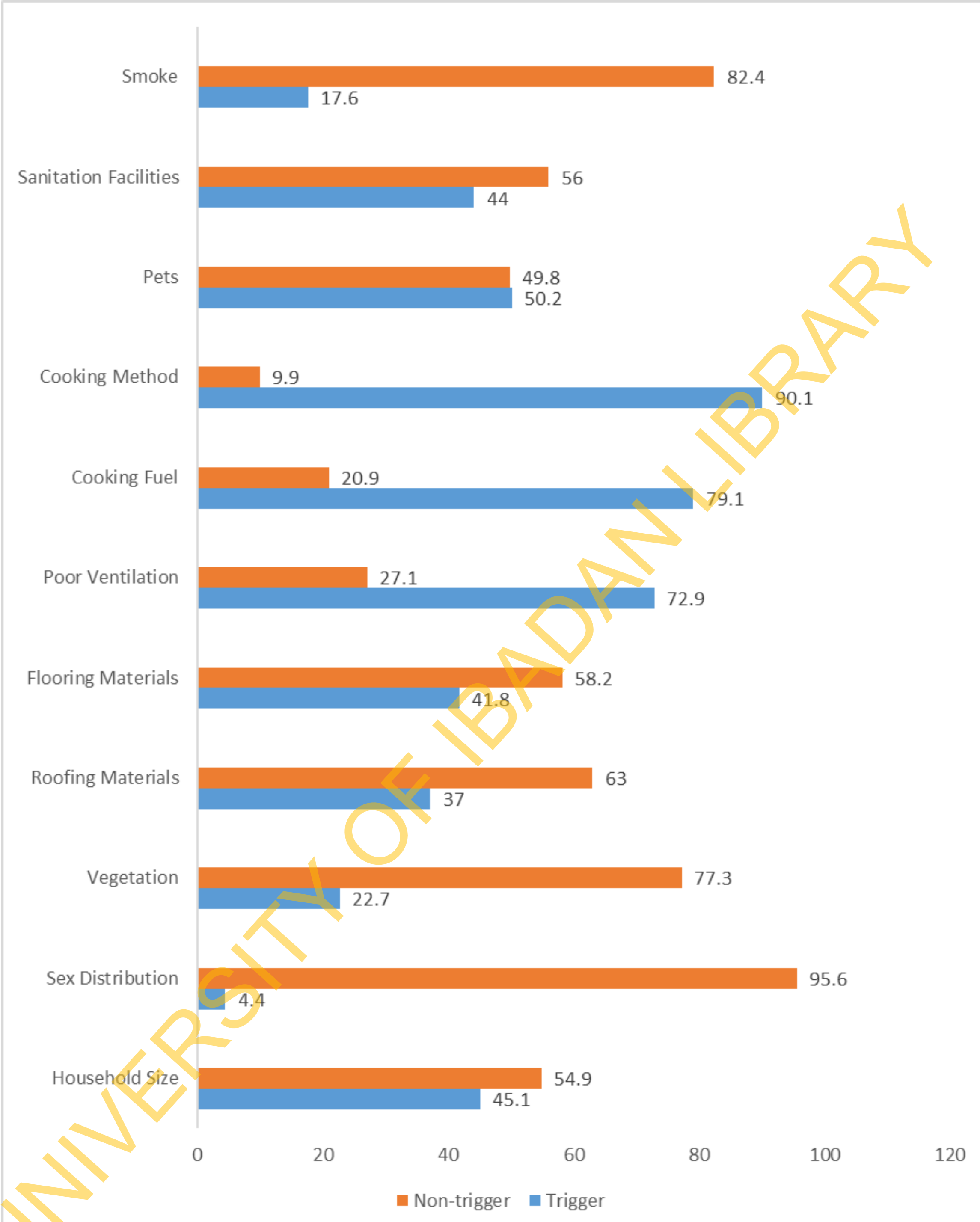

Figure 4.6: Perceived household predictors of asthma triggers

The study further sought to understand respondents' perception about household attributes that trigger asthma the most in children. Based on this, 44.0% attributed the type of cooking preparation method used in the home to the occurrence of asthma, followed by 18.3%, pets then 16.8%, poor ventilation, 6.2%, cooking fuel, 5.5%, spiritual attack, 5.1%, type of sanitation facilities, 4.8%, type of roofing materials, household size, 0.7%, vegetation, 0.4%. Consistent with literature, cooking preparation method and cooking fuel have been linked with asthma exacerbation due to smoke from burnt food and also gas from gas stoves which is also a risk for asthma (Health care disclosure, 2018).

Table 4. 16. Household attributes that trigger asthma mostly in children

Household attributes	Trigger/no trigger	Frequency	Percent
Household size	Trigger	2	0.7
	Not a trigger	271	99.3
Sex distribution	Trigger	0	0.0
	Not a trigger	273	100
Vegetation	Trigger	1	0.4
	Not a trigger	272	99.6
Type of roofing materials	Trigger	0	0
	Not a trigger	273	100
Type of flooring materials	Trigger	13	4.8
	Not a trigger	260	95.2
Poor ventilation	Trigger	46	16.8
	Not a trigger	227	93.2
Cooking fuel	Trigger	17	6.2
	Not a trigger	256	93.8
Cooking method	Trigger	120	44.0
	Not a trigger	153	56.0
Pets	Trigger	50	18.3
	Not a trigger	223	81.7
Type of sanitation facilities	Trigger	14	5.1
	Not a trigger	259	94.9
Smoke	Trigger	0	0
	Not a trigger	273	100.0
Spiritual attack	Trigger	15	5.5
	Not a trigger	258	94.5

Children living with asthma's view was sought on household attributes that can trigger the occurrence of asthma. A 10 years old boy spoke on how furry pets could trigger asthma he stated:

Pets could trigger asthma, hairy pets like dogs and cats go about carrying foreign materials on their body and spread it around the house, and these foreign materials can irritate the lungs **(IDI, Male, 10years, Asthmatic)**.

Furry pets have been associated with asthma. McGlaun (2011) opined that most animals shed dander, small scales or flakes that have the appearance of dandruff but are composed of minute pieces of hair, feathers, or skin. Dander can trigger hypersensitivity and asthma reactions. Likewise, studies on the association between early exposure to dogs and childhood asthma have shown opposing results. However, studies on some urban prospective cohorts showed a reduced risk in children exposed to dog (Lodge, Allen and Lowe, 2012), and other studies reported no association or a reduced risk of asthma and allergy among children in families of dog owners (Almqvist, Garden, Kemp, Li, Crisafulli, Tovey, Xuan and Marks, 2010; Ownby, Johnson and Peterson, 2002).

Reviews based on published cross-sectional, case-control, and cohort studies found rearing of pets to be linked with increased risk of asthma (Apelberg, Aoki and Jaakkola, 2001; Takkouche, González-Barcala, Etminan and Fitzgerald, 2008).

Similarly, a participant attributed shedding of hairs of furry pets to asthma exacerbations for a child at risk. The need for good hygiene was emphasized as cockroaches' droppings could trigger asthma:

> Pets could also trigger the occurrence of asthma especially pets with fur, canine pets like cats and dogs have hairs and shed these hairs, so a child that is at risk could get triggered, they shed and you might not even see it, then even birds, cockroaches' droppings, cockroaches' droppings can also trigger asthma. However, the argument for that is not as a pet but poor hygiene **(KII, Female, Oluyoro, Senior registar)**.

Consistent with the findings, the droppings and saliva of cockroaches has been said to trigger asthma attacks and due to the fact that cockroaches are so ubiquitous, therefore individuals with asthma are advised to practice good house cleaning measures and learn cockroach-control techniques (Young, 2011).

She spoke further on how poor hygiene could trigger the condition

> I don't think anybody will keep cockroaches but poor hygiene can trigger asthma. Also, mites can trigger asthma, you can not see them with naked eyes but a lot sleep on beddings that are not covered, they sleep on mattresses that the foam is just exposed and a child will just sleep directly on pillows without pillow cases, just try and take a mattress that is uncovered and just slam your hands on it and you will see all sorts of particles flying up, those are things that can irritate the airways and the child has to sleep on it all the time. Also, dusty environment triggers asthma (**KII, Female, Oluyoro, Senior registar)**.

Dust mite pieces and droppings are allergens that can travel through the air to trigger the allergic cascade and worsen asthma. Dust mites are tiny arachnids related to ticks and spiders that are found in most homes, though they are invisible to the eye. Dust mites feed on skin flakes and dust, usually on mattresses, pillows, carpets, and upholstered furniture (Young, 2011).

Pest infestations, through their association with asthma, provide another linkage between substandard housing and chronic illness. Cockroaches can cause allergic sensitization and have emerged as important asthma triggers in inner-city neighborhoods. Children with asthma who are sensitized and exposed to cockroaches are at elevated risk for hospitalization (Rosenstreich, Eggleston and Kattan, 1997).

Similarly, respondents were asked if the kind of flooring/ roofing materials could trigger asthma occurrence in children and a respondent attributed it to the fact that children will always play on the floor, so inappropriate use of flooring materials could trigger asthma. Similarly, Young (2011), noted that certain behaviors of children tend to expose them to chemicals and organisms that can trigger asthma attacks because children often play close to the ground both indoor and outdoor and this behavior can put them in contact with contaminated carpet and surface dust.

I learnt use of carpets and rugs in the house could worsen the condition, because usually children will want to play on the floor and rugs which harbours dust thereby leading to asthma attack **(IDI, Male, 11years, Asthmatic, UCH)**.

The importance of appropriate housing characteristics was emphasized in the prevention of triggers such as flooring materials, use of insecticides, use of fresh paints and type of cooking fuel. She maintained that:

> The flooring material is very important, is it rug? is it furry? even the walls, is it newly painted, do they use insecticides, even the cooking fuel, do they make use of kerosene stove? How do they put it off? all these are important questions in prevention of asthma triggers in the household **(KII, Adeoyo, Female, Nurse)**.

However, this is in line with Vaughan and Platts-Mills (2000), old, dirty carpeting, often found in substandard housing, is an important reservoir for dust, allergens, and toxic chemicals. Exposure to these agents can result in allergic, respiratory, neurological, and hematologic illnesses. Studies have found that reducing asthma triggers in the home, particularly for children sensitive to those triggers, may reduce hospitalizations among children with asthma (Crocker, Kinyota, Dumitru, Ligon, Herman, Ferdinands, Hopkins, Lawrence, Sipe, and Task Force on Community Preventive Services, 2011).

Qualitative findings revealed that identification of triggers, separation of the child from triggers, periodic cleaning of the house and proper ventilation are ways of reducing asthma hospitalization which is a sign of well controlled asthma

> To reduce asthma hospitalizations, it is important to first separate the child from all the triggers, you first have to identify the triggers, keep it away from the child, also inform the child about triggers and teach him how to keep away from triggers. Also, there should be proper ventilation and periodic cleaning of the house to prevent dust from accumulating **(KII, Female, Oluyoro, Senior Registrar, Pediatrician)**.

4.22 Relationship between household attributes and frequency of asthma attack

Table 4.17 presented the relationship between household attributes and frequency of attack. The role of household attributes is very important in frequency of attacks of the condition.

There was a significant association between income and frequency of attack. Specifically, (63.5%) of those with monthly income between 10,000 and 50,000 had exacerbations frequently than other income group. Hence, this shows that frequency of asthma attack is dependent on respondents' monthly income. The higher they earn, the fewer the exacerbations, this can be attributed to the fact that with higher incomes, they can effectively prevent the attack and can afford its management.

The study found out that there was no significant relationship between family type and frequency of attack, that is, frequency of attack was not dependent on respondents' family type either nuclear or family extended family.

As regards ownership of house, there was a significant relationship between ownership of house of frequency of attack and those who live in rented houses, that is, houses that do not belong to them have more exacerbations than those who live in self-owned and inherited house. Precisely, (60.9%) of those who lived in rented houses had more attacks than those who lived in self-owned houses and inherited houses, this can be due to the fact that those living self-owned houses can easily do away with triggers by ensuring that certain household attributes that can trigger asthma are removed but those living in rented houses are forced to accept the houses even if the roofing materials exacerbates asthma or the presence of vegetation or even flight of stairs.

Meanwhile, the study found out that there was no significant relationship between number of household members that slept in a room a night prior to the study and frequency of attack. Hence, frequency of asthma attack can not be influenced by number of household members that slept in room in a room.

Table 4.17. Relationship between household attributes and frequency of asthma attack

Household attributes	Frequency of attacks			Total	Test of association
	Very regular	Fairly regular	Not regular		
Average Monthly Income					
Below 10,000	0(0.0)	7(63.6)	4(36.4)	11(100.0)	χ^2 = 89.391
10,000-50,000	6(4.4)	81(59.1)	50(36.5)	137(100.0)	df =8
50,000-100,00	0(0.0)	55(58.5)	39(41.5)	94(100.0)	P.value= 0.000
10,000150,000	0(0.0)	17(70.8)	7(29.2)	24(100.0)	Cramer's V=
Above 150,000	5(71.4)	2(28.6)	0(0.0)	7(100.0)	0.405
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	
Family Type					χ^2 = 5.725
Nuclear	8(3.2)	150(59.8)	93(37.1)	251(100.0)	df =2
Extended	3(13.6)	12(54.5)	7(31.8)	22(100.0)	P.value= 0.057
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.)**	Phi = 0.057
Ownership of House					
Self-owned	2(3.5)	36(63.2)	19(33.3)	57(100.0)	χ^2 = 39.570
Inherited	8(23.5)	16(47.1)	10(29.4)	34(100.0)	df =4
Rented	1(0.5)	111(60.4)	71(39.0)	182(100.0)	P.value= 0.000
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	Cramer's V= 0.269
No of household that slept in a room					
1-2	5(2.9)	99(57.2)	69(39.9)	173(100.0)	χ^2 = 4.431
3-4	6(6.1)	61(62.2)	31(31.6)	98(100.0)	df =4
5-6	0(0.0)	2(100.0)	0(0.0)	2(100.0)	P.value= 0.351
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	Cramer's V= 0.090
Rearing of pets					
Yes	2(4.3)	28(59.6)	17(36.2)	47(100.0)	χ^2 = 0.011
No	9(4.0)	134(59.3)	83(36.7)	226(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.995 Phi = 0.006
Furniture					
Upholstered	5(2.6)	110(57.9)	75(39.5)	190(100.0)	χ^2 = 7.071
Wooden	1(5.9)	12(70.6)	4(23.5)	17(100.0)	df =6
Plastic	0(0.0)	7(70.0)	3(30.0)	10(100.0)	P.value= 0.314
Leather	5(8.9)	33(58.9)	18(32.1)	56(100.0)	Cramer's V=
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	0.161

Pets are considered as household attributes that triggers asthma attack. However, the study revealed that there was no significant relationship between pets and frequency of attack. Hence, frequency of attack is not dependent on rearing of pests.

Also, the study found out that household furniture was not significantly associated with frequency of attacks. Hence, the material nature of the furniture used in the home, whether upholstered, wooden, plastic or leather can not influence the regularity of attack.

Findings further showed that there was no significant relationship between cooking materials and frequency of attack. Usage of firewood, kerosene, gas, electric cooker and charcoal can not influence frequency of attack. A positive relationship between vegetation and frequency of attack was further revealed by the table; even as majority (77.6%) of respondents with vegetation in their houses had fairly regular attacks. This indicated that frequency of attacks could be dependent on presence of vegetation. Asthma as a condition can be exacerbated due to presence of garden/ vegetation.

Findings revealed that there was no significant relationship between ventilation and frequency of attack. That is, houses being well ventilated and poorly ventilated did not influence frequency of attack. Similarly, there was no significant relationship between source of power supply and frequency of attack. Usage of public electricity or generator was not significantly associated with frequency of attack.

Table 4. 17. Relationship between household attributes and frequency of asthma Attack (Cont'd)

Household attributes	Frequency of attacks: Very regular	Fairly regular	Not regular	Total	Test of association
Cooking materials					
Firewood	1(6.7)	12(80.0)	2(13.3)	15(100.0)	χ^2 = 12.703
Kerosene	2(8.0)	11(44.0)	12(48.0)	25(100.0)	df =8
Gas	8(4.7)	98(57.6)	64(37.6)	170(100.0)	P.value=
Electric Cooker	0(0.0)	1(25.0)	3(75.0)	4(100.0)	0.122
Charcoal	0(0.0)	40(67.8)	19(32.2)	59(100.0)	Cramer's
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	V= 0.153
Vegetation					
Yes	0(0.0)	38(77.6)	11(22.4)	49(100.0)	χ^2 = 9.022
No	11(4.9)	124(55.4)	89(39.7)	224(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value = 0.011 Phi = 0.182
Ventilation					
Well ventilated	3(3.1)	59(60.2)	36(36.7)	98(100.0)	χ^2 = 0.375
Poorly ventilated	8(4.6)	103(58.9)	64(36.6)	175(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value = 0.829 Phi = 0.037
Source of power supply					
Public electricity	11(4.2)	155(58.7)	98(37.1)	264(100.0)	χ^2 = 1.436
Generator	0(0.0)	7(77.8)	2(22.2)	9(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value = 0.488 Phi = 0.073
Method of dumping refuse					

Burning	1(1.1)	59(64.8)	31(34.1)	91(100.0)	χ^2 = 21.055
Drums	1(2.1)	32(68.1)	14(29.8)	47(100.0)	df =8
Pub incinerators	2(4.3)	27(57.4)	18(38.3)	47(100.0)	P.value=
Thrown in the bush	3(20.0)	10(66.7)	2(13.3)	15(100.0)	0.007 Cramer's
Trucks	4(5.5)	34(46.6)	35(47.9)	73(100.0)	V= 0.196
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	

Findings specifically showed that methods of dumping refuse are significantly associated with frequency of attack. Specifically, (65.9%) of respondents that engage in burning as a method of waste disposal had more exacerbations, similarly, (86.7%) of respondents that throw their refuse in the bush had more exacerbations. This indicates that frequency of attack could be dependent on methods of waste disposal used in the house, especially for burning which is associated with smoke which is a major triggering factor for asthma. Engaging in burning or throwing in the bush can exacerbate asthma as the aftermath effect of throwing in the bush will likely be burning and could worsen children living with asthma condition.

Also, the study revealed a significant relationship between location of generator and frequency of attack. (60%) of respondents with generators in front of their houses had attacks frequently. This shows that frequency of attack could be dependent on the location of generator. The reason for this is, generators emit smoke which can worsen asthma condition in children.

Meanwhile, the study showed no significant relationship between flooring materials, and frequency of attack. Hence, the kind of flooring materials used in the home such as carpet, sand, cement, rug and tiles can not influence frequency of attack.

Respondents' type of house, age of asthmatic parent, education and occupation were significantly associated with frequency of attack. Thus, respondents' kind of house, age of asthmatic parent, education and occupation.

Table 4: 21 showed no significant relationship between flight of stairs and frequency of attack. Frequency of attack was not dependent on presence or absence of stair case.

In terms of household size, Table 4.21 showed a significant relationship with regularity of attack; majority, (62.6%) of respondents with household size of more than 6 had more exacerbations. This shows that regularity of attack is dependent on household size, therefore, larger family size could have more exacerbations. Also, number of households in compound showed a significant relationship between regularity of attack. All (100%) respondents with households with more than 6 households in a compound had asthma fairly regularly.

Thus, frequency of attack could be dependent on number of households in a compound. Both household size and number of households in a compound as attributes could be linked with overcrowding is a poor housing condition linked with asthma.

The study revealed that there was no relationship between the gender of the household head and frequency of asthma attacks. This may be attributed to the fact that asthma is a disease that is not sensitive to the masculinity or femininity of the household head. However, a positive significant relationship was observed between household decision making on health matters and regularity of attacks. Pointedly, 73.7% of mothers who made decisions on health matters had more exacerbations than fathers. Hence, frequency of attack could be dependent on the gender of the household head.

Meanwhile, the study showed no significant relationship between roofing materials, and frequency of attack. Hence, the kind of roofing materials used in the home either asbestos, PVC or wood can not influence frequency of attack.

Table 4. 17. Relationship between household attributes and frequency of asthma Attack (Cont'd)

Household attributes	Frequency of attacks Very regular	Fairly regular	Not regular	Total	Test of association
Location of generator					
Back of the house	0(0.0)	72(59.0)	50(41.0)	122(100.0)	χ^2 = 13.034 df =6
Front of the house	2(10.0)	10(50.0)	8(40.0)	20(100.0	P.value= 0.043
Generator house	5(8.9)	31(55.4)	20(35.7)	56(100.0)	Cramer's V=
No generator	4(5.3)	49(65.3)	22(29.3)	75(100.0)	0.155
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	
Flooring materials					
Carpet	1(2.8)	21(58.3)	14(38.9)	36(100.0)	χ^2 = 4.222
Sand	0(0.0)	5(83.3)	1(16.7)	6(100.0)	df =8
Cement	2(5.4)	19(51.4)	16(43.2)	37(100.0)	P.value=
Rug	3(4.5)	44(65.7)	20(29.9)	67(100.0)	0.837
Tile	5(3.9)	73(57.5)	49(38.6)	127(100.0)	Cramer's V=
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	0.088
Type of house					
Bungalow	4(9.5)	25(59.5)	13(31.0)	42(100.0)	χ^2 = 7.314
Duplex	0(0.0)	2(50.0)	2(50.0)	4(100.0)	df =6
Face me	1(2.1)	33(70.2)	13(27.7)	47(100.0)	P.value=
Flat	6(3.3)	102(56.7)	72(40.0)	180(100.0)	0.293
Total	**11(4.0)**	**162(59.3))**	**100(36.6)**	**273(100.0)**	Cramer's V= 0.116

Age					
21-25	0(0.0)	3(100.0)	0(0.0)	3(100.0)	χ^2 = 11.230
26-30	0(0.0)	24(77.4)	7(22.6)	31(100.0)	df =10
31-35	3(4.3)	42(60.0)	25(35.7)	70(100.0)	P.value=
36-40	3(3.7)	46(56.8)	32(39.5)	81(100.0)	0.340
41-45	5(7.0)	39(54.9)	27(38.0)	71(100.0)	Cramer's V=
46-50	0(0.0)	8(47.1)	9(52.9)	17(100.0)	0.143
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	

Table 4. 17. Relationship between household attributes and frequency of asthma attack (Cont'd)

Household attributes	Frequency of attacks: Very regular	Fairly regular	Not regular	**Total**	**Test of association**
Education					
Without tertiary education	6(6.1)	58(58.6)	35(35.4)	99(100.)0	χ^2 = 1.675 df =2 P.value= 0.433
With Tertiary education	5(2.9)	104(59.8)	65(37.4)	174(100.0)	Phi = 0.078
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	
Occupation					
Unemployed	0(0.0)	7(63.7)	4(36.4)	11(100.0)	χ^2 = 7.560
Self-employed	10(6.5)	95(61.3)	50(32.3)	155(100.0)	df =4
Either private or public employee	1(0.9)	60(56.1)	46(43.0)	107(100.0)	P.value= 0.109 Cramer's V= 0.118
Total	**11(4.0)**	**162(59.3**	**100(36.6)**	**273(100.0)**	
Flight of stairs					
Yes	1(2.6)	21(55.3)	16(42.1)	38(100.0)	χ^2 = 0.699
No	10(4.3)	141(60.0)	84(35.7)	235(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.705 Phi = 0.051
Household size					χ^2 = 12.615

1-3	5(6.1)	48(58.9)	29(35.4)	82(100.0)	df =4
4-6	3(1.7)	107(61.6)	65(37.1)	175(100.0)	P.value= 0.013
More than 6	3(18.8)	7(43.8)	6(37.5)	16(100.0)	Cramer's V=
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	0.152
No of households in compound					χ^2 = 17.506
1-2	5(5.9)	45(52.9)	35(41.2)	85(100.0)	df =6
3-4	3(1.8)	100(61.3)	60(36.8)	163(100.0)	P.value= 0.008
5-6	3(17.6)	9(52.9)	5(29.4)	17(100.0)	Cramer's V=
More than 6	0(0.0)	8(100.0)	0(0.0)	8(100.0)	0.179
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	

Table 4.17. Relationship between household attributes and frequency of asthma attack (Cont'd)

Household attributes	Frequency of attacks: Very regular	Fairly regular	Not regular	**Total**	**Test of association**
Gender of household head					
Male	11(4.2)	156(59.1)	97(36.7)	264(100.0)	χ^2 = 0.487
Female	0(0.0)	6(66.7)	3(33.3)	9(100.0)	df =2
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value= 0.784
					Phi = 0.042
Roofing materials					
Abestos	6(3.0)	**123(60.6)**	**74(36.5)**	**203(100.0)**	χ^2 = 2.953
PVC	5(7.5)	37(55.2)	25(37.3)	67(100.0)	df =4
Wood Shakes	0(0.0)	2(66.7)	1(33.3)	3(100.0)	P.value= 0.566
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	Cramer's V= 0.074

4.23 Physical exercise/ activity

Physical activity is known to be associated with asthma symptoms in children living with asthma but its role in asthma prevention remains unclear with several schools of thought (Nystad, Nafstad, and Harris, 2001; Shaaban, Leynaert, Soussan, Antó, Chinn, de Marco, Garcia-Aymerich, Heinrich, Janson, Jarvis, Sunyer, Svanes, Wjst, Burney, Neukirch, and Zureik, 2007).

Only about half (50.5%) of respondents participated in physical exercise while below average (49.5%) did not participate in physical exercise. For those who participated in physical exercise, when asked of what informed their decision for participation, 77(55.8%) made mention of school's curriculum as the children spent a significant time in school, they were likely to be involved in PE. This was closely followed by the decision that it was difficult for a child not to participate/ stop a child not to participate in physical exercises because by their nature as children unconsciously they engage in physical exercise while the rest made mention of it being the child's decision and that engaging in physical activity improves their lung function while those that do not allow their children participate in physical exercise made mention of doctor's advice, to prevent the condition from deteriorating and that participation could induce exacerbation.

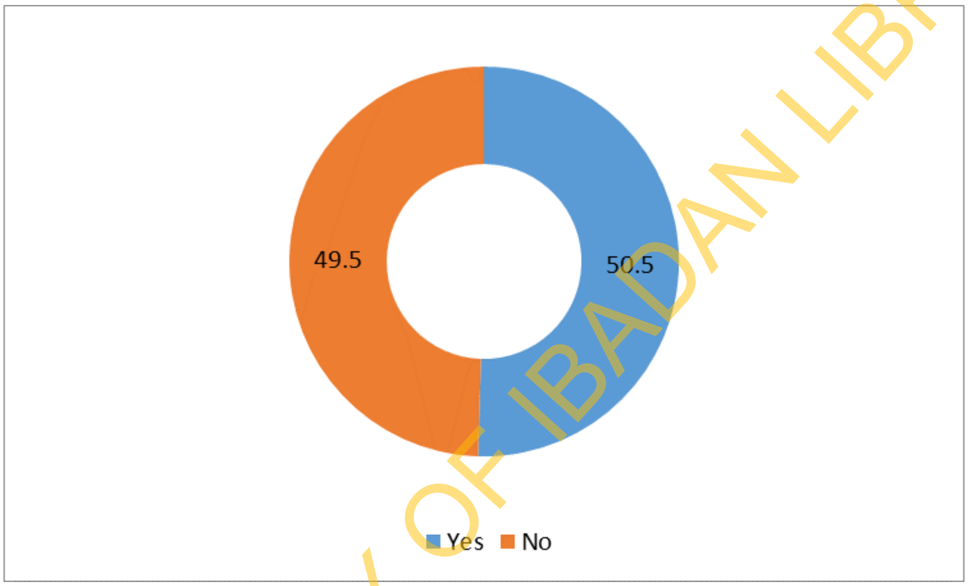

Figure 4. 7: Participation in physical exercises

Table 4.18. Reasons for participation/exemption

Reasons for participation/ exemption	Freq.	Percent
Participates in physical exercises	138	50.5
Childs personal decision	7	5.1
Impossible for a child not to participate	24	17.4
School curriculum	77	55.8
No reason	17	12.3
Improve lung function	13	9.4
Do not participate in physical exercises	**135**	**49.5**
Doctors' advice	7	5.2
Health condition/ prevent condition from deteriorating	13	53.3
Exercise induced exacerbation	44	32.6
No reason	12	8.9

Children living with asthma were further interrogated on participation in physical exercise and asthma attack. A 10 years old boy who is a sprinter in school was of the opinion that participating in physical exercise has nothing to do with asthma because from his own personal experience he does not have attacks while running. However, he believes participation strengthens the lungs. He said:

> I don't think physical exercise has anything to do with asthma, I am a sprinter, so I participate in physical exercise in school and I don't usually have attack during the process, it only strengthens the lungs, it doesn't have anything to do with it **(IDI, 10years, Male, Asthmatic, UCH)**.

The assumption above is in line with Basaran, Guler-Uysal, Ergen, Seydaoglu, Bingol-Karakoc and Altinas (2006) that the lung capacity increases with involvement in exercise which is a proven way to manage asthma exacerbations. Similarly, another respondent who also participates in long distance races noted that participation does not exacerbate his condition: he also made mention of athletes who participate in sporting activities and are living with asthma

> I participate in physical exercise, I run long distances and it doesn't affect me. Also, I have read of two athletes living with asthma and who were able to perform sporting activities, one of them is even a footballer **(IDI, 11Years, Male, Asthatic, UCH)**.

Similar to this, another respondent maintained that participation in physical exercise doesn't trigger his condition so far it is not dust: He explained that:

I participate in physical exercises like skipping and running, since it doesn't affect me because, it doesn't have to do with dust ***(IDI, 9years, Female, UCH)***.

The above statement shows that the asthmatic child does not believe that physical exercise can worsen his condition, she engages in skipping as a form of physical exercise, she however believes dust is a major trigger of asthma.

However, A KII respondent gave insights on how participation in physical exercise by children living with asthma could lead to emergency hospital visits. She stated that participation in physical exercise by an asthmatic can lead to bronchospasm which makes it very difficult to breathe and thereby causing wheezing: she explained that:

> If a child has asthma and he/she is exerting on physical exercise, there could be bronchospasm that means airways just clamp and they refuse to open up. In fact, many times when children are brought to the emergency after having periods of exercise, they just develop sudden onset difficulty in breathing and wheezing, they become all blue in the face, blue in the lips because their body couldn't get enough air. So we have to give oxygen urgently then give anti-inflammatory like inhaled steroids so that the airway can open **(KII, Oluyoro, Female, Senior registrar, Pediatrician)**.

Similarly, another discussant was of the opinion that excessive physical exercise can pose a threat to children living with asthma. However, emphasis was placed on individuals knowing their limits when it comes to excessive physical exercise

> Excessive exercise is not good for asthmatic patients and everyone has a limit but for them the limit depends on each individual, the person knows his/ her own limit, excessive physical exercise can cause exacerbation of the attack **(KII, Oluyoro, Female, Pediatrician)**.

This further corroborates Manning and Nolan (2012) who described physical exercise as a significant cause of asthma symptoms among others for majority of patients, and for some it is the sole cause of asthma symptoms, children who participate in physical exercise could be predisposed to Exercise Induced Bronchoconstriction (EIB).

Contrarily, in a study conducted by Lochte, Nielsen, Petersen and Platts-Mills (2016), they found out adolescents with low physical activity levels had an increased risk of new-onset asthma, and some had a higher risk of current asthma/or wheezing.

Another discussant stated that children living with asthma can participate in physical exercises if well managed:

Asthma can cripple one that you can not do much, it can be quite dilapidating, on the other hand if it is well managed an asthmatic can swim, play soccer, basketball and do all sort of sport ***(KII, Oluyoro, Female, Senior registrar, Pediatrician)***.

Studies on physical activity and childhood asthma have produced diverse results (Corbo, Forastiere, De Sario, Brunetti, Bonci, Bugiani, Chellini, La Grutta, Migliore, Pistelli, Rusconi, Russo, Simoni, Talassi, Galassi and Sidria-2 Collaborative Group, 2008). Some have indicated that physical activity may induce anti-inflammatory effects such that brief intervals of physical activity alter the immune response (Schwindt, Zaldivar, Wilson, Leu, Wang-Rodriguez, Mills and Cooper, 2007). However, whether such effects translate into a reduced risk of developing asthma also remains unclear. Also, cross-sectional studies have shown inconsistent associations between physical activity childhood asthma. In some studies, low levels of physical activity were related to a high asthma risk (Lang, Butz, Duggan, and Serwint, 2004; Mitchell, Beasley, Björkstén, Crane, García-Marcos and Keil, 2013).

4.24 Exercise and perceived preventability

Table 4.19 presented the association between perceived preventability of asthma and participation in physical exercise. There was a significant association between participation of physical exercise by respondents and the perceived preventability of asthma. Specifically, respondents whose asthmatic child did not participate in physical exercise (82.5%) believed that asthma is preventable, more than those whose child participated (75.4%).

Table 4.19. Exercise and perceived preventability

Participation in physical exercise	Preventability of asthma		Total	Test of association
	Preventable	Not preventable		
Child participates	104(75.4)	34(24.6)	138(100.0)	$\chi 2$ = 4.150
Child doesn't participate	115(82.5)	20(14.8)	135(100.0)	df =1
				P.value= 0.042
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	Phi = -0.123

This implied that respondents' participation in physical exercise can be influenced by the perception on asthma prevention; thus, their decision to participate or not in physical exercise. Those who did not allow their children to participate could do so as a result of preventive measure to limit attack caused by exercise induced bronchoconstriction.

4.25 Participation in physical exercise

For children living with asthma who participated in physical exercise, the type of physical exercise that was carried out by them included running, cycling, jogging, climbing stairs, swimming, skipping and soccer. About half (48.4%) engaged in running as a form of physical exercise, 1.5% reported riding of bicycle, 26.7% reported jogging, 1.5% reported of climbing stairs, 1.8% reported swimming, 11.0% reported skipping while 10.6% indicated in soccer as form of physical exercise.

Table 4. 20. Physical exercise participation

Physical exercise	Exercise participation	Frequency	Percent
Running	Allowed	132	48.4
	Not allowed	141	51.6
Riding of bicycle	Allowed	4	1.5
	Not allowed	269	98.5
Jogging	Allowed	73	26.7
	Not allowed	200	73.3
Climbing stairs	Allowed	4	1.5
	Not allowed	269	98.5
Swimming	Allowed	5	1.8
	Not allowed	268	98.2
Skipping	Allowed	30	11.0
	Not allowed	243	89.0
Soccer	Allowed	29	10.6
	Not allowed	244	89.4

4.26 Relationship between perception on preventability of asthma and exercise related activities

These span over aerobic as well as anaerobic physical activities that may exacerbate existing asthmatic conditions. Beyond this, however, Table 4.21 further showed the degree of association between physical exercises and perception on preventability of asthma. The physical exercises carried out by the children are running, cycling, jogging, climbing stairs, swimming, skipping and soccer. Majority (75.5%) of the respondents whose children engaged in running as a physical exercise affirmed that asthma can be prevented while about one quarter of the respondent (23.5%) affirmed that asthma can not be prevented. However, there is no significant relationship between running as a type of physical exercise and perception on preventability of asthma. As regards cycling, three out of the respondents were of the opinion that asthma can be prevented while one was of the opinion that it can not be prevented. For jogging as type of physical exercise, majority (80.8%) of the respondents whose children participate in jogging as a form of physical exercise were of the opinion that asthma can be prevented while 19.2% were of the opinion that asthma can not be prevented. For climbing of stairs, 75% of the respondents whose children participate in climbing stairs were of the opinion that asthma can be prevented while one quarter of the respondents (25%) were of the opinion that it can not be prevented.

For swimming, all (100%) the respondents whose children engaged in swimming as a form of physical exercise were of the opinion that asthma can be prevented. (66.7%) of the respondent whose children engage in skipping as a form of physical exercise were of the opinion that asthma can be prevented while (33.3%) were of the opinion that it can not be prevented. For soccer, (79.3%) of the respondents whose children play soccer were of the opinion that asthma can be prevented while (20.7%) were of the opinion that it can not be prevented.

Overall, there was a significant association between skipping and the perception on preventability of asthma. Specifically, 81.9% of those who did not engage in skipping as a form of physical exercise were of the perception that asthma can be prevented. Hence, this could have influenced their decision not to allow participation while there was no significant relationship between running, cycling, jogging, climbing stairs, swimming and soccer.

Table 4. 21. Relationship between perception on preventability of asthma and exercise related activities

Physical exercise	Preventability of asthma		Total	Test of association
	Preventable	Not preventable		
Running				χ^2 = 2.211
Participate	101(75.5)	31(23.5)	132(100.0)	df =1
Do not participate	118(83.7)	23(16.3)	141(100.0)	P.value= 0.137
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	Phi = -0.09
Cycling	3(75.0)	1 (25.0)	4(100.0)	χ^2 = 0.792
Participate	216(80.3)	53(19.7)	269(100.0)	df =1
Do not participate	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.792
Total				Phi = -0.016
Jogging	59(80.8)	14(19.2)	73(100.0)	χ^2 = 0.23
Participate	160(80.8)	40(20.0)	200(100.0)	df =1
Do not participate	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.880
Total				Phi = 0.009

Climbing stairs	3(75.0)	1(25.0)	4(100.0)	χ^2 = 0.792
Participate	216(80.3)	53(19.7)	269(100.0)	df =1
Do not participate	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.70
Total				Phi = -0.016
Swimming	5(100.0)	0(0.0)	5(100.0)	χ^2 = 1.256
Participate	214(79.9)	54(20.1)	268(100.0)	df =1
Do not participate	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.262
Total				Phi = 0.068
Skipping	20(66.7)	10(33.3)	30(100.0)	χ^2 = 3.902
Participate	199(81.9)	44(18.1)	243(100.0)	df =1
Do not participate	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.048
Total				Phi = -0.120
Soccer	23(79.3)	6(20.7)	29(100.0)	χ^2 = 0.17
Participate	196(80.3)	48(19.7)	244(100.0)	df =1
Do not participate	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.879
Total				Phi = -0.008

4.27 Logistic regression of selected social factors influencing participation of children living with asthma in physical exercise

Table 4.22 showed the social factors influencing the participation of children living with asthma in physical exercise. Table 4.22 revealed that there was a significant relationship between ethnic affiliation, and participation of children living with asthma in physical exercises. Specifically, the study found that the Igbo were 6 times more likely to allow participation in physical exercise of their asthmatic child than the Yoruba.

Furthermore, there was a significant relationship between ownership of house and participation of children living with asthma in physical exercises. Table 4.26 showed that those who lived in rented apartment were 0.313 times less likely to allow their asthmatic child to participate in physical exercise than the reference category 'self-owned". This means that a significant number of those who live in rented apartment are less likely to allow their children living with asthma participate in physical exercises than those who live in houses owned by them. This could be linked to the fact that due to the house not being owned by them, so, engaging in physical exercise could be difficult due to hindrances such as availability of space or fear of intrusion.

Also, there is a significant relationship between education and participation of children living with asthma in physical exercises. Findings showed that those with tertiary education were 6.865 times more likely to allow their children participate in physical exercises than those without tertiary education. This could be linked to the exposure of the parents as regards belief about exercise induced exacerbations. While some believed children living with asthma needs physical exercise to strengthen their lungs, others were of the opinion that engaging in physical exercise can trigger asthma.

The study found that there was a significant relationship between sex of asthmatic child and participation in physical exercise. Specifically, the table showed that asthmatic females were 2.738 times more likely to participate in physical exercise than their male counterparts. This could be attributed to the choice of physical activity being associated more with exacerbation which is skipping and usually, skipping as a form of physical exercise is associated with females.

However, there was no significant relationship between gender of asthmatic parents, religious affiliation, monthly income, age of asthmatic child and occupation. This implies that participation in physical exercise by children living with asthma can not be predicted by respondents' gender, religious affiliation, monthly income, age of asthmatic child and occupation.

Williams, Hoskins, Pow, Neville, Mukhopadhyay, and Coyle (2010) noted that excessive protection and exemption from school sports and recreational activities of children with asthma can also make the child feel isolated and ostracized, sometimes leading to depression and low self-esteem. In addition to occurrence of depression and loneliness in children living with asthma, low self-esteem is often said to be associated with an asthmatic child due to an avoidance of sports activities and other related activities and it could be unhealthy for children (clack, 2010).

Table 4.22. Logistic Regression of selected social factors influencing the participation of children living with asthma in exercise

Demographic Characteristics	Sig.	Exp(B)
Gender		
Male		
Female	0.306	0.609
Ethnic Affiliation		
Yoruba		
Igbo	**0.001**	6.688
Religious Affiliation		
Christianity		
Islam	0.323	0.728
Average Monthly Income		
Below 10,000		
10,000-50,000	0.783	1.265
50,000-100,000	0.465	1.908
100,000-150,000	0.863	0.837
Above 150,000	0.238	0.213
Family Type		
Nuclear		
Extended	0.428	1.732
House Ownership		
Self-owned		
Inherited	0.161	0.388
Rented	**0.008**	0.313
Marital Status		
Single		
Married	0.650	1.284
Education		
Without Tertiary Education		
With Tertiary Education	**0.000**	6.865

Table 4. 8. Logistic Regression of selected social factors influencing the participation of children living with asthma in exercise (Cont'd)

Demographic Characteristics	Sig.	Exp(B)
Age of Asthmatic Child		
6 – 8	0.339	
9 – 11	0.196	1.551
12 – 14	0.833	0.920
Occupation		
Unemployed	0.123	
Self-Employed	0.090	3.927
Either Public or Private Employees	0.343	2.106
Sex of Asthmatic Child		
Male		
Female	**0.001**	2.738

A KII participant stated that it would be unfair and unhealthy to exempt a child from participating in physical exercise, but ensure that necessary precautions are put in place when participating, like having inhaler close by: he explained that:

> In managing exercise induced bronchoconstriction, it would be very difficult and unfair and maybe unhealthy to say a child should not to participate in physical exercises because of asthma but you make sure that child's asthma is well controlled. Also, ensure that inhaler is close such that when symptoms is noticed, the appropriate treatment is instituted so that the child can recover quickly **(KII, Male, Doctor, Adeoyo)**.

4.28 Challenges faced by children living with asthma

Participants were asked the challenges faced by their children living with asthma; large majority (96.7%) of the respondents indicated missed school days, slightly above half (56.0%) of the respondents indicated inability to participate in chores, (87.9%), large majority (94.9%) of the respondents reported frequent hospitalization while 19.0% of the respondents made mention of poor sleep which has been significantly associated with asthma. This is consistent with Samoli'nski, Fronczak, Kuna *et al.* (2012) that the quality of sleep of children with asthma will be affected due to the condition and such children will experience physical limitations and frequent hospitalization.

Table 4. 9. Challenges faced by children living with asthma

Challenges faced by children living with asthma	Frequency	Percentage
Missed school days	264	96.7
Inability to participate in physical activities	153	56.0
Inability to participate in chores	240	87.9
Frequent hospitalization	259	94.9
Poor sleep	52	19.0

4.29 Association between physical exercise participation and frequency of attack

In table 4.24, the association between physical exercise and frequency of attack was statistically demonstrated. For those who participated in running as a form of physical exercise, 63.6% of the total respondents had exacerbations fairly regular while 55.3% of those that do not participate in physical exercise had exacerbations fairly regularly. There was no significant association between running as a form of physical exercise and frequency of attack among children.

For riding of bicycle as a form of physical exercise, majority of those who participated in cycling had exacerbations fairly regularly. However, there was no association between riding of bicycle and frequency of attack, that is, participation in cycling can not predict how regularly an asthmatic child has attacks.

Also, 40 out of 73 children living with asthma that participated in jogging as a form of physical exercise had attack fairly regularly. However, there is no association between jogging and frequency of attack, participation in jogging can not predict how regularly an asthmatic child had attack. Furthermore, all (100%) of those who climbed stairs frequently had attacks more regularly. For swimming as a form of physical exercise, large majority (80%) of those who participated in swimming as form of physical exercise had asthma fairly regularly.

There was a significant association between skipping and frequency of asthma attack. Specifically, 23.3% of those who participated in skipping as form of physical exercise had asthma regularly than those who did not participate (1.6%). For soccer, there was no significant relationship between soccer and frequency of asthma attack.

Table 4. 10. Association between physical exercise participation and frequency of attack

Physical Exercise	Frequency of attack: Very regular	fairly regular	Not regular	Total	Test of association
Running					$\chi^2 = 3.988$ df =2
Participate	7(5.3)	84(63.6)	41(31.1)	132(100.0)	P.value= 0.136
Do not participate	4(2.8%)	78(55.3)	59(41.8%)	141 (100.0)	
Total	11(4.0%)	162(59.3)	100(36.6)	273(100.0)	Cramer's V =0.121
Riding of bicycle					
Participate	0(0)	3(75.0)	1(25.0)	4(100.0)	$\chi^2 = 0.481$
Do not participate	11(4.1)	159(59.1)	99(36.8)	269(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.786 Cramer's V =0.042
Jogging					
Participate	4(5.5)	40(54.8)	29(39.7)	73(100.0)	$\chi^2 = 1.128$
Do not participate	7(3.5)	122(61.0)	71(35.5)	200(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.569 Cramer's V =0.064
Climbing stairs					
Participate	0(0.0)	4(100.0)	0(0.0)	4(100.0)	$\chi^2 = 2.781$
Do not participate	11(4.1)	158(58.7)	100(37.2)	296(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.249 Cramer's V =0.101
Swimming					
Participate	0(0.0)	4(80.0)	1(20.0)	5(100.0)	$\chi^2 = 0.956$
Do not participate	11(4.1)	158(59.0)	99(36.9)	268(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.620 Cramer's V =0.059

Table 4.24. Association between physical exercise participation and frequency of attack (Cont'd)

Physical Exercise	Frequency of attack Very regular	fairly regular	Not regular	Total	Test of association
Skipping					
Participate	7(23.3)	15(50.0)	8(26.7)	30(100.0)	$\chi^2 = 32.579$
Do not participate	4(1.6)	147(60.5)	92(37.9)	243(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.000 Cramer's V =0.345
Soccer					
Participate	0(0.0)	19(65.5)	10(34.5)	29(100.0)	$\chi^2 = 1.557$
Do not participate	11(4.5)	143(58.6)	90(36.9)	244(100.0)	df =2
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	P.value= 0.459 Cramer's V =0.076

Out of the physical exercises performed by the children living with asthma, skipping showed a significant relationship and this could be attributed to the fact that skipping as form of exercise involves rigorous jumping and sometimes leaves the doer panting, and can lead to breathlessness which is a significant symptom of asthma. Also, literature has shown that aerobic exercise can trigger or worsen asthma-related symptoms and when it happens, it is called exercise-induced asthma (Nunez, 2020). However, regular physical activity can decrease asthma symptoms by improving lung capacity, strengthening muscle, improve cardiovascular fitness and reduce inflammation.

4.30 Household chores and asthma management

Table 4.25 presented the various activities that were performed or avoided by children living with asthma. For bleaching of oil, 68.5% of the respondents did not exempt their children living with asthma from this activity while 31.5% exempted their children from the activity. Also, 71.4% of the respondents exempted their children from frying while 28.6% did not exempt their children from frying. For baking, 75.5% of the respondents exempted their children from taking part in this activity while 24.5% allowed them. Furthermore, 74.7% exempted their children from roasting while 25.3% allowed them to participate in such activity. For grilling, majority of the respondents did not allow their children to take part in such activity while 18.7% of the respondents allowed them. Majority (80.6%) of the respondents did not allow their children living with asthma to sweep at home while few (19.4%) of the respondents allowed them to take part in such activity. For washing of plates, slightly below half (47.6%) exempted their children from washing plates at home while the rest (52.4%) allowed them to wash plates.

Also, majority (81.7%) of the respondents did not allow their children living with asthma to take part in dusting as a form of house chore while the rest (18.3%) allowed them to take part. Majority (84.6%) of the respondents did not allow their children living with asthma in feeding pets while the rest (15.4%) allowed them to. For laundry, 85.0% of the respondents did not allow their children living with asthma to do laundry while (15.0%) allowed them. In preparing meals, 83.2% of the respondents exempted their children living with asthma from preparing meals while (16.8%) allowed them to do such activity. For setting of fire for cooking, majority (83.9%) of the respondents did not allow their children living with asthma to take part in such activity while the rest (16.1%) did not exempt them. For gathering of firewood, almost all (94.5%) of the respondents did not allow their children living with asthma to gather firewood while few (5.5%) allowed their children living with asthma to take part in such activity. Also, large majority (95.6%) did not allow their children living with asthma to water plants while just (4.4%) allowed them to water plants. lastly, almost all (94.9%) of the respondents did not allow their children living with asthma to cut grass while just (5.1%) of the respondents allowed their children living with asthma to cut grass.

These implied that parents and households of asthmatic patients made conscious and deliberate efforts to manage exacerbating activities of encounters that could affect their children's health. Important as this may be, the efficacy of such measures would depend, largely, on the correctness of their perceived etiology of the disease. Thus, increased awareness and knowledge about asthma disease and its management in children needs to be emphasised and promoted.

Exemption from household chores/physical activity was observed among children living with asthma by their parents especially activities that are very strenuous and not necessarily have to do with smoke and dust. However, some respondents were still of the opinion that irrespective of the child's condition, he / she must be involved in household chores especially the female child, triggers should be identified early and the child should be made to do chores that will not trigger the attack. Above all, it was revealed that most of the children living with asthma were exempted from household chores not only because of their health condition as advised by the doctor but simply because some of them were underage and could not be involved in such chores at that age

Table 4.25. Exemption from household activities

Household activities	Respondents' associated behaviour	Frequency	Percentage
Bleaching of oil	Exempted	86	31.5
	Not exempted	187	68.5
Frying	Exempted	195	71.4
	Not exempted	78	28.6
Baking	Exempted	206	75.5
	Not exempted	67	24.5
Roasting	Exempted	204	74.7
	Not exempted	69	25.3
Grilling	Exempted	222	81.3
	Not exempted	51	18.7
Sweeping	Exempted	220	80.6
	Not exempted	53	19.4
Washing of plates	Exempted	130	47.6
	Not exempted	143	52.4
Dusting	Exempted	223	81.7
	Not exempted	50	18.3
Feeding of pets	Exempted	231	84.6
	Not exempted	42	15.4
Laundry	Exempted	232	85.0
	Not exempted	41	15.0
Preparation of meals	Exempted	227	83.2
	Not exempted	46	16.8
Setting of fire	Exempted	229	83.9
	Not exempted	44	16.1
Gathering of firewood	Exempted	258	94.5
	Not exempted	15	5.5
Watering plants	Exempted	261	95.6
	Not exempted	12	4.4
Cutting of grass	Exempted	259	94.9
	Not exempted	14	5.1

In an interview conducted, a 12-year-old asthmatic boy claimed that he was not exempted from house chores, probably because of the tiles that were used as flooring material in his home.

No, I sweep. It has nothing to do with attack, I am only exempted from cleaning dust, I sweep my room although it is tiled ***(IDI, Male, 12years, UCH)***.

While this suggested that sweeping alone, without dust, may not be perceived as a trigger for asthma, another respondent noted that the possible stress that may come with sweeping, even without dust, could constitute a major trigger of asthma.

> Participation in household chores is not a hindering factor for children, there are household activities apart from sweeping and washing plates that children can do that doesn't have to be strenuous, it can be dusting of chairs or cleaning of tables **(IDI, Female, 10years, Adeoyo)**.

Therefore, any household activity that is strenuous should be avoided by children living with asthma; she further stated that children living with asthma can participate in household chores that were not strenuous.

Similarly, another respondent stated how he is being exempted from household chores especially during cold weather. According to him,

I don't sweep, and during cold weather, I don't wash plates and I always wear my cardigan but when the weather is cold, I wash plates ***(IDI, male, 10years, UCH)***.

However, a 12 years old asthmatic boy stated that the belief that exemption from house chores prevents attack is simply a myth. He believes that exemption from household chores by children living with asthma is a widely held but fake belief and it has nothing to do with asthma attack.

That children living with asthma are not meant to participate in physical exercise and that they are not meant to do household chores it simply a myth ***(IDI, Male, 12years, UCH)***.

A key informant maintained that any activity that will cause exertion or excessive breathing should be avoided and if done should be properly monitored by always having an inhaler.

> House chores or anything that will cause excessive or rapid breathing and physical exertion should be avoided and or monitored properly and child should always have an inhaler. I mean it is not when an attack is on the way that you will go and look for where it is, it must be known at all times, my inhaler is in my pocket or in my bag, by my bed side cabinet that's the way it should be **(KII, Female, Oluyoro, Pediatrician).**

This corroborates the earlier submissions of an in-depth interviewee who emphasized the role of stress in the incidence of an asthmatic attack, even without the presence of dust. This may be attributed to the fact that bending to sweep, as is customary among the Nigerian peoples and cultures has the tendency of generating impact on the cardio-respiratory system of the human body.

Based on the reported exemption of children from certain activities that were perceived to be etiological to asthma, this study further investigated the overarching factors for exemption from some physical activities. These are presented in Figure 4.5.

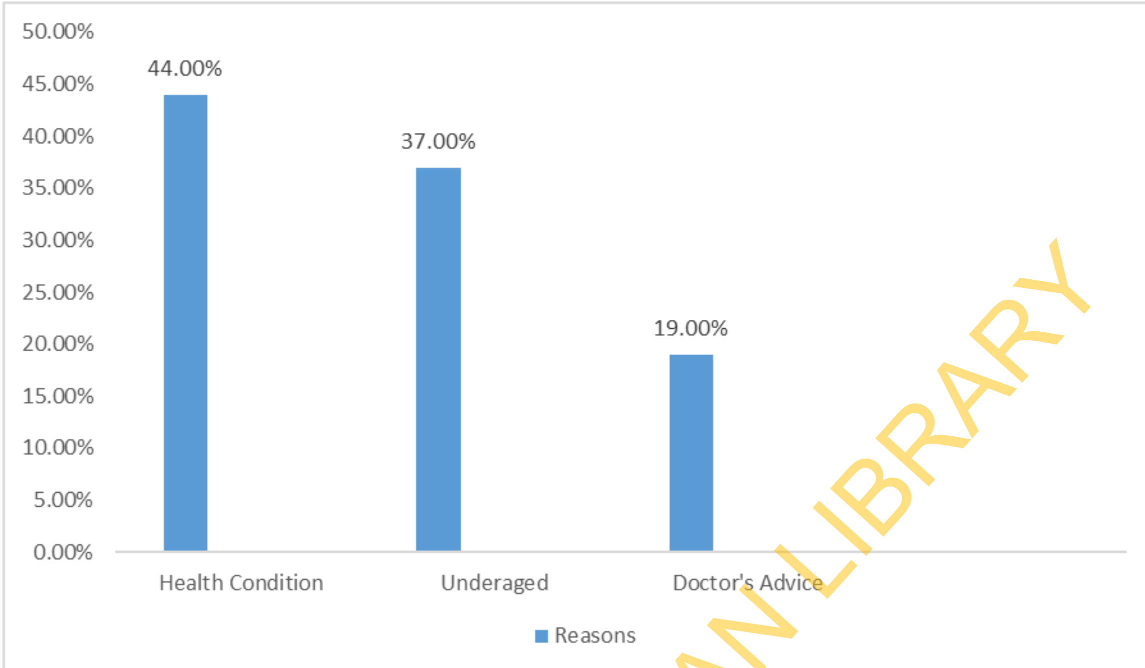

Figure 4. 8: Overarching reasons for exemptions from physical activities

4.31 Association between household activity and perception on preventability of asthma

Based on this, Table 4.26 further revealed the association between household activity and perceived preventability of asthma. For bleaching of oil as a form of household activity, findings showed that there was no significant relationship between bleaching of oil and perceived preventability of asthma. Specifically, (89.9%) of respondents who exempted their children from bleaching of oil believed that asthma is preventable, more than those who did not exempt their children (78.5%). This implies that respondents' perception on preventability of asthma does not influence their decision on whether to exempt or not to exempt their asthmatic child from bleaching of oil in the house.

Also, for frying as a form of physical activity, there was no significant relationship between frying and the perception on preventability of asthma since p-value (0.387) for chi-square is greater than 0.05. However, respondents who exempted their children from frying (83.9%), believed asthma is preventable, more than (78.5%) of those who did not exempt. This implies that respondents' perception on preventability of asthma does not influence their decision on whether to exempt or not to exempt their asthmatic child from frying as form of household activity.

Likewise, there was no significant relationship between baking and perception on preventability of asthma, that is, respondents' perception on preventability of asthma did not have influence on the child's involvement in baking as a form of household activity. Irrespective of the respondents' perception on preventability of asthma, (81.1%) of respondents who perceived asthma to be preventable exempted their children from baking while (77.6%) of those that shared the same view did not exempt their children from such activity in the home.

As regards roasting and grilling as a form of household activity, roasting involves the action of cooking something in an oven or an open fire while grilling is a form of cooking that involves dry heat applied to the surface of food, either below or above. It is evident from literatures that the smoke from a grill can trigger asthma. However, there was no significant relationship between roasting/ grilling and perception on preventability of asthma. Specifically, (81.9%) of the respondents who exempted their children from roasting/ grilling perceived asthma to be preventable while 75.4% who did not exempt their children, also perceived asthma to be preventable. It implies that the perception on preventability of asthma does not influence parents' decision as to whether to allow or not to allow their children living with asthma to be involved in such activity at home.

Sweeping as a household chore can stir up dust particles which can trigger asthma. However, findings revealed that there was no significant relationship between sweeping and perception on preventability of asthma.

However, there exists a significant relationship between washing of dishes and perception on preventability of asthma. Specifically, 67.7% of respondents who did not allow their children living with asthma to wash plates believed asthma is preventable, while 32.3% believed it is not a preventable disease. Also, large majority (91.6%) of the respondents who did not exempt their children from washing plates believed asthma is a preventable disease while few (8.4%) believed it is not a preventable disease. This implies that parents' decision as to whether to exempt or not to exempt their children living with asthma in washing of dishes is influenced by their perception on preventability of asthma. This could be attributed to the fact that washing of dishes is a chore that is mostly likely to be done in the kitchen where food preparation takes place, so a parent can decide not to allow such asthmatic child to participate in such chore because of exposure to triggers such as smoke from frying, roasting or grilling or even products such as bleach, glass cleaner, detergents which are used for washing and can exacerbate asthma. This is in line with Takaro (2020), which study found out that hand dishwashing soap, dish washer detergent, laundry soaps commonly referred to as cleaning products were said to damage the respiratory lining by triggering inflammatory pathways of the immune system and that early exposure to household cleaning products is associated with the development of asthma in children.

Table 4.26. Association between household activity and perception on preventability of asthma

Household activity	Preventability of asthma		Total	Test of association
	Preventable	Not preventable		
				$\chi^2 = 1.095$
Bleaching of oil	73(83.9)	14(16.1)	87(100.0)	df =1
Exempted	146(78.5)	40(21.5)	186(100.0)	P.value= 0.295
Not exempted	**219(80.2)**	**54(19.8)**	**273(100.0)**	Phi = 0.063
Total				
Frying				
Exempted	159(81.5)	36(18.5)	195(100.0)	$\chi^2 = 0.748$
Not exempted	60(76.9)	18(23.1)	78(100.0)	df =1
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.387
				Phi =0.052
Baking				
Exempted	167(81.1)	39(18.9)	206(100.0)	$\chi^2 = 0.381$
Not exempted	52(77.6)	15(22.4)	67(100.0)	df =1
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value= 0.537
				Phi =0.037
Roasting				
Exempted	167(81.9)	37(18.1)	204(100.0)	$\chi^2 = 1.373$
Not exempted	52(75.4)	17(24.6)	69(100.0)	df =1
Total	**219(80.20**	**54(19.8)**	**273(100.0)**	P.value= 0.241
				Phi=0.071
Grilling				
Exempted	167(81.9)	37(18.1)	204(100.0)	$\chi^2 = 1.373$
Not exempted	52(75.4)	17(24.6)	69(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.241
				Phi=0.071
Sweeping				
Exempted	174(79.1)	46(20.9)	220(100.0)	$\chi^2 = 0.910$
Not exempted	45(84.9)	8(15.1)	53(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.340
				Phi=-0.058
Washing of plates				
Exempted	88(67.7)	42(32.3)	130(100.0)	$\chi^2 = 24.546$
Not exempted	131(91.6)	12(8.4)	143(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.000
				Phi =-0.300

For dusting as a form of household chore, there was no significant relationship between perception on preventability of asthma and dusting, that is, respondents' decision to exempt or not to exempt their asthmatic child from the chore is not influenced by their perception on preventability of asthma. Feeding of pets as a chore/ household activity often involves regular touch with the pets and furry pets are known to be triggers of asthma. However, the study found out that there exists a significant relationship between feeding of pets and preventability of asthma. Specifically, (77.9%) of respondents who exempted their asthmatic child from feeding pets believed asthma is preventable, this could explain their decision as they are said to be taking preventive measures since they are aware that asthma is preventable, so a key prevention strategy may be avoidance of feeding of pets while the rest (22.1%) believed asthma is not a preventable disease. Hence, the decision as to whether to exempt a child from doing this chore is influenced by the parents' perception on preventability of asthma.

Table 4.26. Association between household activity and perception on preventability of asthma (Cont'd)

Household activity	Preventability of asthma		Total	Test of association
	Preventable	Not preventable		
Dusting				χ^2 = 0.551
Exempted	177(79.4)	46(20.6)	223(100.0)	df =1
Not exempted	42(84.0)	8(16.0)	50(100.0)	P.value= 0.458
Total	219(80.2)	54(19.8)	273(100.0)	Phi=-0.045
Feeding of pets				χ^2 = 4.996
Exempted	180(77.9)	51(22.1)	231(100.0)	df =1
Not exempted	39(92.9)	3(7.1)	42(100.0)	P.value= 0.025
Total	219(80.2)	54(19.8)	273(100.0)	Phi =-0.135
Laundry				
Exempted	180(77.6)	52(22.4)	232(100.0)	χ^2 = 6.752
Not Exempted	39(95.1)	2(4.9)	41(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.009
				Phi =-0.157
Preparation of meals				
Exempted	178(78.4)	49(21.6)	227(100.0)	χ^2 = 2.768
Not exempted	41(89.1)	5(10.9)	46(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.096
				Phi =-0.101
Setting of fire				
Exempted	180(78.6)	49(21.4)	229(100.0)	χ^2 = 2.342
Not exempted	39(88.6)	5(11.4)	44(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.126
				Phi =-0.093
Gathering of firewood				χ^2 = 0.568
				df =1
Exempted	205(79.8)	52(20.2)	257(100.0)	P.value= 0.451
Not exempted	14(87.5)	2(12.5)	16(100.0)	Phi =-0.046
Total	219(80.2)	54(19.8)	273(100.0)	

There existed a significant relationship between laundry and perception on preventability of asthma. Literature has it that laundry detergent contains high concentrations of irritating fragrances which could trigger asthma though it is an often unrecognized/ overlooked source of asthma trigger. (77.6%) of the respondents who exempted their children living with asthma from doing laundry believed asthma is preventable while (22.4%) of them believed asthma is not a preventable disease.

However, there existed no significant relationship between setting of fire, gathering of firewood, watering of plants, cutting of grass and perception on preventability of asthma. It implies that that respondents' perception on preventability of asthma does not influence their decision to exempt or not exempt their children living with asthma from participating in such chores.

Table 4. 26. Association between household activity and perception on preventability of asthma (Cont'd)

Household activity	Preventability of asthma		Total	Test of association
	Preventable	**Non preventable**		
Laundry				χ^2 = 6.752
Exempted	180(77.6)	52(22.4)	232(100.0)	df =1
Not Exempted	39(95.1)	2(4.9)	41(100.0)	P.value= 0.009
Total	219(80.2)	54(19.8)	273(100.0)	Phi =-0.157
Preparation of				
meals	178(78.4)	49(21.6)	227(100.0)	χ^2 = 2.768
Exempted	41(89.1)	5(10.9)	46(100.0)	df =1
Not exempted	219(80.2)	54(19.8)	273(100.0)	P.value= 0.096
Total				Phi =-0.101
Setting of fire				
Exempted	180(78.6)	49(21.4)	229(100.0)	χ^2 = 2.342
Not exempted	39(88.6)	5(11.4)	44(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.126
				Phi =-0.093
Gathering of				
firewood				χ^2 = 0.568
Exempted	205(79.8)	52(20.2)	257(100.0)	df =1
Not exempted	14(87.5)	2(12.5)	16(100.0)	P.value= 0.451
Total	219(80.2)	54(19.8)	273(100.0)	Phi =-0.046
Watering plants				
Exempted	207(79.3)	54(20.7)	261(100.0)	χ^2 = 3.095
Not exempted	12(100.0)	0(0.0)	12(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.079
				Phi =-0.106
Cutting of grass				
Exempted	207(79.9)	52(20.1)	259(100.0)	χ^2 = 0.281
Not exempted	12(85.7)	2914.3)	14(100.0)	df =1
Total	219(80.2)	54(19.8)	273(100.0)	P.value= 0.596
				Phi =-0.032

Table 4.26. Association between household activity and perception on preventability of asthma (Cont'd)

Household activity	Preventability of asthma		Total	Test of association
	Preventable	Not preventable		
Watering plants				χ^2 = 3.095
Exempted	207(79.3)	54(20.7)	261(100.0)	df =1
Not exempted	12(100.0)	0(0.0)	12(100.0)	P.value= 0.079
Total	219(80.2)	54(19.8)	273(100.0)	Phi =-0.106
Cutting of grass	207(79.9)	52(20.1)	259(100.0)	χ^2 = 0.281
Exempted	12(85.7)	2914.3)	14(100.0)	df =1
Not exempted	219(80.2)	54(19.8)	273(100.0)	P.value= 0.596
Total				Phi =-0.032

4.32 Association between household activity and frequency of attack

Inquiry was made from respondents regarding their children's exemption from certain house chores/activity. It was revealed that some children living with asthma were exempted from certain chores/activity in the home as a result of the child's condition, doctor's advice and under age. That is, they were not of age to be participating in the chores, after which the responses were cross tabulated with the frequency of attack which was divided into three categories: very regular, fairly regular and not regular based on the number of exacerbations the child had.

For bleaching of oil which is a form of food preparation in the home involves heating up of oil used in cooking. This method of food preparation sometimes leaves the house in smoke. There was no significant association between bleaching of oil and frequency of asthmatic attack among children. This implies that exemption or non-exemption from the activity does not influence how often a child has exacerbations and on the other hand, frequency of attacks does not influence parents' decision to exempt or not to exempt their asthmatic child from bleaching of oil. However, the table showed that more of the children not exempted from such activity had attacks fairly regular than children exempted.

In terms of frying, there was a significant association between frying and frequency of attack, that is, participation/non participation in frying influenced the frequency of asthmatic attacks. Frequency of attacks could influence parents' decision to exempt or not exempt their asthmatic child from frying. Specifically, the table showed that those that rarely had exacerbations were not exempted from frying while those that had regular attacks were exempted. It also showed that exemption from frying could possibly be as a result of frequency attacks.

Similarly, there was a significant relationship between baking and frequency of attack since P value 0.043 is lesser than 0.05. This implies that participation/ non participation in baking influences the regularity of asthmatic attacks and regularity of attack could influence parents' decision to exempt or not exempt their asthmatic child from baking.

Also, there is a significant relationship between doing laundry and frequency of attacks. It implies that is participation/ non participation in laundry influence the regularity of asthmatic attacks and on the other hand regularity of attack could influence parents' decision to exempt or not exempt their asthmatic child from doing laundry. However, for activities such as roasting, grilling, sweeping, washing of dishes and dusting, results showed that there was no significant relationship between frequency of attacks among children, and exemption or non-exemption from these activities.

Table 4. 27: Association between household activity and frequency of attack

Household activity	frequency of attack Very regular	fairly regular	Not regular	Total	Test of association
					$\chi^2 = 4.515$
Bleaching of oil					df =2
Exempted	6(6.9)	55(63.2)	26(29.9)	87(100.0)	P.value= 0.105
Not exempted	5(2.7)	107(57.5)	74(39.8)	186(100.0)	Cramer's V=
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	0.129
Frying					$\chi^2 = 6.002$
Exempted	11(5.6)	118(60.5)	66(33.8)	195(100.0)	df =2
Not exempted	0(0.0)	44(56.4)	34(43.6)	78(100.0)	P.value= 0.050
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	Cramer's
Baking					$\chi^2 = 6.300$
Exempted	11(5.3)	126(61.2)	69(33.5)	206(100.0)	df =2
Not exempted	0(0.0)	36(53.7)	31(46.3)	67(100.0)	P.value= 0.043
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	Cramer's
Roasting					$\chi^2 = 65.740$
Exempted	11(5.4)	124(60.8)	69(33.8)	204(100.0)	df =2
Not exempted	0(0.0)	38(55.1)	31(44.9)	69(100.0)	P.value= 0.057
Total	**11(4.0)**	**162(59.3)**	**100(36.6)**	**273(100.0)**	Cramer's
Grilling					$\chi^2 = 5.740$
Exempted	11(5.4)	124(60.8)	69(33.8)	204(100.0)	df =2
Not exempted	0(0.0)	38(55.1)	31(44.9)	69(100.0)	P.value= 0.57
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	Cramer's
Sweeping					
Exempted	11(5.0)	133(60.5)	76(34.5)	220(100.0)	$\chi^2 = 4.231$
Not exempted	0(0.0)	29(54.7)	24(45.3)	53(100.0)	df =2
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value= 0.121
Washing of					
dishes	3(2.3)	80(61.5)	47(36.2)	130(100.0)	$\chi^2 = 2.043$
Exempted	8(5.6)	82(57.3)	53(37.1)	143(100.0)	df =2
Not exempted	11(4.0)	162(59.3)	100(36.6)	2739100.0)	P.value= 0.360
Dusting					
Exempted	11(4.9)	134(60.1)	78(35.0)	223(100.0)	$\chi^2 = 3.489$
Not exempted	0(0.0)	28(56.0)	22(44.0)	50(100.0)	df =2
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value= 0.175
					Cramer's
					V=0.113

Table 4.27 showed that there was a significant relationship between doing laundry and frequency of attacks. It implies that participation/ non participation in laundry influences the regularity of asthmatic attacks and on the other hand, regularity of attack could influence parents' decision to exempt or not exempt their asthmatic child from doing laundry.

However, for activities such as feeding of pets, preparation of meals, setting of fire, gathering of firewood, watering plants and cutting grass, results showed that there no significant relationship between frequency of attacks among children, that is, exemption or non-exemption from these activities does influence the frequency of attacks.

Table 4. 27. Association between household activity and frequency of attack (Cont'd)

Household activity	frequency of attack				Test of association
	Very regular	fairly regular	Not regular		
Feeding of					
pets	11(4.8)	141(61.0)	79(34.2)	231(100.0)	χ^2 = 5.152
Exempted	0(0.0)	21(50.0)	21(50.0)	42(100.0)	df =2
Not exempted	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value=
Total					0.076
					Cramer's
					V=0.137
Laundry					
Exempted	11(4.7)	143(61.6)	78(33.6)	232(100.0)	χ^2 = 7.137
Not Exempted	0(0.00	19(46.3)	22(53.7)	41(100.0)	df =2
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value=
					0.028
					Cramer's
					V=0.162
Preparation of					
meals					χ^2 = 4.601
Exempted	11(4.8)	138(60.8)	78(34.4)	227(100.0)	df =2
Not exempted	0(0.0)	24(52.2)	22(47.8)	46(100.0)	P.value=
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	0.100
					Cramer's
					V=0.130
Setting of fire					
Exempted	11(4.8)	139(60.7)	79(34.5)	229(100.0)	χ^2 = 4.319
Not exempted	0(0.0)	23(52.3)	21(47.7)	449100.0)	df =2
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value=
					0.115
					Cramer's
					V=0.126
Gathering of					
firewood					χ^2 = 0.717
Exempted	11(4.3)	152(59.1)	94(36.6)	257(100.0)	df =2
Not exempted	0(0.0)	10(62.5)	6(37.5)	16(100.0)	P.value=
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	0.699
					Cramer's

	V=0.051

Table 4. 27. Association between household activity and frequency of attack (Cont'd)

Household activity	Preventability of asthma			Total	Test of association
	Preventable		Not preventable		
Watering plants					
Exempted	11(4.2)	155(59.4)	95(36.4)	261(100.0)	χ^2 = 0.595
Not exempted	0(0.0)	7(58.3)	5(41.7)	12(100.0)	df =2
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value= 0.743
					Cramer's V=0.047
Cutting of grass					
					χ^2 = 0.659
Exempted	11(4.2)	153(59.10	95(36.7)		df =2
Not exempted	0(0.0)	9(64.3)	5(35.7)		P.value= 0.719
Total	11(4.0)	162(59.3)	100(36.6)		Cramer's V=0.049

4.33 Association between age, sex of asthmatic child and preventability of asthma

Table 4.28 showed the association between age, sex and perception on preventability of asthma. There was no significant relationship between age of asthmatic child and parents' perception on preventability of asthma. This implies that the age of asthmatic child does not influence parents' perception on preventability of asthma. However, there was a significant relationship between sex of asthmatic child and parents' perception on preventability of asthma since p value 0.009 is lesser than 0.05. This shows that parents' perception on preventability of asthma is influenced by the sex of the asthmatic child.

Table 4. 28. Association between age, sex and preventability of asthma

Demographic characteristics	Preventability of asthma		Total	Test of association
	Preventable	**Not preventable**		
Age				
6-8	95(79.2)	25(20.8)	120(100.0)	χ^2 = 4.921
9-11	66(75.0)	22(25.0)	88(100.0)	df =2
12-14	58(89.2)	7(10.8)	65(100.0)	P.value=
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	0.085
				Cramer's
				V = 0.134
Sex				
Male	108(87.1)	16(12.9)	124(I00.0)	χ^2 = 6.771
Female	111(74.5)	38(25.5)	149(100.0)	df =1
Total	**219(80.2)**	**54(19.8)**	**273(100.0)**	P.value=
				0.009
				Phi = 0.157

4.34 Association between age, sex and regularity of asthmatic attack

Table 4.29 showed the association between age, sex and regularity of asthmatic attack. The table showed that there was no significant association between sex and frequency of attacks, that is, frequency of attack was not influenced by the sex of the child, and the number of exacerbations a child had did not have anything to do with the child being male or female.

There was a no significant relationship between age and frequency of attack. However, those within the age range of 6-8 years had more exacerbations than the other age groups. It further showed that exacerbations were heightened at this age group. This implies that frequency of attack is not influenced by their ages.

Table 4. 29. Association between age, sex, and regularity of asthmatic attack

Demographic Characteristics	frequency of attack Very regular	fairly regular	Not regular	Total	Test of association
Sex					
Male	2(1.6)	72(57.3)	51(41.1)	124(100.0)	χ^2 = 4.714
Female	9(6.0)	91(61.1)	49(32.9)	149 (100.0)	df =2
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	P.value= 0.095 Cramer's V =0.131
Age					
6-8	4(3.3)	72(60.0)	44(36.7)	120(100.0)	χ^2 = 1.020
9-11	3(3.4)	52(59.1)	33(37.5	88(100.0)	df =4
12-14	4(6.2)	38(58.5)	23(35.4)	65(100.0)	P.value= 0.907
Total	11(4.0)	162(59.3)	100(36.6)	273(100.0)	Cramer's V =0.043

4.35 Neighborhood effects and asthma prevention

Beyond the condition of the housing unit itself, the site of the home can influence the incidence of illness or health outcomes of residents (Amzat and Razum, 2014). For instance, different features of these neighborhoods may contribute to poor air quality due to proximity to sources of vehicle exhaust emissions such as major roads, bus depots, airports, and trucking routes (Perlin, Wong, and Sexton, 2001). Also, they create substantial noise exposure, pungent smell which may be associated with a range of adverse health effects for example sites of improper waste disposal can harbor pests, which can then infest homes (Stansfeld, Haines and Brown, 2000). In Nigeria, the indiscriminate construction of roads, buildings and similar other projects could generate dust that adversely affects health outcomes. There is increasing evidence that points to a link between exposure to particle air pollution, asthma and a growing number of toxicological studies indicate that a causal effect of smoke pollution on asthma and atopy is biologically plausible (Schei *et al.*, 2004). However, control of environmental precipitants of asthma is an important component of self-management.

4.36 Production activities in the neighborhood

Respondents were asked if there were production activities or industries in their neighborhood, 51(18.7%) had production industries in their neighborhood. Majority (64.7%) had block industry in their neighborhood, (21.6%) had paint industries, followed by milling 9.8%, bakery (2.0%) and welding (2.0%). They were further asked of the signs they noticed during production, (56.9%) of the respondents made mention of noise, (27.5%), noise and pungent smell, (9.8%) noise and dust, (3.9%) concentrated smell and 2.0% made mention of smok.

Table 4. 30. Production activities in the neighborhood

Production activities	**Frequency**	**Percentage**
Bakery	1	2.0
Block industry	33	64.7
Milling	5	9.8
Paint production	11	21.6
Welding	1	2.0
Signs noticed during production	**Frequency**	**Percentage**
Concentrated smell	2	3.9
Noise	29	56.9
Noise and dust	5	9.8
Noise and Pungent smell	14	27.5
Smoke	1	2.0

4.37 Business activities in the neighborhood and asthma prevention

Respondents were interrogated on the nature of business activities carried out in the neighborhood. 40.3% of respondents indicated bakery, 27.1% of respondents indicated milling and grinding, 17.2% of respondents indicated welding 14.9% of respondents indicated poultry, 8.4% of respondents indicated saw milling, 7.0% of respondents indicated mechanic workshop, 3.7% of respondents indicated soldering, 2.9% of respondents indicated agro allied, 2.2% of respondents indicated market, 2.2% of respondents indicated quarry, 1.1% of respondents indicated manufacturing factories.

Table 4.31. Business activities in the neighborhood

Business activity	Frequency	Percentage
Argo allied	8	2.9
Quarry	6	2.2
Poultry	39	14.3
Milling and grinding	74	27.1
Welding	47	17.2
Mechanic workshop	19	7.0
Bakery	27	40.3
Market	7	2.6
Saw milling	23	8.4
Manufacturing factories	3	1.1
Soldering	10	3.7

4.38 Business activity distance to the house

Table 4.32 revealed that the business activities carried out in the neighborhood, 12.5% of respondents who had agro allied business around their houses had it close to their houses, 33.3% of those who had quarry have it less than 5 houses to theirs, 10.3% had poultries around them, 10.7% had milling and grinding close to them with, 7 of the respondents had in their compound while 22 had in less than 5 houses to their houses. 23.4% of respondents with welding around their neighbourhood had theirs in less than 5 houses to theirs, 26.3% had mechanic workshop close to them, 14.8% or respondents had bakery close to them, 57.1% had markets 5-10 houses from them, 8.7% had saw milling close to their houses, and 33.3% had manufacturing factories close to their houses. While 40% of those with soldering business around them had it less than 5 houses to theirs.

Table 4.32. Business activity and distance to the house

Business activity/ distance to the house	Frequency	Percentage
Argo allied		
Less than 5 houses	1	12.5
5-10 houses	6	75.0
More than 15 houses	1	12.5
Quarry		
Less than 5 houses	2	33.3
5-10 houses	2	33.3
More than 15 houses	2	33.3
Poultry		
Less than 5 houses	4	10.3
5-10 houses	25	64.1
More than 15 houses	10	25.6
Milling and Grinding		
in compound	7	2.6
Less than 5 houses	22	8.1
5-10 houses	29	10.6
More than 15 houses	16	5.9
Welding		
Less than 5 houses	11	23.4
5-10 houses	16	34.0
More than 15 houses	16	34.0
Mechanic workshop		
Less than 5 houses	5	26.3
5-10 houses	10	52.6
Bakery		
Less than 5 houses	4	14.8
5-10 houses	14	51.9
11-15 houses	4	14.8
Market		
5-10 houses	4	57.1
11- 15 houses	3	42.9

Table 4. 32. Business activity and distance to the house (Cont'd)

Business activity/ distance to the house	Frequency	Percentage
Saw milling		
Less than 5 houses	2	8.7
5-10 houses	4	17.4
11-15 houses	13	56.5
More than 15 houses	4	17.4
Manufacturing factories		
Less than 5 houses	1	33.3
5- 10 houses	2	66.7
Soldering	4	
Less than 5 houses	4	40.0
5-10 houses	2	40.0
11- 15 houses		20.0

4.39 Business activities within the compound

Respondents were further interrogated on whether they shared their compound with certain activities such as preparation and selling of food, baking and frying, beer parlor, grinding/milling and salon (Table 4.33). Majority (68.0%) of the respondents were neighbours to those who prepared and sold food in the same compound that they resided. About 22.0% had grinding/ milling activity going on within their compound of residence while 4.0% had beer parlor and salon in their compound while 2.0% had those who were involved in baking and frying in their compound. These point to the high variation of respondents' exposure to the social factors that could predict or exacerbate the incidence of asthma disease.

Table 4. 33. Business activities within the compound

Business activity	Frequency	Percent
Preparation and selling of food	34	68.0
Baking and frying	1	2.0
Beer parlor	2	4.0
Grinding/Milling	11	22.0
Salon	2	4.0
Dumping site distance		
Less than 5 houses	5	22.7
5-10 houses	10	45.5
11-15 houses	1	4.5
More than 15 houses	6	27.3
Management of dumping site		
Collected	3	13.6
Burning	19	86.4

Thus, those who had activities such as preparation and selling of food in their compounds, baking and frying, beer parlor, grinding and milling and salon could be at risk of triggers because even if these activities were not carried out by them, they were, in one way or the other, exposed to the aftermath of these activities which could heighten attack. This is due to the fact that outdoor allergens are generally less manageable, because their levels can not be modified by human intervention.

4.40 Influence of intergenerational factors in the prevention and management of asthma

Expression of asthma has been said to be an expression between hereditary factors and environmental factors and one without the other is not enough for the manifestation of asthma, that is, the genes must be right and the environment must be right. The study documented the influence of intergenerational factors on the prevention and management of asthma. Majority (60.8%) of the respondents attributed the major cause of asthma to environmental factors while (30.4%) attributed it to both parents' asthmatic status and environmental factors, 37.3% of the respondents attributed it to parents' asthmatic status while 1.5% attributed theirs to spiritual attack. Overall, findings were consistent with Thomsen (2015) who stated that asthma runs in families, and children of asthmatic parents are at increased risk of asthma though individual risk of asthma is dependent on familial background, the phenotypic expression of asthma may be modified by other genetic and environmental factors. It is believed that a small number of genes set the individual background risk that is acted upon by another set of modifying genes and also environmental factors.

A key informant emphasized that asthma, like other conditions, has genetic background but also requires the right environment to manifest. The participant explained that it is very possible to have a genetic background of asthma and not have exacerbations because the predisposing factors have been taken care of. Thus, for asthma to manifest, it needs the right genes and the right environment. These are the exact words of the informant:

> Most conditions have genetic background; there is what we call nature which is genetic makeup and also environmental factors. You can have the tendency for a condition in your genes but those genes may not have expression if they don't have the right environmental condition. So, if a child has a family history of asthma and there are no triggers, no predisposing factors, it might not express that gene. The gene is there but you can limit the number of attacks just by changing your lifestyle despite the fact that there is a background genetic makeup. Those things need the right environment for it to manifest. If they are not there, it might not be so much of a problem. The genes are there and you take care of the predisposing factors **(KII, Male, Doctor, Adeoyo)**.

Table 4. 34. Factors responsible for asthma

Factors responsible for asthma	Frequency	Percent
Parents' asthmatic status	20	37.3
Environmental factors	166	60.8
Parents' asthmatic status and environmental factors	83	30.4
Spiritual attack	4	1.5

4.41 Family history of asthma

The family history of asthma was obtained, findings was in agreement with prior studies that reported positive asthma history among most of their respondents (AlOtaibi, & AlAteeq, 2018; Kuti *et al.*, 2017). Majority (61.9%) of the respondent reported to have family members with asthma history while (38.1%) did not have family members with asthma history.

Participants were further asked which of their family members had asthma history. Out of the respondents who reported having family members with asthma history, about 18.9% indicated that their paternal grandmothers had asthma history, and 13.0% indicated it was their spouses. Also, 12.4% mentioned their maternal grandmothers, and 11.8% indicated their cousins. In addition, a handful reported that their aunts (10.1%) and uncles (5.3%), while 4.7% indicated maternal grandmothers and aunts, 4.1% each mentioned nephews, themselves, and maternal grandfathers. About 3.6% mentioned themselves and maternal grandmothers. 3.0% indicated uncles and cousins, while 2.4% indicated their nieces.

According to Weibel (2013), the incidence of asthma during the first 27 years of life is strongly related to family history of asthma. They found out that children with maternal asthma develop asthma on average earlier than those with paternal asthma.

The qualitative data presented here further expatiates on the importance of family history in asthma. Transmission may not be from immediate parents; it could be from grandparents or other relatives. A family history of atopy is said to run in families; when a child presents symptoms of asthma, there is a possibility that a relative has allergy or atopy.

> Yes! If you see a child that presents the symptoms that look like asthma, of course, you want to ask, “Is there anybody in the family that has the kind of symptoms?” It might not even be the

> parents; it may be the grandparents, uncles or someone related to them and it may not be asthma per say. Some may have allergies, allergy rhinitis. Some may have another thing that points to allergy or atopy and not necessarily asthma but a family history of atopy **(KII, Female, Oluyoro, Pediatrician).**

Family history is an important risk factor for atopic disease. However atopic disease manifests in transient or persistent form, Hence, assessing information on patterns of disease within families is very important (Alford, Zoratti, Peterson, Maliarik, Ownby, and Johnson, 2004), due to the role of heredity in disease susceptibility and its associated perception. Table 4.39 presents a list of respondents' family members who had also had asthma.

Table 4. 35. Family members with history of asthma

Family member	Frequency	Percent
Self	7	4.1
Self and Maternal Grandmother	6	3.6
Spouse	22	13.0
Maternal Grandmother and Aunty	8	4.7
Paternal Grandmother	32	18.9
Maternal Grandfather	7	4.1
Paternal Grandfather	4	2.4
Uncle	9	5.3
Uncle and Cousin	5	3.0
Aunty	17	10.1
Cousin	20	11.8
Niece	4	2.4
Nephew	7	4.1
Maternal Grandmother	21	12.4

4.42 Atopic symptoms among family members

Respondents were further asked if they have had the following symptoms persistently before such as coughing, wheezing, breathlessness, chest pain, catarrh, skin rashes, skin dryness, sneezing, running nose, stuffy nose, itching and fever. 31(11.4%) of the respondents claimed to have coughed persistently before, 11(4.0%) had experienced wheezing before, 14(5.4%) had experienced breathlessness, 13 (4.8%) claimed to have experienced chest pain, 14 (5.1%) catarrh, 33 (12.1%) claimed rashes, 22 (8.1%) claimed skin dryness, 58 (21.2%) claimed running nose, 45 (16.5%), stuffy nose 30 (11.0%), itching 5(1.8%) and fever (1.1%). Respondents were asked if they had the symptoms of atopy because they have been said to be referred to genetic tendency to develop allergic disease, so it is possible for family members to have atopic conditions and if both parents are affected by an atopic disease, it is likely that the children who have inherited the atopy gene(s) become sensitized and to develop allergic inflammation when exposed to environmental influence'. Similarly, studies have shown that children of atopic parents are of greater risk of asthma than children of non-atopic parents. Table 4.36 presents the range of symptoms that characterise atopic conditions as reported by respondents.

Table 4.36. Atopic symptoms

Atopic symptoms	Yes	No
Coughing	31 11.4%	242 88.6%
Wheezing	11 4.0%	262 96.0%
Breathlessness	14 5.1%	259 94.9%
Chest pain	13 4.8%	260 95.2%
Catarrh	14 5.1%	259 94.9%
Skin Rashes	33 12.1%	240 87.9%
Skin Dryness	22 8.1%	251 91.9%
Sneezing	58 21.2%	215 78.8%
Running nose	45 16.5%	228 83.5%
Stuffy nose	30 11.0%	243 89.0%
Itching	5 1.8%	268 98.2%
Fever	3 1.1%	270 98.9%

These were corroborated by the submissions of an interviewee as presented below:

> Atopy conditions are rash, eczema or conjunctivitis. Children of parents that had this condition will not remember that when he was a child, he used to have itchy eyes all the time or running nose, he may not remember that he used to have eczema or a rash, a rash that comes up in some particular part of the body, so a parent that has one of the atopic conditions is more at risk to have an asthmatic child **(KII, Oluyoro, Female, Pediatrician)**.

4.43 Parents' asthma history

When respondents were asked to report their asthmatic statuses, only a few (1.5%) parents reportedly lived with the condition while majority (98.5%) of the respondents were not living with the condition. Also, two (0.7%) of the respondents' spouses were living with the condition.

Table 4.37. Parents' asthma history

Parents asthmatic history	Frequency	Percentage
Self		
Living with asthma	4	1.5
Not living with asthma	269	98.5
Spouse		
Spouse is living with asthma	2	0.7
Spouse is not living with asthma	271	99.3

In one of the narratives, a pediatrician reported that the cause of asthma is familial in nature and runs in families; she stated that families who have asthma possess the atopic conditions and that manifestation of asthma occurs when exposed to triggers:

> As the cause, it is usually quite complex, you can not just put your finger and say this is the cause of asthma, but usually asthma is familial. I would say hereditary in the sense that it runs in families and I know, of course, that there are some specific genes that will code for the manifestation of asthma. But essentially, what happens is that families, in which people have asthma, have what is known as atopy. Asthma is one of the atopic conditions whereby we call it hyper sensitivity reaction, one of the hyper sensitivity reactions whereby the body produces excessive substances known as estamins and other inflammatory markers when exposed to triggers, so it's familiar. And when the tendency of the predisposition is there, then exposure to any of known triggers or inciters will now cause an asthmatic attack **(KII, Oluyoro, Female, Doctor)**.

In corroboration to this, another participant stated that atopic conditions are hereditary in nature and can manifest as asthma, eczema, and skin rashes. Also, parents of children living with asthma will likely have history of atopy. She also emphasized the intergenerational transmission which may be difficult to trace:

> If I have atopic conditions, my children will have the tendency to have any of the atopic conditions, including eczema, skin rashes, and asthma. So those are the atopic conditions. But then someone is actually going to start it, so it is possible for it to skip someone. It may not be direct parents and maybe it could be an aunt or a grandma somewhere, so it could skip the direct parents. Except you delve into the family's history so deeply, you might not be able to pick; but generally speaking, one can identify from one of the parents, the history of atopy in a child that has asthma **(KII, Oluyoro, Female, Pediatrician)**.

In light of this, it is important to note that the risk of personal asthma increased in relation to both parents' asthma and siblings' asthma, and showed a dose-response pattern with increasing number of siblings having asthma. Also, past studies in asthma have revealed that the incidence rates of asthma were the highest among those who had more than one first degree relative with asthma, including parents and siblings (Weibel, 2013).

4.44 Perception of asthma as an intergenerationally transmitted disease

Respondents' perceptions were sought on intergenerational transmission of asthma and how parental experiences influence asthma prevention and management in their children living with asthma. Respondents were asked if a child with an asthmatic parent would not have asthma. As presented in table 4.42, few (13.9%) responded in the affirmative while majority (86.1%) of the respondents disaffirmed the perception that the asthmatic condition of parents could predict the disease in their offspring. Majority (71.4%) of the respondent claimed that asthma can be prevented irrespective of parents' asthmatic status while the rest (28.6%) claimed asthma can not be prevented irrespective of parent's asthmatic status.

Table 4.38. Perception on asthma hereditability

Hereditary factors	Frequency	Percentage
A child with an asthmatic parent will definitely have asthma	38	13.9
A child with an asthmatic parent will not have asthma	235	86.1
Asthma can be prevented irrespective of parent's status	195	71.4
Asthma can not be prevented irrespective of parent's status	78	28.6

Despite asthma being heritable, the condition is not caused by a single mutation in one gene, and therefore the transmission of the disease through generations does not follow simple Mendelian inheritance typical of classic monogenic diseases. Rather, asthma is a polygenic, multifactorial disorder, which means that many factors contribute to its development. These factors are both genetic and environmental; accordingly, the combined action of several genes interacting with one another and with environmental factors causes the condition (Palmer and Cookson, 2000).

I am 52years old and I am currently living with asthma. Asthma as a condition can be prevented irrespective of parental asthmatic status, though asthma is hereditary but if certain precautions and measures are put in place, it can be prevented. However, the mechanism of transmission of asthma is very complicated. In my household, I have the condition but it comes intermittently especially when I am exposed to triggers especially smoke but out of my three children, it's just the very last girl that has the condition and it didn't even manifest till she was seven, although my first child has food allergy and reacts to fish, shrimps etc. but till date, he doesn't sneeze or cough even after being exposed to smoke and other triggers. I think my other two children have strong immunity because they are all exposed to the same triggers and yet they didn't show symptoms. However, my daughter showed symptoms when she was seven though it wasn't as severe as mine. Also, her daughter is currently asthmatic which is very mild though in fact her trigger is mostly exercise induced and stress and doesn't have to do with dust and smoke and other common triggers. Due to the hereditary nature of the condition that as a family, we are aware of, it has helped us managed the condition and even my grandchild's condition is mild **(CS, Female, 52years).**

Case 1. Narrative of an asthmatic Grandparent

Asthma history of grandparents is very important in intergenerational transmission of asthma (Sheikh, Pitts, Ryan-Wenger, McCoy, Hayes, 2016). Having a grandparent with asthma is associated with childhood asthma irrespective of parent's asthmatic status (Kuiper, et al, 2018). Few (10.6%) of the children living with asthma had grandparents with asthma history while the rest 244 (89.4%) did not have grandparents with asthma history. Out of which slightly below average 12(41.4%) had paternal grandmothers with asthma history, 4 (13.8%) had paternal grandfather with asthma history, 9 (31.0%) had maternal grandmother with asthma history, 4 (13.8%) had paternal grandfather with asthma history. Substantively, it was revealed that:

Asthma is very much hereditary; don't let anyone tell you otherwise. It worsens when you have contact with environmental pollutants commonly referred to as triggers. My asthma condition is more of intermittent but when I was a child, it was severe. Age has its role to play in the occurrence of asthma. I said asthma is hereditary because my son who is 44 years old too has the condition though very mild and his daughter, my grandchild is currently asthmatic. Well, because of age, I no longer show symptoms like I did several years ago because I have been able to manage it by limiting exposure to triggers, using natural home remedies like moringa and turmeric. Also, I make sure I use honey with warm water first thing whenever I wake up. I have been able to pass the regimen to my grandchild too which she does religiously **(CS, Female, 69years).**

Case 2. Narrative of an asthmatic grandparent

Based on the statement above, it can be deduced that the participant, who is currently living with the condition has a son with asthma history and also a grand-daughter currently living with the condition, buttressed the hereditability of asthma. The case of first degree and second-degree relative transmission came to play here. Though her son seemed to have outgrown the condition, she is currently living with the condition as well as her 8 years old grand-daughter. Also, from her narrative, the influence of the grandmother in the management of the asthmatic child was clear because she engaged in some management practices which she passed to her grandchild. Valerio, *et al.* (2010), further corroborates the above narrative, in their study, as they examined the association between childhood asthma, parent and grandparent asthma status. They however found out that regardless of gender, ethnic background and birth order, children with parents with asthma are more likely to have asthma and that children with an asthmatic parent were two times likely to have asthma, and those with a parent and grandparent with asthma were four times likely to have the condition, they also went further to elaborate on the influence of the grandparental relationship on asthma: another participant has this to say:

My mum still has symptoms of asthma even though she doesn't have attack, so she usually makes sure I am free from triggers especially dust and smoke ***(IDI, Female, 12years, Asthmatic, UCH)***.

As can be observed from Table 4.43, only 10.6% of respondents had grandparents who were asthmatic. This suggests that the onset of asthma, for majority (89.4%) of the respondents, did not depend on presence of asthma in their grandparents.

Table 4.39. Reported asthma history of respondent's grandparents

Grandparents' asthma history	Frequency	Percentage
Asthmatic grandparent	29	10.6
Not asthmatic	244	89.4
Grandparents currently living with asthma		
Paternal grandmother	12	41.4
Paternal grandfather	4	13.8
Maternal grandmother	9	31.0
Paternal grandfather	4	13.8

4.45 Logistic Regression of age, frequency of attack and family history of asthma

Table 4.40 showed the intergenerational factors influencing asthma prevention and management. Table 4.40 revealed that there was a significant relationship between age of asthmatic child and intergenerational factors. Specifically, children living with asthma within the age bracket of 9-11years are 1.996 more likely to have a family member suffering from asthma compared to those within the range 6-8 years. Similarly, there was a significant relationship between frequency of attack and intergenerational factors. The result suggests that children that experiences asthma once in six months are less likely to have a family member suffering from asthma when compared to those that the condition on a weekly basis. What this means is that, children that experience asthma weekly has family members suffering from the condition.

Table 4.40. Logistic Regression of age, frequency of attack, and family history of asthma

Independent Variables	Sig.	Exp(B)
Sex of Asthmatic Child		
Male		
Female	0.829	0.945
Age of Asthmatic Child		
6 – 8		
9 – 11	**0.021**	**1.996**
12 – 14	0.095	1.733
Regularity of Asthmatic Attack		
Weekly		
Once in a Month	0.083	0.157
Twice in three Months	0.099	0.169
Once in Six Months	**0.014**	**0.042**
Dependent Variable: Whether any Family Member Suffers from Asthma		

4.46 Parental experience in asthma prevention

The importance of experience in the intergenerational transmission of asthma can not be over emphasized. Respondents were asked which of their asthma prevention and management is being used in managing their child's asthmatic condition. Respondents gave responses ranging from use of medication and drugs, paying attention to triggers, avoidance of exposure to dust and smoke, use of natural remedies, avoiding extreme weather condition, avoiding crowded places, safe cooking method, use of honey and inhaler, exemption from house chores and prayers.

In summary, the influence of heredity on the risk of developing asthma is said to decline over age, but remains significant even in the older age periods. As an exception, the influence of heredity increased over time when both parents have asthma. This could indicate strong gene-environment interactions: it is possible that when parents have asthma, they are careful in their home environment and lifestyle to take into consideration the known allergens and other suggested causes of asthma. When the child grows older, he/she presumably is exposed to these allergens and other exposures, and due to his/her high hereditary risk has an increased risk of developing asthma in the older age (Weibel, 2013). Also, perceived susceptibility can influence asthma prevention and management because a child who is susceptible due to the asthmatic status of a family member can influence parental prompt influence in the management of the condition through experience.

Table 4. 41. Distribution of asthmatic parental experience in asthma prevention

Responses	Frequency	Percent
Paying attention to triggers	1	0.4
Avoiding smoke	4	1.5
Avoiding exposure to dust	1	0.4
Avoidance from dust and smoke	4	1.5
Avoidance of dust and smoke/ use of natural remedies like honey	1	0.4
Avoidance of smoke and cold	1	0.4
Avoiding crowded places	2	0.7
Avoiding extreme weather condition	3	1.1
Avoiding frying of things	2	0.7
Avoiding frying, use of honey	1	0.4
Avoiding smoke, change of pillow case	1	0.4
Avoiding smoke, and frying	1	0.4
Avoiding extreme weather conditions	1	0.4
Drugs and medications	11	4.02
Exemption from household chores	3	1.1
Honey and inhaler	3	1.1
Honey, ginger and herbal mixture	1	0.4
Mixing of camphor in warm water and rubbing on child's body	1	0.4
Natural home remedies, use of pawpaw leaves, garlic, turmeric	1	0.4
and mango seed	1	0.4
Natural home remedies and avoidance of frying	1	0.4
Prayers	1	0.4
Safe cooking method	1	0.4
Sitting upright during attack and use of peak flow rate	1	0.4
Using hot water to bath	1	0.4
Use of anti-inflammatory drugs, honey, garlic and turmeric	224	82.1
Total	273	100

4.47 Household perception on asthma treatment

Household perception and practices are crucial for improving asthma outcomes in children**.** On household perception and asthma treatment, respondents were asked if household perception about asthma influences its treatment. Little above average (59.7%) believed household perception did not influence its treatment while (40.3%) were of the opinion that it influences its treatment. Respondents were further asked how it influences treatment, majority (79.4%) alleged that such perception will assist them in determining pathways to seek care in terms of what step to take first, where to go and other factors related to seeking care, (15.0%) claimed it can influence their health seeking behavior while only (5.6%) attributed their reasons to having more information about triggers which is key to the management of the condition.

Table 4.42. Household perception on asthma treatment

Household perception on asthma treatment	Frequency	Percentage
Household perception doesn't influence asthma treatment	166	59.7
Household perception influences asthma treatment	107	40.3
Responses		
Can influence health seeking behaviour	16	15.0
Determine pathways to seek care	85	79.4
Observation, information about triggers	6	5.6

4.48 Confidence in ability to control asthma

According to Global Initiative for Asthma report, optimal management of asthma is said to be achieved when symptoms are prevented, exacerbations are minimized, or the need for rescue medication, ordinary levels of physical activity are enabled and near-normal lung function is achieved, while incurring minimal adverse effects from the medication, that is, the patient is assumed to have achieved some level of self-efficacy (GINA, 2020).

Asthma is defined as controlled if the patient reports symptoms and the use of reliever medications twice per week or less, no night waking, no activity limitation or airway obstruction, and no exacerbations; partly controlled" when symptoms or reliever use are present more than twice per week, and night waking, activity limitation, airway obstruction or exacerbations are present in any week, and "uncontrolled" with the presence of any three or more of these individual features within any week. If bronchial asthma symptoms are controlled, the patient should have fewer worsening of symptoms, lower costs, a higher quality of life, less morbidity, slower progression of airway remodeling from inflammation, and lower risk to die from bronchial asthma (Elbanna, Sileem, Bahga, and Ibrahem, 2017).

According to the health belief model, achieving self-efficacy refers to the level of a person's confidence in their ability to successfully perform a behaviour. Respondents were asked if they confidently managed the condition, little below average (49.8%) of the respondents agreed that they could confidently manage the condition. They were further interrogated on their ability to confidently manage asthma, majority lay claim to having better understanding of the condition, 30.1% of the respondents believed they had been able to confidently manage the condition because symptoms are longer frequent, (6.6%) looked up to to God's help and neighbors, 3.7% of the respondents attributed their confidence to reduction in exacerbations, (3.7%) to doctors' advice, (2.2%) to reduction in hospital visits while others were reliance on God and close friends, natural remedies, help of child's teacher and adherence to regimen.

According to Büssing, Ostermann and Matthiessen (2007), spirituality and religion have a significant effect on patients' beliefs about diseases, strategies for coping with it and approaches to its management, the God's perceived role in influencing health can not be over emphasized because spirituality or religiosity is an important coping strategy for persons suffering from chronic diseases (Adeli, Moghaddam, Hosseinzadeh and Vahedian, 2014).

Also, half (50.2%) of the respondents asserted that they can not confidently manage the condition because it is difficult to manage/overwhelming, they still visit the hospital regularly, each asthma episode is unique and that they are not just confident to manage the condition. However, management goals for childhood asthma are the ability to live a normal life free of any symptoms (e.g., cough, wheeze and breathlessness), the ability to have a restful sleep, to grow and develop normally, to attend school or preschool regularly and participate in all school activities including sports, to minimize the number of attacks of acute asthma, to avoid hospitalization and to avoid medication related side effects (Potter, 2010).

Table 4. 43. Household perception on ability to confidently manage asthma

Ability to confidently manage asthma	Freq.	Percent
Can confidently manage asthma	136	49.8
Can not confidently manage asthma	137	50.2
Reasons		
Can confidently manage asthma	**136**	**49.8**
Reliance on God and close friends	3	2.2
Information and awareness	1	0.7
Natural home remedies	1	0.7
Help of child's teacher	1	0.7
Reliance on family members	1	0.7
Adherence to regimen	2	1.5
God's help	2	1.5
Hospital visits have reduced	3	2.2
Doctors' advice	5	3.7
Exacerbations have reduced	5	3.7
God's help and neighbours	9	6.6
Better understanding of the condition	62	45.6
Symptoms are not frequent	41	30.1
Can not confidently manage asthma	**137**	**50.2**
Each asthma episode is unique	14	10.2
Difficult to manage/overwhelming	41	29.9
Regular hospital visit	14	10.2
I am not just Confident	68	49.6

4.49 Pathways to seeking care

The underlying pathological process resulting in the features of asthma differ among individuals. Hence, each person's asthma has different characteristics and pattern of triggers and their response to treatment varies. Hence, pathways to seeking care varies due to illness perceptions, medication beliefs, social status, cultural practices, access to health care services and perceived quality of the services.

Oftentimes, asthmatic patients coordinate their care pathway themselves by including the professionals of their choice, practitioners, while others often believe they are able to manage their asthma without the intervention of healthcare professionals (Hannane, Misane, Devouassoux, Colin and Letrilliart (2019). Pathways to care are influenced by various factors such as gender, cultural and economic background or the social network of the individual.

In understanding the pathways to seeking care, respondents were asked the last time the child had an attack, 13.2% of the respondents reported the last one week prior to the study. (21.6%) reported last two weeks, (8.8%) reported three weeks prior to the study while slightly above average (56.4%) reported more than three weeks. Large majority (94.9%) of the respondents coughed persistently as a symptom as at the time to seek care, (87.5%) had wheeze, (66.3%) had chest pain, (8.8%) had catarrh while (10.3%) of the respondents had fever.

Furthermore, the duration of the occurrence was elicited, majority (63.0%) of the respondents indicated that occurrence lasted for less than 24hours while the one third (37.0%) of the respondents had theirs lasted for more than 24hours.

Table 4. 44. Childs last asthma attack/symptoms and duration of occurence

Last time child had an attack	Frequency	Percentage
Last one week	36	13.2
Last two weeks	59	21.6
Last three weeks	24	8.8
More than three weeks ago	154	56.4
Symptoms noticed		
Coughing	259	94.9
Wheeze	239	87.5
Breathlessness	197	72.2
Chest pain	181	66.3
Catarrh	24	8.8
Fever	28	10.3
Duration of the occurrence		
24hours or less	172	63.0
More than 24hrs	101	37.0

4.50 Symptoms that prompted actions to seek care

Respondents were interrogated on things that prompted actions to seek care, majority (60.6%) indicated breathlessness, which shows that breathlessness which is an internal cue to action triggered the decision-making progress. Also, 78 (23.9%) of the respondents had the combination of cough, chest pain and breathlessness, 23 (7.0%) mentioned cough and breathlessness, 7(2.1%), chest pain, 7 (2.1%), cough and wheezing, 6 (1.8%) persistent coughs, while the rest indicated chest pain & restlessness, chest pain & breathlessness, wheezing & breathlessness, chest pain & wheezing and chest pain & severe cough.

According to the Centers for Disease Control and Prevention (CDC), uncontrolled asthma symptoms are one of the leading causes of urgent care visits (CDC, 2018)

Table 4. 45. Symptoms that prompted actions to seek care

Symptoms	Frequency	Percentage
Breathlessness	198	60.6
Chest pain	7	2.1
Chest pain and breathlessness	1	0.3
Chest pain and sneezing	1	0.3
Chest pain and severe cough	3	0.9
Persistent cough	6	1.8
Cough and breathlessness	23	7.0
Cough and wheezing	7	2.1
Cough, chest pain and breathlessness	78	23.9
Sweaty face	2	0.6
Wheezing and breathlessness	1	0.3
Total	**327**	**100**

4.51 First step taken in care seeking

In understanding the pathways to seeking for asthmatic child, respondents were asked to describe their pattern of seeking care in three steps, the steps they took, what influenced the steps taken, who advised them to take such step, whose decision was final, amount paid on treatment, who paid and the effectiveness of the treatment.

Majority (65.2%) of the respondents used drugs/ inhaler as a first step for treatment in case of attack, closely followed by use of herbs 14.2%, then informal consultation with health personnel (12.1%). 4.8% of the respondents visited patent medicine vendor, 1.5% visited hospital and healthcare centers, while 0.7% utilised spiritual/religious consultations. Responses were further elicited on what influenced the first step taken. Majority (70%) of the respondents attributed their reason to knowledge of the disease; that it was because of their residual knowledge about asthma, they were able to take the first step they took. Also, 18.6% of the respondents laid claim to success in outcome of previous treatment, 8.4% of the respondents attributed theirs to their belief/perception about the disease. What influenced 2.6% of the respondents to utilise the first step was proximity to care providers, while the rest (0.4%) related theirs to finance.

Furthermore, on who advised them on the decision to take the first step they took, majority (71.1%) of the respondents indicated that they were responsible for such decision, followed by the spouses (22.3%), and only 1.4% of the respondents indicated that it was the mother-in-law's advice. In terms of the amount paid for treatment, majority (75.8%) claimed the treatment was free. While few (14.7%) of the respondents paid less than ₦2,000 for treatment, fewer (5.9%) paid between ₦2,001 and ₦4,000. 2.6% of the respondents paid between ₦4,001 and ₦6,000, while the rest (1.0%) of the respondents paid above ₦6,000 for treatment. As regards who paid for the treatment, majority (66.7%) of the respondents claimed they paid themselves and a few (33.3%) others claimed it was their spouses who paid for the treatment. On the effectiveness of the step taken, almost all

(93.0%) of the respondents were of the opinion that the step taken was not effective, while the rest (7.0%) claimed it was effective. The study revealed that majority of the respondents use drugs/ inhaler as first point or treatment because of the nature of the condition. The first step is usually taken to suppress the condition temporarily before further help is sought. Participants revealed that the first step taken by the asthmatic child was to separate themselves from possible triggers before the use of inhaler. This was substantiated by a response from an asthmatic child.

*First of all, I separate myself from the area where it occurs then keep myself from all possible triggers then I use my inhaler and sit still till further help will be gotten (**IDI, Male, 11years, Asthmatic**).*

The above response revealed that the first step taken by the asthmatic child was to separate himself from possible triggers before the use of inhaler. Another respondent provided a similarly position about use of inhaler and staying in a well-ventilated place once she starts wheezing.

> Once I start wheezing, I will stay where there is enough air and well-ventilated place, I have an inhaler before I always use inhaler but now, I don't use it again because it has expired **(IDI, , Female, 10years, Asthmatic)**

Similarly, a key informant gave insights on the first step to be taken during attack. She stated that the first step is to ensure the child can breathe. In case the child is unable to breathe properly, oxygen is fixed to enhance smooth breathing. Thereafter, medication is inhaled. The narrative of the informant is expressed as follows:

> The first thing is to ensure that the child can breathe properly and if that child can not breathe sufficiently on his or her own, the next thing is to give the child oxygen. So that is the first thing: get oxygen and you get this drugs "aerosol". Most importantly, the child should have inhaler but the procedure in the hospital is oxygen and inhaled medication (**KII, Oluyoro, Female, Pediatrician)**.

Corroborating this, another respondent attributed the severity of asthma as one which can kill and hence the need to act fast during attack. Separating from triggers, sitting quietly where there is proper ventilation and making use of inhaler were the first step considered as appropriate during asthma attack. However, he stated that he does not like to use inhaler and sometimes he does not remember where the inhaler is during attack.

> Asthma can kill, it can lead to suffocation, it makes the bronchi tubes to contract and that's the means through which the air enters through the lungs. So, when you have an asthmatic attack, you first of all separate yourself from the trigger then sit quietly in a place where there is proper ventilation and there is no noise or disturbance, then you use your inhaler and wait for further help but sometimes I forget where I kept my inhaler during attack, I don't like using inhaler **(IDI, Asthmatic, Male, 11years, Oluyoro)**.

The above statement is in line with Gupta, Bhat and Pianosi (2018) that it is very well known that children do not want to and/or do not remember to take inhalers or medicines if they are feeling well, and so exacerbations on a background of poor adherence can be even more severe.

On appropriate use of inhaler because inappropriate use can lead to complications if not properly managed. Participants reported that they learnt how to use the inhaler through the manual, skit or a family member. A KII respondent spoke on proper use of the inhaler which requires training and use of appropriate spacer device:

> Inhaler use in children needs efforts, its needs training of the children on the use. Most times they need spacer device, you attach it to the inhaler so when they press it, it goes inside that thing so they can take it at their own pace, they can do the normal one for adult ...so for some of them we tell them to cut eva bottle and attach inhaler so when you spray it its already in the device so they can take it at their own pace if not it will waste (**KII, Female, Oluyoro, Paediatrician)**.

The above qualitative response is in line with Oluwole et al, (2017) and Marsden et al, (2016), that the complications of asthma could be influenced by poor knowledge, poor use of inhaler technique. Thus, appropriate use of inhaler is very important.

A participant maintained that:

My mum heard of some plants like turmeric and ginger and she found out that they can help in preventing the symptoms of asthma so anytime it's about to happen, she gives me some to use ***(IDI, Asthmatic, Female, 10years, UCH)****.*

4.52 Second step taken in care seeking

As for the second step, majority (84.2%) of the respondents visited hospitals. This is followed by a handful (5.1 %) of the respondents who visited health care centers. A similar proportion (3.9%) used drugs/inhaler at home. Much fewer (2.8%) had informal consultation with health personnel, and visited patent medicine vendors (2.8%), while very few (0.8%) had spiritual/religious consultations (0.8%) and herbs (0.4%).

Respondents were further asked what influenced their decision as regards where they sought help. Majority (78.7%) of the respondents attributed their reason to failure in outcome of the previous treatment. Few (9.8%) of the respondents took the second step due to the knowledge of the disease. A handful (4.3%) of the respondents took the second step due to success in outcome of previous treatment. Almost a similar proportion (3.9%) took the second step due to proximity to care providers, while 3.1% of the respondents took the second step because of their belief/perception about the condition.

When asked who advised them on the step taken, majority (72.8%) of the respondents stated that they were responsible for the decision taken. One quarter (25.6%) indicated it was their spouses who paid for treatment and 1.6% of the respondents indicated neighbors. On amount of money spent on treatment for the second stage, 45.3% of the respondents spent between ₦4,001and ₦6,000, 30.7% of respondents spent more than ₦6,000 for treatment, 16.1% of respondents spent between ₦2,000 and ₦4,001, while

7.9% of respondents spent less than ₦2,000 on treatment. On who paid for treatment, slightly above average (53.9%) of the respondents paid for treatment themselves while for the rest 46.1% of the respondents, their spouses paid. As regards the effectiveness of the step taken, majority (90.2%) reported that the step taken was effective, while 9.8% reported that the step taken was not effective.

4.53 Third step taken in care seeking

For the third step, almost all (96.0%) of the respondents visited hospitals while very few (4.0%) of the respondents visited health care centers. At this stage, it was revealed that the condition mostly deteriorates, hence the utilisation of health care services. On what influenced the third step, majority (88.0%) of the respondents laid claim to knowledge of the disease. Few (8.0%) of the respondents took the decision based on proximity to care providers, while very few (4.0%) took the decision based on their belief/perception of the disease.

On who advised them on the step taken, less than half (44%) of the respondents reported themselves, similar proportion (44.4%) of respondents claimed it was their spouses who advised them on the step taken. Few (8%) of the respondents claim that it was their neighbors, while very few (4%) of the respondents claimed it was their relatives who advised them.

On the amount spent on treatment, a little above average (52.0%) of the respondents spent more than ₦6,000 on treatment, 24.0% of respondents spent between ₦2,001 and ₦4,000, 20.0% of the respondents spent between ₦4,001 and ₦6,000, while 4.0% of respondents spent less than ₦2000 on treatment. On who paid for treatment, majority (64.0%) of the respondents claimed it was their spouses and one-third (36.0%) claimed they paid for the treatment themselves. As regards the effectiveness of the step taken, all (100%) of the respondents claimed the step was effective. Respondents utilised the services of hospitals after using up every other available options. Asthmatic patients are said to only visit the hospital when the condition has deteriorated after they must have tried other means. They first visit patent medicine vendors, community pharmacy, thereby neglecting the first point of call.

Table 4. 46. Steps taken in care seeking

Steps/Actions	**Stages of steps**		
Steps Taken	**1st Step**	**2nd Step**	**3rd step**
Use drugs/inhaler at home	178(65.2%)	10(3.9%)	-
Visit hospital	4(1.5%)	214(84.2%)	24(96.0%)
Visit healthcare Centre	4(1.5%)	13(5.1%)	1(4.0%)
Use herbs	39(14.2%)	1(0.4%)	-
Visit patent medicine vendors	13(4.8%)	7(2.8%)	-
Spiritual/religious consultation	2(0.7%)	2(0.8%)	-
Informal consultation with health personnel	33(12.1%)	7(2.8%)	-
What influenced first step			
Success in outcome of previous	51(18.6%)	11(4.3%)	-
treatment	7(2.6%)	10(3.9%)	2 (8.0%)
Proximity to care providers	23(8.4%)	8(3.1%)	1(4.0%)
Belief/perception	1(0.4%)	-	-
Finance	191(70.0%)	25(9.8%)	22(88.0%)
Knowledge of disease	-	200(78.7%)	
Failure in outcome of previous treatment			
Who advised on step taken			
Self	194(71.1%)	182(72.8%)	11(44.0%)
Spouse	61(22.3%)	65(25.6%)	11(44.0%)
Mother-in-law	11(4.0%)	1(0.4%)	--
Father-in-law	1(0.4%)	-	1(4.0%)
Relatives	4(1.5%)	2(0.8%)	2(8.0%)
Neighbors	1(0.4%)	4(1.6%)	
Spiritual leaders	1(0.4%)	-	-
Whose advise was final			

Self	195(71.4%)	184(73.6%)	11(4.0%)
Spouse	63(23.1%)	66(26.0%)	13(52.0%)
Mother-in-law	11(4.0%)	1(0.4%)	-
Father-in-law	1(0.4%)	-	-
Relatives	3(1.1%)	-	1(4.0%)
Amount spent on treatment			
Less than ₦2,000	40(14.7%)	20(7.9%)	1(4.0%)
₦2,001-₦4,000	16(5.9%)	41(16.1%)	6(24.0%)
₦4,001 – ₦6,000	7(2.6%)	115(45.3%)	5(20.0%)
Above ₦6,000	3(1.0%)	78(30.7%)	13(52.0%)
Free	207(75.8%)	-	-

Table 4. 46. Steps taken in care seeking (Cont'd)

Steps/Actions	**Stages of steps**		
Steps Taken	**1st Step**	**2nd Step**	**3rd step**
Who paid for treatment			
Self	55(20.1%)	137(53.9%)	9(36.0%)
Spouse	11(4.1%)	117(46.1%)	16(64.0%)
Free	207(75.8%)	-	-
Effectiveness of treatment			
Effective	19(7.0%)	229(90.2%)	25(100.0%)
Not effective	254(93.0%)	25(9.8%)	-

The data are substantiated by the following comments from the qualitative data:

> This is Nigeria; people go anywhere, people go to the chemist. By chemist, I mean the patent medicine seller. (She learnt the work from someone). So, people go anywhere. People go to pharmacy, they call them community pharmacists and they prescribe, so some people get to the hospital, which ideally should be the first place they should go to (**KII, Female, Oluyoro, Pediatrician)**.

Similarly, as expressed by the pediatrician, the severity of condition determines the kind of care to seek. Asthmatic patients are of different categories based on the numbers of attacks (such as intermittent, mild persistent, moderate persistent and severe persistent) which determine the kind of medication to use. While for some category, they use preventer medication, some use reliever; and when all the medications are not working, they use the hospital. This is affirmed by a doctor:

> Some patients come with acute attack; so, the next attack could be in 2years. I think there is intermittent, there is mild persistent, there is moderate persistent and severe persistent, based on number of attacks in a week, number of attacks at night. For some of those stages, they need to use their inhaler every day, not the normal regular one. So, it depends on the category that the patient is. For some, they have to use the drugs every day whether they have an attack or not. It contains steroids; it's just to suppress or prevent the attack. So, when they now have the attack, there is

> another one to use and when all those are not working, they have to come to the hospital **(KII, Male, Adeoyo, Doctor)**.

The narrative below identifies the factors that encouraged the use of hospital, such factors include parental knowledge about the condition and severity of the condition. However, it was revealed that most children living with asthma utilise the hospital when the condition has deteriorated.

> Usually, they come in extreme cases when their condition is so bad. Our society is unregulated that anybody can prescribe medication anywhere, they have other options usually they don't come until it is very bad except you have people that are knowledgeable, I am not talking about literacy now. For instance, if someone has asthma in the family and they are knowledgeable about it, they want to get to the hospital, and those are the ones that will come early to the hospital. Also, a mother that is just a bit finicky, and concerned about why the child is always coughing or finding it difficult to breathe when there is dust will say let's go the hospital but, in the average, they come when the condition is really bad **(KII, Female, Oluyoro, Pediatrician)**.

However, in Nagakumar, Davies and Gupta (2020), the Royal College of Paediatrics and Child Health (RCPCH) raised concerns children presenting late to the hospital, the importance of asthma attacks being managed aggressively during the first hour of presentation was stressed because the risk to a child of an asthma attack is significant and can be fatal. Asthma attacks result in poor quality of life, missing home/school and the potential to adversely impact the child's lung function trajectory.

Poorly controlled asthma was linked to poor diagnosis of the condition and use of over-the-counter medication: an expert maintained that:

> Asthma is very serious and it can kill, it does kill, it's that serious so any child who is coughing or have difficulty in breathing should be seen by a physician. For children, over the counter medications is a horrible idea, there is no gain saying, over the counter medication for children are terrible. People should know that asthma is serious in children and it is poorly managed in children because it is poorly diagnosed and even when there is suspicion of it, proper treatment is not instituted because we have

> too many places that people can access suspicious care and because of that they don't get proper treatment (**KII, Female, Oluyoro, Pediatrician)**.

In corroboration, WHO (2020), noted that asthma is under-diagnosed and under-treated which later creates substantial burden to individuals and families and often restricts individuals' activities for a lifetime.

The pathways to care of asthmatic patients were further linked to the parent's socioeconomic status and affordability of care. Caregivers in deprived communities face severe financial difficulty and are unable to provide adequate asthma care for their children (Bellin, *et al.*, 2017).

> There are several places they can go before the hospital, it depends on the socioeconomic status of the parents, for some, they can not afford quality asthma care. Education has a role to play too, Also, if it's not the first attack, they must have been going somewhere before so they know where to go when attack occur **(KII, Adeoyo, Female, Nurse)**.

Another respondent further stated that due to the chronicity of asthma, it is essential that patients visit the hospital regularly and also stated the importance of support groups to the management of the condition, she said:

> Asthma is a chronic condition just like hypertension and diabetes even if you have a normal blood pressure, buy over the counter drugs, you still have to come to the hospital for regular check-ups, its more than using drugs. You run tests, sometimes you have to adjust your dose for asthma patients its more than using the inhaler. Even the inhalers are not the same, they contain different things, there are different kinds, there are some that you use when you have an attack, there are some that you use with or without attack everyday just to prevent an attack, so it's not just taking drugs, they should have support groups, they should have clinics where they meet (**KII, Female, Oluyoro, Paediatrician)**.

As noted by a paediatrician, the severity of the condition determines what kind of care to be given to asthmatic patients, for severe cases, they resuscitate while for mild cases the patient is examined, and proper investigation will be done. However, visiting the hospital is considered severe because most patients would have tried all means before visiting the hospital.

> Depending on how bad the condition is, if it's a very serious case, we resuscitate them, checking the airways but if it's not so bad, we take the history, examine the patients, and we do investigations and decide from what we have seen. However, in severe cases, we nebulise because for them to have come to the hospital, it must have been really bothersome, they can not manage the condition because as mild as asthma looks, it could be life threatening so for them to come to the hospital, they must have done several things at home, those that have inhaler would have used it maybe it's not working so they need urgent care (**KII, Female, Oluyoro, Paediatrician**).

The above responses revealed that the perceived severity of the condition made asthmatic patients utilise the third step to visit the hospital and in mild cases, they use drugs and other natural home remedies at home.

Respondents were further asked what step they preferred, majority (88.6%) of the respondents preferred the second step while 18 (6.6%) preferred the third step and 13 (4.8%) preferred the first step. On why they preferred the steps, reasons were low cost and effective treatment.

Table 4. 47. Preferred step and reasons for preference

Variables	Frequency	Percentage
Preferred step		
First step	13	4.8
Second step	242	88.6
Third step	18	6.6
Reason for preference		
Low cost	123	45.1
Effective treatment	150	54.9

4.54 Factors influencing the decision to take the third Step

Table 4.48 revealed that there was a significant relationship between income and decision to take the third step. Specifically, the study found out that respondents with monthly income of ₦10,000- ₦50,000 were 0.234 times less likely to take the third step than those with income below 10,000. Also, respondents with monthly income of ₦50,001 - ₦100,000 are 0.092 less likely to take the third step than respondents with income below ₦10,000 while respondents with income between ₦100,001 and ₦150,000 were 0.062 less likely to take the third step than respondents with income below 10,000. Findings revealed that the more they earn, the lesser they take third step. Respondents that earned less than 10,000 were more likely to take a third step than those that earned other income categories. This could be because the first step taken by those earning little could be less effectively because they are unable to pay for a certain pathway that could produce a good result. This shows that those with income between 10,000 and 150,000 are likely to have taken the first and second step and gotten effective treatment thereby not taking the third step; while those below monthly income of 10,000 would have tried all means from the first step to the second and third. It implies that the factors influencing the decision to take the third step are influenced by income.

However, there is no significant relationship between education, sex of asthmatic child, age of asthmatic child and regularity of attack. This implies that factors influencing the decision to take the third step can not be predicted by respondents' educational, sex of asthmatic child, age of asthmatic child and regularity of attack.

Table 4. 48. Factors influencing the decision to take the third step

Demographic characteristics	Sig.	Exp(B)
Education		
Without Tertiary Education		
With Tertiary Education	0.459	1.456
Sex of Asthmatic Child		
Male		
Female	0.616	0.705
Income		
Below ₦10,000		
₦10,000 –₦ 50,000	0.038	0.234
₦50,001 –₦ 100,000	0.005	0.092
₦100,001 –₦150,000	0.028	0.062
Above ₦150,000	0.999	0.000
Age of Asthmatic Child		
6 – 8		
9 – 11	0.309	1.597
12 – 14	0.276	0.419
Regularity of Attack		
Not Regular		
Regular	0.744	1.157

4.55. Association between treatment pathway and socio demographics

Table 4.49 showed the degree of association between gender, ethnicity, religion, income, family type, ownership of house, type of house, age and treatment pathways. Findings showed that there was no significant relationship between gender and treatment pathways. Hence, the gender of the respondent does not have a significant impact on whether to utilise traditional or modern pathway. Likewise, there was no significant relationship between ethnicity and the kind of treatment pathways utilised by the respondent that is modern or traditional.

However, findings revealed that there was a significant relationship between religion and treatment pathways. Specifically, majority of the respondents (91.1%) who were Christians utilised modern pathways, that is, visit to the hospital/ visit to health care centers while (8.9%) utilised traditional pathways which involved use of herbs and concoctions. Conversely, it is convenient to say that religion influences the pathways to seeking care among asthmatic patients.

Also, there was a positive association between average monthly income and the decision to utilise traditional and modern pathways. Pointedly, all respondents whose monthly income fell between ₦100,000 and above, utilised modern pathways while those who fell between ₦10,000- ₦50,000 utilised traditional pathways. This shows that respondents' monthly income influences the kind of care they seek during attacks. This may be attributed to the fact that those with higher income are more knowledgeable about the disease and can afford the treatment, hence, they utilise modern pathways while those with lesser income may not be able to afford the modern pathway treatment.

Meanwhile, there was a positive relationship between family type and treatment pathways. (86.7%) of respondents that belong to the nuclear family type utilised modern pathways while the rest utilised traditional while (45.5%) of the respondents that belong to the extended family type utilised traditional pathways while the rest utilised modern pathways. This implies that the respondents' family type influences where to seek care in terms of modern and traditional pathways. Those that belong to the extended family might utilise traditional pathways due to familial relationship amongst family members who can influence their decision on where and how to seek care during attacks.

Findings further revealed that there was a significant relationship between ownership of house and treatment pathways. Large majority (96.2%) of respondents that lived in self-owned houses utilised modern pathway. This can be attributed to the fact that those who live in houses that belong to them are more economically buoyant to afford modern treatment and visit the hospital promptly. Similarly, there is a association between type of house that respondents lived and the treatment pathways that they utilised. All the respondents that live in a duplex utilised modern pathway. Also, 92.5%, 87.8% of those that lived in bungalow and flat respectively utilised modern pathway while 58.5% of those that lived in "face me" utilised modern pathway while the rest utilised traditional pathway. Since housing is an important determinant of health, socio economic status of respondents plays a huge role in the kind of hoses they lived in and also the kind of health care service they utilise when the need arises, so those that live in "face me" houses might not be able to afford the modern pathways initially hence their decision to utilise traditional pathway.

Also, findings shows that there is no significant relationship between age of respondents and treatment pathways. This implies that the age of the respondents does not influence their treatment pathways on whether to utilise modern or traditional pathway. Also, their marital status did not influence their treatment pathways on whether to utilise modern or traditional pathways.

Table 4. 49. Association between treatment pathway and socio demographics

Demographic characteristics	**Treatment Pathways** **Traditional**	**Modern**	**Total**	**Test of association**
Gender				χ^2 = 1.282
Male	3(9.4%)	29(90.6%)	32(100.0%)	df =1
Female	36(17.3)	172(82.7%)	208(100.0%)	P.value= 0.257
Total	**39(16.2%)**	**201(83.8%)**	**240(100.0%)**	Phi= -0.073
Ethnicity	38(17.8)	175(82.2)	213(100.0)	$\chi2$ = 3.519
Yoruba	1(3.7)	26(96.3)	27(100.0)	df =1
Igbo	**39(16.2)**	**201(83.8)**	**240(100.0)**	P.value= 0.061
Total				Phi= 0.121
Religion	11(8.9%)	113(91.1%)	124(100%)	$\chi2$ = 10.264
Christianity	28(24.1%)	88(75.9%)	116(100%)	df =1
Islam	**39(16.2%)**	**201(83.8)**	**240(100%)**	P.value= 0.001
Total				Phi= -0.207
Income	2(33.3)	4(66.7)	6(100.0)	$\chi2$ = 29.579
Below 10,000	35(27.6)	92(72.4)	127(100.0)	df =4
10,000-50,000	2(2.5)	77(97.5)	79(100.0)	P.value= 0.000
50,001-100,000	0(0)	21(100.0)	21(100.0)	Cramer's V=
100,001-150,000	0(0)	7(100.0)	7(100.0)	0.351
Above 150,000	**39(16.2)**	**201(83.8)**	**240(100.0)**	
Total				

Family type	29(13.3)	189(86.7)	218(100.0)	χ2 = 15.179
Nuclear	10(45.5)	12(54.5)	22(100.0)	df =1
Extended	**39(16.2)**	**201(83.8)**	**240(100.0)**	P.value= 0.000
Total				Phi= -0.251
Ownership of house	2(3.8)	51(96.2)	53(100.0)	χ2 = 8.770
Self-owned	8(25.8)	23(74.2)	31(100.0)	df =2
Inherited	29(18.6)	127(81.4)	156(100.0)	P.value= 0.012
Rented	**39(16.2)**	**201(83.8)**	**240(100.0)**	Cramer's V=
Total				0.191

Table 4.49. Association between treatment pathway and socio demographics (Cont'd)

Demographic characteristics	**Treatment Pathways**		**Total**	**Test of association**
	Traditional	**Modern**		
Type of house				
Bungalow	3(7.5)	37(92.5)	40(100.0)	χ2 = 23.883
Duplex	0(0.0)	3(100.0)	3(100.0)	df =3
Face me	17(41.5)	24(58.5)	41(100.0)	P.value= 0.000
Flat	19(12.2)	137(87.8)	156(100.0)	Cramer's V=
Total	**39(16.2)**	**201(83.8)**	**240(100.0)**	0.315
Age	6(21.4%)	22(78.6%)	28(100.0%)	χ2 = 6.015
26- 30	9(14.1%)	55(85.9%)	64(100.0%)	df =4
31- 35	16(22.2%)	56(77.8%)	72(100.0%)	P.value= 0.198
36- 40	8(13.1%)	53(86.9%)	61(100.0%)	Cramer's V=
41- 45	0(0)	15(100.0%)	15(100.0%)	0.158
46- 50	**39(16.2%)**	**201(83.8%)**	**240(100.0%)**	
Total				

Marriage, education, family size, age of children living with asthma, occupation, asthma attack frequency, and household decision making and treatment pathways were all shown to have a significant impact. The degree of formal education was significantly linked to the methods of care pursued. Notably, practically all respondents with post-secondary education used contemporary routes, while only a tiny fraction (2.7%). This suggests that educational opportunities play a significant role in paving the way to receiving medical attention. Respondents are aware of the signs of a health problem and know when it's time to seek medical attention because of their prior experiences. There was also a significant relationship between household size and treatment modalities, with those in smaller households using more up-to-date methods than those in larger ones.

Most experts agree that parents are in the best position to assess the severity of their child's asthma since they are familiar with their child and can keep a close eye out for any signs. They know what sets off the reaction and why. Because self-management of the disease frequently entails collaboration between the child and the parent, education plays a vital role. Evidence suggests that parents' low health literacy may affect their capacity to participate in the decision-making process with physicians and their children's adherence to the treatment plan (Gandhi, Kenzik, Thompson, DeWalt, Revicki, Shenkman and Huang, 2013). A high health literacy level has also been linked by Wood, Price, Dake, Telljohann, and Khuder (2010) to a sense of agency and competence in managing asthma. Asthma results have also been demonstrated to be highly related to parental aspects like health literacy, self-efficacy, and satisfaction with the decision-making process.

In addition, there was a somewhat significant connection between the number of people living in a household and the types of care that were sought. In a similar vein, there was a correlation between occupation and treatment paths, with 93.8% of respondents from families with 1-3 individuals making use of cutting-edge options. It follows that the size of respondents' households may play a role in their preference for either traditional or modern methods. As can be seen in the table below, there was a significant relationship between the age of the asthmatic child and the recommended treatment options. Ninety-four point five percent of children living with asthma between the ages of 12 and 14 used the latest methods. Children with asthma may choose between traditional and modern treatments depending on their age. A similar correlation between respondents' professions and their final courses of therapy is also displayed in the table. Almost all respondents (96.7%), whether they worked in the commercial or public sector, used non-traditional routes (3.3%). Because of this, respondents' professions may play a role in whether they opt for conventional or nonconventional means.

In addition, there was only a marginally significant correlation between husband-and-wife decision-making in the home and final treatment outcomes. Eighty-eight percent of wives who responded used non-traditional channels, while only eleven percent used conventional channels. However, there was no correlation between respondents' marital status, the frequency with which they were attacked, and whether they opted for modern or traditional methods of defense.

Table 4. 49. Association between treatment pathway and socio demographics (Cont'd)

Variables	Treatment Pathways		Total	Test of association
	Traditional Pathways	**Modern pathways**		
Marital status				χ2 = 2.029
Unmarried	1(5.0%)	19(95.0%)	20(100.0%)	df =1
Married	38(17.3%)	182(82.7%)	220(100.0%)	P.value= 0.154
Total	**39(16.2%)**	**201(83.8%)**	**240(100.0%)**	Phi= -0.092
Education	35(38.0%)	57(62.0%)	92(100.0%)	χ2 = 52.066
Without tertiary education				df =1 P.value= 0.000
With tertiary education	4(2.7%)	114(97.3%)	148(100.0%)	Phi= 0.466
Total	**39(16.2%)**	**201(83.8%)**	**201(83.8%)**	
Household size	4(6.2)	60(93.8)	64(100.0)	χ2 = 18.140
1-3	27(16.9)	133(83.1)	160(100.0)	df =2
4-6	8(50.0)	8(50.0)	16(100.0)	P.value= 0.000
More than 6	**39(16.2)**	**201(83.8)**	**240(100.0)**	Cramers V= 0.275
Total				

Age of asthmatic child				
6-8	22(19.8)	89(80.2)	111(100.0)	χ2 = 6.137
9-11	14(18.9)	60(81.1)	74(100.0)	df =2
12-14	3(5.5)	52(94.5)	55(100.0)	P.value= 0.047
Total	**39(16.2)**	**201(83.8)**	**240(100.0)**	Cramers V= 0.160
Occupation				
Unemployed	1(14.3)	6(85.7)	7(100.0)	χ2 = 18.598
Self-employed	35(24.6)	107(75.4)	142(100.0)	df =2
Either private of				P.value= 0.000
Public employee	3(3.3)	88(96.7)	91(100.0)	**Cramers V=**
Total	**39(16.2)**	**201(83.8)**	**240(100.0)**	**0.278**

Table 4. 49. Association between treatment pathway and socio demographics (Cont'd)

Demographic characteristics	**Treatment Pathways Traditional**	**Modern**	**Total**	**Test of association**
Frequency of attack				
Regular	28(17.9)	128(82.1)	156(100.0)	χ2 = 0.945
Not regular	11(13.1)	73(86.9)	84(100.0)	df =1
Total	**39(16.2)**	**201(83.8)**	**240(100.0)**	P.value= 0.331
				Phi= 0.063
Household				
decision making	26(21.0)	98(79.0)	124(100.0)	χ2 = 4.196
Father/Husband	13(11.2)	103(88.8)	116(100.0)	df =1
Mother/wife	**39(16.2)**	**201(83.8)**	**240(100.0)**	P.value= 0.041
Total				Phi= 0.132

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The perception about disease etiology influences prevention, treatment and management strategies, and their acceptance by patients as well as their significant others (Amzat and Razum, 2018). This study found that almost half (45.9%) of the respondents perceived asthma to be caused by environmental factors, inherited disease (37.5%), spiritual attack (13.0%) and punishment for sin (3.5%). Hence, high level of erroneous conceptions and beliefs still abound regarding asthma aetiology among respondents. Findings from qualitative data further suggested that respondents with tertiary education were more likely to perceive asthma as an inherited disease than those without tertiary education. Higher-educated people are more prone to attribute asthma to genetics, which may be attributable to their exposure to and knowledge of the condition, indicating that education plays a key influence in the perception of asthma as an inherited disease. Abu-Shaheen, Nofal, and Heena (2016) observed that differences in asthma etiology perception were associated with respondents' level of education, lending credence to this finding.

In spite of this, however, respondents had perceptions about Asthma symptoms that resonated with scientific perspective. For instance, all (97.8%) of the respondents reported cough as a major symptom of asthma in children, 97.1%) reported breathlessness, (93.4%) reported wheezing and (80.6%) reported chest pain. This is in line with several literatures that identified cough, breathlessness, wheezing and chest pain as the major symptoms of asthma in children (GINA, 2020).

Children spend most of their time, everyday, in the house. Thus, the propensity of the household attributes influencing the incidence of asthma is high, even though the household is where children spend the majority of their time, making it a prime location for asthma attacks. Consequently, the study found that cooking method (90.1%), cooking fuel (79.1%) and poor ventilation (72.9%) were perceived as household attributes that triggered asthma in children. Activities such as frying (χ^2=6.002), baking (χ^2=6.300), and laundry (χ^2=7.137), were significantly associated with regularity of asthma attacks, and these activities were exempted from children with asthma. The study revealed that knowledge on regularity of attack is critical to asthma management, since it impacts on perceived severity of the condition and in turn, enhances health seeking behavior.

Owning a house had implications for the prevention and management of asthma, as this can make people afford modification of the household attributes in favour of asthma or any health condition. With majority (66.7%) of respondent's resident in rented houses, there was little that they could do to modify household attributes for the prevention and management of asthma. This explained why majority (93%) of respondents living in houses owned by them perceived asthma to be a preventable disease. This shows the perception of asthma as a preventable and manageable disease was influenced by ownership of house, probably due to the fact living in rented may be forced to accept certain attributes placed in the home since its rented and not owned by them, it becomes difficult altering flooring method, roofing materials, vegetation/ garden which are significantly associated with the occurrence of asthma.

The scientific perspective acknowledges the role of heredity in the incidence of asthma. Similarly, qualitative data in the study revealed that family history of asthma was significant in the management of asthma in children. Grandparent's experiences such as use of natural home remedies such as (honey, ginger, pawpaw leaves, camphor, mango seeds and turmeric) were used in the management of children with asthma. It was further established that 61.9% of the children living with asthma claimed to have family members with asthma history. The study also revealed that children of atopic parents were of greater risk of asthma than children of non-atopic parents because most of the respondents have experienced the following symptoms persistently before cough, wheeze, breathlessness, chest pain, catarrh, skin rashes, skin dryness, sneezing, running nose, stuffy nose and itching which are associated with atopy conditions.

The study further revealed that first degree relatives and second-degree relatives' asthma history is very important in intergenerational transmission of asthma, majority. The importance of experience in the intergenerational transmission of asthma can not be over emphasized especially use of natural remedies (moringa, pawpaw leaves, honey, turmeric garlic & ginger) use of herbal mixtures, medication and drugs, paying attention to triggers, avoidance of exposure to dust and smoke, use of natural remedies, avoiding extreme weather condition, avoiding crowded places, safe cooking method, use of and inhaler, exemption from house chores and prayers are common experiences passed from generations to generations. Respondents identified household perception about asthma as helpful in providing more information about asthma triggers and determining pathways to seek care in terms of what step take first, where to go and other efforts related to seeking care. Respondents also attributed achieving self-efficacy in asthma to fewer symptoms, lesser exacerbations and hospitalizations which is achieved with the help of God, family members and health practitioners.

Disease perception, in its multifarious dimensions, influences the pathways to the utilisation of care. Respondent's socio-demographic factors such as religion (χ^2=10.264), income (χ^2=29.579), family type (χ^2=15.179), ownership of house (χ^2=8.770), type of house (χ^2=23.883), education (χ^2=52.066), household size (χ^2=18.140), age of children living with asthma (χ^2=6.137), occupation (χ^2=18.598) and household decision making (χ^2=4.196) were significantly related to treatment pathways. These attributes can affect the perceptions of disease, extent and quality of information and social network, as well as coping resources for asthma care. For instance, qualitative data suggested that majority of low-income respondents only visited the hospital when the condition had deteriorated.

This situation that may not be unconnected with the ability to afford care, which according to the HBM is, itself, a cue to action. Most asthmatic patients use more of reliever medication rather than preventer medication, they don't believe it is necessary to use preventer medication in the absence of symptoms. Furthermore, respondent's religion, monthly income, family type and ownership of house were significantly associated with treatment pathways. The decision to utilise either modern or traditional pathways was largely dependent on respondent's religion, income, family type and ownership of house.

5.2 Conclusion

The study concluded based on its findings that asthma is perceived to be caused by environmental factors than hereditary factors and respondent's perception is influenced by their socio demographic characteristics. However, there appears to be a disparity between the perceptions of asthma patients and the medical understanding of asthma treatment. This had implications for the choice of the capacity for adequate treatment and management of asthma in children.

Furthermore, housing was an important determinant of asthma-related health and household attributes were important in the prevention and management of the condition, which was largely dependent on socio economic status, including house ownership. There was misperception on exemption of children living with asthma in physical activities, even when medical prescription affirmed it. Parent's asthmatic experiences were important for identifying triggers, limiting exposure to triggers, and managing the condition. Inappropriate health seeking behavior was observed in the pathway to the utilisation of asthma care, while home remedy (use of inhaler/ drugs at home) was identified as the major first step during attack, as patients only visited the hospital when the condition became very severe. The study, thus, concluded that, to fully understand or enhance the management of asthma in children, it was important to place socio economic status at the center of investigation.

5.3 Recommendations

The following recommendations are based on the results of this study:

- Children's asthma education should be encouraged. This includes identification of triggers, how to use inhaler devices and what to do in the case of an exacerbation.
- Asthmatic youngsters should undergo routine examinations, including peak expiratory flow (PEF) measurement and/or pulmonary function tests (PFT).
- Parental education is critical for effective asthma control and adherence to a treatment plan. Exacerbations can be avoided if parents of children with asthma have a better understanding of the disease, how to recognize symptoms and triggers, and what to do in between exacerbations.
- Schools should be educated on identification of triggers and overall asthma management of children living with asthma.
- Families with children living with asthma are urged to implement better home circumstances and culinary technology.
- Educating children living with asthma and their families about the importance of making lifestyle changes at home will help them manage their condition better.
- Children living with asthma should be exempted from household chores that can worsen their condition.
- Improved housing policy by government
- There should be improved coordination and cooperation between caregivers and health care professionals through a family-centered approach.
- There should be specialized asthma clinic in state and private hospitals.
- Health policies should be designed to provide services that are accessible and affordable for children living with asthma.

5.4 Contributions to Knowledge

Based on the foregoing, this study has made the following contributions to asthma scholarship and management, with focus and children:

- Expanded the frontiers of knowledge on household attributes influencing the prevention and management of asthma in children.
- Expanded the frontier of application of health belief model in discussing health behavior and the pathways to seeking care for children and parents of children living with asthma.
- Provided a detailed documentation of household attributes that triggers asthma in children.
- Provided better understanding on the perceived factors responsible for asthma in children and the role of intergenerational factors in managing the chronic condition.

5.5 Suggestions for Further Studies

Further studies should concentrate on identifying specific environmental and lifestyle factors that increase asthma risk, as well as a follow-up study on asthma remission and control in adults.

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APPENDIXES

Appendix 1: Informed Consent Form

IRB Research approval number……………………

This approval will elapse on…………………………

Title of the Research: The Prevention and Management of Asthma in Children Attending Selected Hospitals in Ibadan, Nigeria.

Name and affiliation of the researcher: This study is being conducted by Ejiade Omolara Oluwakemi, Matric Number: 145744 and of the Department of sociology, Faculty of the Social Sciences, University of Ibadan, Nigeria.

Sponsor of research: This research is self-sponsored.

Purpose of research: The purpose of this study is to examine the household attributes influencing the prevention and management of asthma in children in Ibadan, Nigeria

Procedure of the research: A total of 273 children age 6-14 of both sexes and their care givers will participate in the study. The respondents will be given the questionnaire which will be both quantitative (self-administered questionnaire) and qualitative (in-depth interview) after giving them adequate information about the study and receiving informed consent from them.

Expected duration of research and of participant(s)' involvement: In total, you are expected to answer the questions at the time of administration of the instrument. The administration of the questionnaire will last for about 30-40 minutes. While the in-depth interview session may take up to 50 minutes

Risks: There are no risks associated with this study.

Costs to the participants: Your participation in this research is completely voluntary all we request for is your time of answering the questions.

Benefit: The study will be useful in identifying triggers which can be useful in self managing the chronic disease among children and also identify the behaviors useful for designing appropriate public health campaign.

Confidentiality: All information collected will be treated with extreme confidentiality. It will not be linked to the respondents in any way.

Voluntariness: Participation in this research study is entirely voluntary and participants can withdraw any time.

Alternatives to participant: If any respondent choose not to participate, this will not affect him in any way.

Due inducement(s): No form of compensation is attached to your participation in this study.

Consequences of participants' decision to withdraw from research and orderly termination of participation: The participant can choose to withdraw from the research at anytime. Please note that some of the information that has been obtained about you before you chose to withdraw may be modified or used in reports and publications. These can not be removed anymore. However, the researcher promises to make effort in good faith to comply with your wishes as much as possible.

What happens to the research participants when research is over: The researcher will inform you of the outcome of the research through report submitted to the Management of the University as well as dissemination of key findings in relevant academic publication media including in news prints.

Statement of person obtaining informed consent:

I have fully explained this research to ____________________ and have given sufficient information, including about risks and benefits, to make an informed decision.
DATE:______________ SIGNATURE:___________
NAME:____________________________

Statement of the person giving consent:

I have read the description of the research. I have also talked it over with the researcher to my satisfaction. I understand that my participation is voluntary. I know enough about the purpose, methods, risks and benefits of the research study to judge that I want to take part in it. I understand that I may freely stop being part of this study at any time. I have received a copy of this consent form and additional information sheet to keep for myself.

DATE:_________________
SIGNATURE:____
NAME:____
_

Detail contact information including contact address, telephone, fax, e-mail and any other contact information of researcher, institutional HREC and head of the institution:

This research has been approved by the Ethics Committee of the University of Ibadan and the Chairman of this committee can be contacted at Biode Building, Room 201, 2nd Floor, Institute for Advanced Medical Research and Training, College of Medicine, University of Ibadan. E-mail : uiuchirc@yahoo.com. In addition, if you have any question about participation in this research, you can contact the principal investigator : Ejiade omolara oluwakemi, Department of Sociology, Faculty of the Social Sciences,University of Ibadan, Phone number : 08052433787 E-mail: omolaraejiade@yahoo.com. Or contact the Project Supervisor ; Dr K.K. Salami, Department of Sociology, Faculty of the Social Sciences, University of Ibadan, Phone number : 08034735714

Appendix 2: Questionnaire

DEPARTMENT OF SOCIOLOGY

FACULTY OF THE SOCIAL SCIENCES

UNIVERSITY OF IBADAN, IBADAN.

Dear Respondent,

I am a PhD student of Sociology Department, University of Ibadan researching on Household attributes in the the prevention and management of asthma in children in Ibadan. This study will be conducted as part of the requirements for the award of the PhD degree of the University of Ibadan, Ibadan. This questionnaire is meant to collect information on household attributes influencing the prevention and management of asthma in children in Ibadan. I seek your consent to participate in this study as a respondent. Your responses will be used for academic purposes only and treated with utmost confidentiality. I will be glad if correct and honest information is given to enhance the quality and credibility of this thesis. Thank you for anticipated co-operation.

Yours Sincerely,

Omolara Oluwakemi Ejiade.

Instruction: Tick/circle corresponding codes to your choice of answer provide answers to the open-ended questions and where necessary, multiple responses are allowed. Please answer the following questions by ticking the relevant options or write down your answer in the space provided.

Section A: Socio-Demographic Characteristics of Respondents

S/N	Question	Options	Codes
1.	Gender	Male Female	1 2
2.	Age as at last birthday	Please specify	
3.	Marital status	Single Married Divorced Separated Widow/widower	1 2 3 4 5
4	Ethnicity	Yoruba Igbo Hausa/Fulani Others…………...........	1 2 3 4
5	Religion	Christianity Islam Traditionalist Others …………...........(specify)	1 2 3 4
6.	Education	None Primary school leaving cert. SSCE NCE OND HND BSc. MSc. PhD	1 2 3 4 5 6 7 8 9

		Arabic Education	10
7.	Occupation	Please specify	
8.	Average monthly income	Below 10,000 10,000-50,000 50,000-100,000 100,000-150,000 Above 150,000	1 2 3 4 5
9.	Family type	Nuclear Extended	1 2
10	No of members of the household		
11.	No of adults:	Male .... Female	
12.	No of children:	Male .... Female	
13.	How many of your children have exhibited asthma symptoms?	Please specify	
14.	Ownership of a house?	Self- owned Inherited Rented Lease Others.........................(specify)	1 2 3 4 5
15.	Sex of asthmatic child	Male Female	
16.	Age of asthmatic child		

Section B: Perceived factors responsible for asthma

Please answer the following questions by ticking the relevant Options or write down your answer in the space provided. Also, multiple responses are allowed where necessary (**MRA**).

S/N	**Question**	**Options**	**Codes**

17.	State your own perception about Asthma? (MRA)	Treatable disease Untreatable disease An inherited disease A spiritual attack A punishment for sin Environmentally induced Others.…………..........	1 2 3 4 5 6 7
18.	What are the possible triggers of asthma in children? (MRA)	Dust Food Molds Smoke Exercise Pets danders Infections pollens Air pollution Poor hygiene Poor nutrition Weather conditions physical activities Stress Negative emotions perfumes cleaning products Air fresheners Insecticides Hairspray Fresh paint Medications Spiritual attack Others..................(specify)	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
19.	What symptoms do you usually notice before your child's attack? (MRA)	Cough Wheeze Breathlessness Chest pain Catarrh Fever Others.......................(specify)	1 2 3 4 5 6 7
20.	Duration of symptoms before attack?		
21.	What time of the day do the symptoms occur?		

22.	Do you think asthma can be prevented	Yes No	1 2
23.	Reason(s) for your answer		
24.	Do you think asthma is curable?	Yes No	1 2
25.	Reason(s) for your answer		
26.	Do you think asthma can be managed	Yes No	1 2
27.	Reason(s) for your answer		

Section C: Perceived household Attributes and asthma prevention

Please answer the following questions by ticking the relevant Options or write down your answer in the space provided.

S/N	Question	Options	Code	Skip option
28.	Do you think children living with asthma are being treated unfairly?			
29	Reason(s) for your answer			
30.	How many members of your household slept in a room yesterday?			
31.	Do any of your household member smoke cigarette?	Yes No	1 2	
32.	Do you rear pets at home?	Yes No	1 2	If No, go to question 33

33.	If Yes, What are the types of pets? (MRA)	Cats Dogs Rabbits Others specify	1 2 3 4	
34.	Do you have a garden/ vegetation in your house?	Yes No	1 2	
35	What type of furniture do you have in your house?	Upholstered furniture Wooden Plastic Leather Others specify	1 2 3 4 5	
36.	What type of roofing materials do you have in your house?	Asbestos PVC Wood shakes Ceramic tiles Asphalt Slate Others specify	1 2 3 4 5 6 7	
37.	What type of flooring material do you have in the house?	Rug Polished Wood Vinyl/ Asphalt Strips Ceramic Tiles Cement Carpet Wood Plank Bamboo Earth Sand Dung Others specify	1 2 3 4 5 6 7 8 9 10 11 12	

The following seeks for the type of power supply, sources of lightening, type of cooking fuel, and food preparation methods. Kindly indicate what is being currently used and regularity of use of each.

SN	Power/energy usage	Current use	Regularity of use			
			Once a week	Twice a week	Thrice a week	More than thrice a week
38	**Power supply**					
A	Public electricity					
B	Generator					

C	Inverter					
D	Solar					
E	Others					
39	**Sources of lightning**					
A	Candle					
B	Electric bulb					
C	Gas lamps					
D	Open fire					
E	Paraffin					
F	Rechargeable lamps					
G	Lantern					
H	Others					
40	**Type of cooking fuel**					
A	Wood					
B	Crop residue					
C	Straw					
D	Lignite					
E	Charcoal					
F	LPG					
G	Biogas					
H	Kerosene					
I	Electricity					
J	Others					
41	**Food preparation method**					
A	Bleaching of oil					
B	Frying					
C	Baking					
D	Roasting					
E	Grilling					
F	Drying					
G	Cooking					
H	Others					

Provide options to the following as necessary

SN	Questions	Options	Codes	Skip option
42.	What alternative source of power supply is used in the house?			

43.	(If alternative) How many hours daily do you use this source of supply?			
44.	(If generating plant is mentioned) where is it located?	In front of the room Inside the room At the back of the house In a generator house	1 2 3 4	
45.	Will you agree that the generator is too close to the house/living area	Yes No		
46.	Reason(s) for your answer			
47.	Where is your kitchen located?	Inside the house Outside the house	1 2	
48.	What age was asthma discovered in your child?	Please specify		
49.	What signs did you first notice about the asthmatic child?	Please specify		
50.	What is the gender of your household head?	Male Female		
51.	Who makes decision on health matters in your household?			
52.	How regularly does your child experience asthma?	Weekly Once in a month Twice in three months Once in six months Others	1 2 3 4 5	

53.	Identify household attributes that you can relate these asthma attacks with?	Household Size Sex Distribution Vegetation Type of roofing material Type of Flooring Material Poor ventilation Cooking Fuel Cooking method Pets Type Of Sanitation Facilities Smoke Others	1 2 3 4 5 6 7 8 9 10 11 12	
54.	Which one of these attributes triggers asthma among children mostly?	Household Size Sex Distribution Vegetation Type of roofing material Type of Flooring Material Poor ventilation Cooking Fuel Cooking method Pets Type Of Sanitation Facilities Smoke Others	1 2 3 4 5 6 7 8 9 10 11 12 13	
55.	What period of the year does your child usually come down with asthma?	Rainy season Dry season Harmattan	1 2 3	
56.	What month of the year does your child come down with asthma the most?	January February March April May June July August September	1 2 3 4 5 6 7 8 9	

		October November December	10 11 12	
57.	If parents had asthma before, please state which of the triggers exacerbate attack most?	Please specify		
58.	What preventive measures is been put in place to reduce reoccurrence of attack in children?			

Section D: Household Activities geared towards asthma prevention.
Please answer the following questions by ticking the relevant Options or write down your answer in the space provided.

S/N	Question	Options	Codes	Skip option
59.	Does your asthmatic child participate in physical exercise in school or at home?	Yes No	1 2	
60.	State reason(s) for your answer			
61	If yes, What kind of exercises are been done by your asthmatic child?	Running Cycling Jogging Climbing stairs Swimming skipping Others.............................(specify)	1 2 3 4 5 6 7	If no to 59 go to 63
62	What informed your choice of physical exercises for your asthmatic child?	His/her health condition Doctors advise Others specify	1 2 3	

63.	What are the challenges faced by children living with asthma	Missed school days Inability to participate in physical activities Inability to participate in chores Frequent hospitalization Others...............................(specify)	1 2 3 4 5	

The following are some of the activities and chores in the home, identify those ones that you do not allow your child to perform or which your child has ever refused to perform and kindly state reasons for exemption. (Feel free to tick as many as possible)

S/N			
64.	Food preparation/ house chores	Yes/No	Reasons for exemption
A	Bleaching of oil		
B	Frying		
C	Baking		
D	Roasting		
E	Grilling		
F	Drying		
G	Sweeping		
H	Washing of plates		
I	Dusting		

J	Feeding of pets		
K	Doing laundry		
L	Preparing meals		
M	Setting of fire		
N	Vacuuming		
O	Gathering of firewood		
P	Cleaning bathrooms		
Q	Watering plants		
R	Weeding the garden		
S	Cutting of grass		
T	Others		

Section E: Environmental factors

Please answer the following questions by ticking the relevant option(s) or write down your answer in the space provided.

S/N	Question	Options	Codes	Skip option
65	Are there any production activities or industries in your	Yes No	**1** **2**	If no go to 68

	neighbourhood			
66	If yes, What kinds of activities are being done there?			
67	What are the signs are noticed when production starts?			
68	Do you have lock up shops within your compound?	Yes No	1 2	If no go to 70
69	What kinds of activities are being done there?	Preparation and selling of food Baking and frying Beer parlour Grinding/milling Others	1 2 3 4 5	
70	How do you dispose refuse?	Burning Burying Thrown into the bushes Public incinerator State trucks Others………………. (specify)	1 2 3 4 5 6	
71	What kinds of refuse are generated often?			
72	Is a state dumping of refuse site located in your neighbourhood?	Yes No	1 2	If no go to Q75
73	How far is your house from the dumping site?			
74	How is the dumping site managed?			
75	How many households are in your compound?			
76	Do your neighbours own generators?	Yes No	1 2	If no go to Q78
77	Where are the generators located?			

Which of the following businesses/ activities are present in your neighbourhood? Kindly indicate as many as are present and how far/ close they are to your house.

78.	Business activities	yes/ no	Distance to your house

A	Agro allied business		
B	Quarry		
C	Poultry		
D	Milling & grinding		
E	Welding		
F	Mechanic workshop		
G	Bakery		
H	Markets		
I	Saw milling		
J	Manufacturing factories		
K	Soldering		
L	Others		

Section F: Intergenerational factors

Please answer the following questions by ticking the relevant Option(s) or write down your answer in the space provided.

79	Which of your family members have asthma history? (tick as many as possible)			
A	Self	☐		
B	Spouse	☐		
C	Maternal grandmother	☐		
D	Paternal grandmother	☐		
E	Maternal grandfather	☐		
F	Paternal grandfather	☐		
G	Uncle	☐		
H	Aunty	☐		
I	Cousin	☐		
J	Niece	☐		
K	Nephew	☐		
S/N	**Question**	**Options**	**Codes**	**Skip option**
80	Kindly indentify if you have had the following symptoms persistently before? (MRA)	Coughing Wheezing Breathlessness Chest pain Catarrh Skin Rashes Skin Dryness Sneezing Running nose Stuffy nose Itching Fever	1 2 3 4 5 6 7 8 9 10 11 12	

81.	I am currently living with asthma?	Yes No	1 2	
82	My spouse is currently living with asthma	Yes No		
83	Which of your experience in asthma prevention/ management treatment is being used in managing your child's asthmatic condition?	Please specify		
84.	What do you think is responsible for asthma in children	Parents asthmatic status Environmental factors Others ……………….. (specify)	1 2 3	
85.	A child with an asthmatic parent will definitely have asthma	Yes No	1 2	
86.	Is any of the child's grandparents currently living with asthma?	Yes No	1 2	If No, go to question 89
87.	If yes, which of the grandparents?	Paternal grandmother Paternal grandfather Maternal grandmother Maternal grandfather	1 2 3 4	
88.	Can asthma be avoided in children irrespective of their parents' asthmatic status?	Yes No	1 2	If No go to Question 91
89	(If yes) how?			
90.	Do you think household perception about asthma influence its treatment?	Yes No	1 2	if No go to Question 93
91.	(If yes) how?	Please specify		

92.	Do you feel confident in your ability to manage asthma effectively	Yes No	1 2	
93.	Please state your reason(s) for your answers	Please specify		

Section G: PATHWAYS TO SEEKING CARE

Please answer the following questions by ticking the relevant Option(s) or write down your answer in the space provided.

S/N	Question	Options	Code	Skip Option
94	When was the last time your child had an attack?			
95.	What was the duration of the occurrence?			
96.	What were the symptoms that the child had as at the time to seek care? (MRA)	Cough Wheeze Breathlessness Chest pain Catarrh Fever Others……………………	1 2 3 4 5 6 7	
97.	What were those things that prompted you to take actions?	Please specify		

98. As at the last time the child had an attack, kindly indicate the steps that was taken to seek care and why the steps were taken.

1st Step TAKEN						2nd Step TAKEN						3rd Step TAKEN					
What influenced steps/decision taken	Who advised on steps taken	Who se advice was final	Amount spent on treatment	Who paid for treatment	How effective was the treatment	What influenced steps/decision taken	Who advised on steps taken	Who se advice was final	Amount spent on treatment	Who paid for treatment	How effective was the treatment	What influenced steps/decision taken	Who advised on steps taken	Who se advice was final	Amount spent on treatment	Who paid for treatment	How effective was the treatment

99. Which of the steps was preferred? ....

100. Why was the step preferred? ....

STEPS TAKEN:	WHAT INFLUENCED STEPS:	WHO ADVISED/PAID:	EFFECTIVENESS OF THE TREATMENT
1 – USE DRUGS/INHALER AT HOME 2 – VISIT HOSPITAL 3 – VISIT HEALTH CENTRE 4 – USE HERBS 5 – VISIT PATENT MEDICINE DRUG SHOP 6 – VISIT TRADITIONAL HEALER 7 – SPIRITUAL/RELIGIOUS CONSULTATION 8 – INFORMAL CONSULTTAION WITH HEALTH PERSONNEL 9 – DO NOTHING 10 – OTHERS	1 – SUCCESS IN OUTCOME OF PREVIOUS TREATMENT 2 – PROXIMITY TO CARE PROVIDERS 3 – BELIEF/PERCEPTION OF DISEASE 4 – FINANCE 5 – KNOWLEDGE OF DISEASE 6- FAILURE IN OUTCOME OF PREVIOUS TREATMENT 7 – OTHERS	1 –SELF 2 – SPOUSE 3 – MOTHER-IN-LAW 4 – FATHER-IN-LAW 5 – RELATIVES 6 – NEIGHBOURS 7 – SPIRITUAL LEADERS 8 – OTHERS	1 – EFFECTIVE 2– NOT EFFECTIVE

Appendix 3: Assent form for children living with asthma

I am doing a study on asthma. I want to learn more about some of the household activities and physical activities that you do not do. If you agree to be in my study, I am going to ask you some questions about asthma and how you manage it.

You can ask questions about this study at any time, if you decide at any time not to finish, you can ask me to stop. There are no right or wrong answers because this is not a test.

If you sign this paper, it means that you have read and want to be part of the study. If you do not want to be part of the study, don't sign this paper. Being in the study is up to you and no one will be upset if you don't sign this paper or if you change your mind later.

Statement of person obtaining informed consent:

I have fully explained this research to ____________________ and have given sufficient information, including about risks and benefits, to make an informed decision.

DATE:______________ SIGNATURE:___________

NAME____________________________

Statement of the person giving consent:

DATE:_________________

SIGNATURE:____

NAME:____

_

Detail contact information including contact address, telephone, fax, e-mail and any other contact information of researcher, institutional HREC and head of the institution :

This research has been approved by the Ethics Committee of the University of Ibadan and the Chairman of this committee can be contacted at Biode Building, Room 201, 2nd Floor, Institute for Advanced Medical Research and Training, College of Medicine, University of Ibadan. E-mail : uiuchirc@yahoo.com. In addition, if you have any question about participation in this research, you can contact the principal investigator : Ejiade omolara oluwakemi, Department of Sociology, Faculty of the Social Sciences, University of Ibadan, Phone number :08052433787 E-mail: omolaraejiade@yahoo.com. Or contact the Project Supervisor ; Dr K.K. Salami, Department of Sociology, Faculty of the Social Sciences, University of Ibadan, Phone number : 08034735714

Appendix 4: In depth Interview (IDI) Guide for children living with asthma

1. Socio-demographic information of the discussants:

- Age
- Sex

2. Perceived factors responsible for asthma in children

a. How do you perceive asthma?
b. What are the main causes of asthma/ symptoms?
c. why do you think children are the most vulnerable to asthma attack?
d. In your own opinion, do you think asthma is hereditary?
e. In your own opinion, do you think asthma is curable?
f. Are you of the opinion that asthma can be prevented/ managed in the home? How is it prevented and managed in the home?

3. Perceived household attributes, activities and asthma prevention and management

a. Identify household attributes, you think causes asthma in children?
b. Why do you think these attributes affect asthma in children?
c. Describe the impact of household attributes(size, sex and age composition, vegetation, income, source of drinking water, housing characteristics, type of sanitation facilities, rearing of pests, type of flooring & roofing material and number of rooms in the dwelling, cooking fuel and methods of cooking) on asthma prevention and management.
d. Describe the impact of various household activities (physical exercises, household chores on asthma prevention and management.
e. In your own opinion, why should children with asthma should be exempted from household activities.
f. What kind of household activity is been done/ avoided by children living with asthma?
g. Are you exempted from any form of activity in the house? Physical exercise, cooking, cultivating vegetation, rearing of pets.

5. Biological and social factors influencing the prevention and management of asthma.

a. What are the beliefs associated with asthma in children? Hereditary factors/ social factors? How do you think it can influence the prevention and management of asthma?
b. What influence do genetic factors have on asthma prevention?
c. What influence do genetic factors have on asthma management?
d. What social precautions are to be taken to avoid asthma attack?
e. What are the effects of socio-cultural beliefs on asthma prevention and management in children?
f. Is there a possibility that precautions taken for children against asthma are related to household belief?

6. Pathways to seeking care for children living with asthma

a. When asthma attacks occur, what is the first action that you take? First aid that is been done. Use of inhalers, has there been any health education on use of inhaler?

b. What type of treatment options do you use during attacks and why?

Appendix 5: Key Informant Interview (KII) Guide for Medical Practitioners

Socio-demographic information
a. Age
b. Sex
c. Religion
d. Cadre/level in the organisation
e. Area of specialisation
e. Number of years in service

Perceived factors responsible for asthma in children
a. How do you describe asthma?
b. What local names do people call asthma in this community
d. What are the main causes of asthma?
e. What are the most common symptoms for asthma and how do they present?
f. Who are the most vulnerable/susceptible to asthma?
Probe:

- Adults, Elderly
- Manifestation of each category
- Experience of each category

g. Why do you think children are the most vulnerable to asthma attack?
h. What makes children experiences different from other categories of the elderly and adults?
i. How do people get asthma?
Probe:

- Hereditary factors
- Environmental factors

j. How curable is asthma?
k. How best is asthma prevented in the home?
l. How best is asthma managed in the home?

3. Perceived household attributes, activities in asthma prevention and management
a. Identify household attributes you think can cause asthma in children?
b. Why do you think these attributes affect asthma in children?
c. Describe the impact of household attributes (size, sex and age composition, vegetation, income, source of drinking water, housing characteristics, type of sanitation facilities,

rearing of pests, type of flooring & roofing material and number of rooms in the dwelling, cooking fuel and methods of cooking) on asthma prevention and management.
d. Describe the impact of various household activities (exercises, household chores on asthma prevention and management.
e. How best should children living with asthma be cared for to avoid attack?
f. What kind of household activity is been done/ avoided by children living with asthma?

5. Intergenerational factors influencing the prevention and management of asthma.
a. What are the beliefs associated with asthma in children?
Probe: Hereditary/social factors.
b. What influence do genetic factors have on asthma prevention?
c. What influence do genetic factors have on asthma management?
d. What social precautions are to be taken to avoid asthma attack?

6. Pathways to seeking care for children living with asthma
a. Where do you think patients go first when they have attacks?
b. When asthma attacks occur, what is the first action that is done? Use of inhalers, health education on how to use it.
c. What particular procedure for asthma treatment in children?
d. Do you have it in this facility?
e. What condition could warrant alteration of procedure for treatment?
f. What type of treatment options is been given to children living with asthma in this facility?
g. At what stage do caregivers bring children living with asthma for treatment?
Probe: Severe, moderate or mild
h. Follow up/ appointments
i. What other sources of care are there for children living with asthma?
j. Other health care providers: (ask about others)

Appendix 6: Household Observation Checklist

Indicators	Type observed
Roofing materials	
Flooring materials	
Cooking materials/ methods	
flight of stairs	
Vegetation	
Presence of household pets (in or outside the house)	
Kitchen location	
Ventilation	
No of windows in living room	
No of windows in rooms	
Source of power supply	
Sanitation facility	
Method of dumping refuse* presence of incinerator, drums, etc	
Number of generators	
Location of generator	
Number of households in the compound	
Type of house (face me, flat	

Appendix 7: ETHICAL APPROVAL 1

INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IAMRAT)
College of Medicine, University of Ibadan, Ibadan, Nigeria.

Director: **Prof. Catherine O. Falade,** *MBBS (Ib), M.Sc., FMCP, FWACP*
Tel: 0803 326 4593, 0802 360 9151
e-mail: cfalade@comui.edu.ng lillyfunke@yahoo.com

UI/UCH EC Registration Number: **NHREC/05/01/2008a**

NOTICE OF FULL APPROVAL AFTER FULL COMMITTEE REVIEW

Re: Household Attributes influencing the prevention and Management of Asthma in Children in Ibadan, Nigeria.

UI/UCH Ethics Committee assigned number: UI/EC/18/0086
Name of Principal Investigator: **Omolara O. Ejiade**
Address of Principal Investigator: Department of Sociology,
Faculty of the Social Sciences
University of Ibadan, Ibadan

Date of receipt of valid application: 14/02/2018
Date of meeting when final determination on ethical approval was made: **N/A**

This is to inform you that the research described in the submitted protocol, the consent forms, and other participant information materials have been reviewed and *given full approval by the UI/UCH Ethics Committee.*

This approval dates from **03/08/2018 to 02/08/2019.** If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the* UI/UCH EC *assigned number and duration of* UI/UCH EC *approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC at least four weeks before the expiration of this approval in order to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the UI/UCH EC. *No changes are permitted in the research without prior approval by the* UI/UCH EC *except in circumstances outlined in the Code. The* UI/UCH EC *reserves the right to conduct compliance visit to your research site without previous notification.*

UI/UCH EC
03 AUG 2018
APPROVED
COLLEGE OF MEDICINE, U.I.

Professor Catherine O. Falade
Director, IAMRAT
Chairperson, UI/UCH Ethics Committee
E-mail: uiuchec@gmail.com

Research Units • Genetics & Bioethics • Malaria • Environmental Sciences • Epidemiology Research & Service • Behavioural & Social Sciences • Pharmaceutical Sciences • Cancer Research & Services • HIV/AIDS

Appendix 8: ETHICAL APPROVAL 2

TELEGRAMS................ TELEPHONE................

OYO STATE: THE PACESETTER

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. ....
All communications should be addressed to the Honorable Commissioner quoting
Our Ref. No. AD 13/479/ 764

20th April, 2018

The Principal Investigator,
Department of Sociology,
Faculty of the Social Sciences,
University of Ibadan,
Ibadan.

Attention: Ejiade Omolara

ETHICS APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: ''Household Attributes Influencing the Prevention and Management of Asthma in Children in Ibadan, Nigeria.'' has been reviewed by the Oyo State Ethics Review Committee.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

4. Wishing you all the best.

Dr. Abbas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethics Review Committee

Appendix 9: ETHICAL APPROVAL 3

OLA CATHOLIC HOSPITAL
OLUYORO OKE-OFA

P. O. Box 7044, Secretariat,
Ibadan, Nigeria
E-mail: oluyorocatholic@yahoo.com

Tel: 0701 807 4569

*Your Ref. No.*________ *Our Ref. No.* OCH/EC/18/03 *Date:* 28th March, 2018

MISS EJIADE OMOLARA O.
Dept of Sociology,
Faculty of Social Sciences,
University of Ibadan,
Ibadan.
Oyo State

Dear Omolara,

RE: ETHICAL APPROVAL ON PROJECT TOPIC: "INTERGENERATIONAL FACTORS & HOUSEHOLD ATTRIBUTES INFLUENCING THE PREVENTION & MANAGEMENT OF ASTHMA IN CHILDREN IN IBADAN, OYO STATE"

This is to inform you that after due consideration by the Ethical Committee of this Institution, your above named study has been given ethical clearance subject to the following conditions:

(1.) That the work will be completed within three months from the date of this letter.

(2.) That you sought written permission for extension of time if the work is not completed within the next six months.

(3.) That a final copy of the work will be submitted to the Committee for the hospital's library.

We wish you success.

Yours sincerely,

Dr. Okedare Amos Olufemi MB; BS (ABU) M.COMM.H (OAU) FWACP (FM)
Chairman, Ethics Committee

28/3/18
Mr. Ojo Jude.O. BMLS
Secretary

CATHOLIC HOSPITAL
P.O BOX 7044 SEC.
OLUYORO OKE-OFA
IBADAN