KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH PROMOTION AND EDUCATION

AN EXPLORATION INTO THE KNOWLEDGE MOTHERS HAVE OF FOOD ALLERGY IN CHILDREN UNDER FIVE IN TWO GHANAIAN HOSPITALS.

BY

LINDA AMANKWAA ABABIO

(BSC ADMINISTRATION)

NOVEMBER, 2016

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A THESIS SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, COLLEGE OF HEALTH SCIENCES, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI IN PARTIAL FULFILMENT OF REQUIREMENTS FOR MASTER OF PUBLIC HEALTH (MPH) DEGREE HEALTH EDUCATION AND PROMOTION

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DECLARATION

With the exception of references from literature which has been duly acknowledged, I hereby do declare that this work has never been submitted, either in whole or part to any institution for the award of any kind. The work presented here was done by me, a student of the KNUST SCHOOL OF PUBLIC HEALTH.

LINDA AMANKWAA ABABIO Signature…… …….. Date……

(PG 2396014)

Certified by;

DR. SAM NEWTON Signature …….. Date……

(Supervisor)

Name ……. Signature …… …. .. Date……

(Head of Department)

DEDICATION

This study is first dedicated to the Almighty God, my family and all others for their support in various forms.

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ABSTRACT

Background

Food allergy is an abnormal response to a food triggered by the body's immune system. It is a challenge and an important public health concern that affects children and adults and which may be increasing in prevalence. Approximately 6% of infants and young children have food allergies

and it is important that mothers know of the condition. The objective of this study was to assess the awareness of food allergies in mothers of children under five (5) in the Maternal and Child Health Care Hospital (MCHH) and the Asokwa Children's Hospital to ascertain whether they can identify symptoms of the condition and find out their ways of managing the condition.

Methods

A cross sectional survey was undertaken in the two hospitals in the months of January and February 2015. Purposive sampling was used to select 500 mothers. Data was collected using questionnaires.

Results

The study found out that, 63% of mothers had no knowledge of food allergies and mother's awareness of food allergy was closely linked to their level of education and this was found to be highly significant (p=0.002). The number of tertiary educated women who said they were aware of food allergy was (54%) as compared to the other levels of education ; basic education (31%) and secondary/post-secondary education (42%). The study found out that 4.4 percent of the 500 children had been diagnosed with food allergy and other children who reported symptoms of two or more gastrointestinal reactions (10.6%), respiratory reactions (29.2%) and cutaneous/skin reactions symptoms (17.2%) had not been diagnosed with food allergy. The foods causing most allergies were hen's egg (1.6%) banana (0.6%) followed by dairy products, groundnuts, and palmnut (0.4%) with the least being seeds (0.2%).

CONCLUSION

Awareness amongst mothers was rather low (37%) and the symptoms presenting in children were high. Mothers also had had low health education on food allergy which affected their methods of

management which included seeking healthcare without results, or managing symptoms at home through the use of orthodox medicine, herbal medicine, and removal of offending allergens.

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The best food for a newborn is its mother's milk. When a baby is started and continued on breast milk, the infant is off to a good start. There are some babies however who in the first week or after the first six months of life exhibit symptoms of food allergy when introduced to complementary foods (Warner, 1979; Greer, 2008). Food allergy as defined by the US National Library of Medicine indicates "food allergy as an abnormal response to a food triggered by the body's immune system" (http://www.nlm.nih.gov, 2004).

Historically, food allergies have probably affected human beings since the dawn of time. Eras ago, the Roman philosopher, Lucretius, said: "The food of one may be poison to another". The first well documented case histories of food-allergic patients made an appearance in the early part of the twentieth century, but food allergies were generally ignored by the medical community and regulatory authorities until even more recently (Taylor, 1996). Food allergy is a challenge because globally, it's is an important public health concern that affects children and adults and maybe increasing in prevalence. According to studies, there are no remedies presently available to prevent or treat food allergy and the only way of prevention and treatment available is the avoidance or elimination of offending allergens or management of symptoms as they appear (Boyce *et al*, 2010).

"In the United States, about 6% of infants and young children and 3.7% of adults have food allergy. In young children, the most common underlying foods are cow's milk, egg, peanut, wheat, soy, tree nuts, fish, and shellfish. In adults, the commonest foods which cause

allergies are shellfish, peanut, tree nuts and fish. Early childhood allergy to milk, egg, soy, and wheat are usually resolved by school age (about 80%), whereas peanut, tree nuts and seafood allergies are generally considered permanent. In Europe, early childhood allergy to cow's milk has an occurrence of about 2%. There is however a relatively high prevalence (0.5%) of peanut allergy in British children (Mansueto *et al*, 2006).

Food allergy has been viewed as being uncommon in Africa. However, the pervasiveness of other allergic manifestations such as asthma and atopic dermatitis continues to intensify in African countries with a higher GDP. Apart from the foods that frequently cause allergy in westernized countries, other locally significant or unusual food allergens may include pineapple (Ghana), okra (Nigeria), and mopane worm (Botswana) (Kung SJ, June 2014). Studies show that information on food allergy prevalence rates in Africa is limited. About 10% of patients of all ages referred to the only specialist allergy clinic in Harare, Zimbabwe, in September 1997 to September 2002, were reportedly diagnosed with food allergies. Westritschnig *et al* conducted a study of 50 allergic patients in Zimbabwe for the presence of IgE antibodies to 20 food allergen extracts: apple (24%), tomato (24%),soy (22%), crab (22%) and peanut (20%) were the most frequently detected food allergens. Using skin prick tests, Levin *et al* (2008) reportedly as cited by Boye found out that a 5% prevalence rate of food allergy in a study of urban high school black children of Xhosa ethnicity in South Africa. Foods responsible for manifestations of reactions were egg white (3.3%), peanut (1.9%) and milk (Boye, 2012). Wheat, soy and fish have been reported as common allergens in other studies.

In one study in South Africa by Gray (2012) quoted by Boye (2012), mothers who ingested more peanut in pregnancy had a better chance of bearing a child who might be peanut

allergic, with regards to seafood, an earlier study found prawns (46.7%), crayfish (43.8%), abalone (35.2%), black mussels (33.3%), oyster (23.8%), snails (16.2%), shrimp(13.3%), crab (12.4%) and squid (11.4%) to be some of the commonest species causing food reactions in South Africa. Bony fish species most commonly causing reactions were hake (24.8%) and yellow tail (Boye,2012).

In Ghana, a study of food allergy by Boye (2012) in 1,407 school children found 11% of children reporting adverse reactions to foods, and 5% of 1,431 children showing a positive SPT reaction regularly directed against peanut and pineapple. In a similar study in school children in the urban area of the southern belt of the country, results showed 23.6% positive allergic reaction to groundnuts 60 minutes after consumption, with reactions including vomiting, itching and tingling mouth, breathlessness, runny nose and rash (Amoah, 2012).

From the above, it can be realized that Africa has a rising problem with food allergy with regards to regional foods as well as western based foods because there is an increase in the introduction of westernized diets to children, and even though the resulting diseases such as asthma, anaphylaxis, eczema and other respiratory conditions are well attended to, the immediate cause is not given much attention.

The effects of being unknowledgeable about the condition results in the unnecessary suffering of children since relatives do not know about the removal of offending allergens and the continuation of allergic conditions in the family as explained in a study by Boyce et al (2012) which reported that the highest risk factor for allergic diseases is a family member with the condition.

According to Kwon et al (2013), symptoms of food allergy include a range of reactions such as skin rashes, to anaphylactic shock the most severe allergic response and a leading cause of emergency room visits and 100-200 deaths yearly in the USA. Food allergy has no cure therefore the only solution is the identification and strict avoidance of offending allergens. The condition can be life threatening as well as impact patients psychologically and socially because they have to live with a life threatening condition that has no cure.

Children with food allergies are according to Valovirta (2009) as cited by Kwon et al (2013) reported to be bullied, mocked or harassed by their peers because of the evident symptoms and also as a result of a misunderstanding of their symptoms, Moreover, food allergies impose some sensitive reactions such as fear, guilt, and anxiety on parents of children with food allergies. Families also face challenges related to their children attending schools, eating at restaurants thereby affecting their quality of life (Kwon et al,2013).

The children above have some knowledge of their condition and even then still suffer stigmatization. This reveals that a child or parent without knowledge of what is happening to them will suffer greater stigmatization due to lack of information. This study intends to investigate, what mothers both literate and illiterate, know about the disease and how the condition is being managed in children.

Africa, specifically Ghana, is no exception in light of lack of knowledge of food allergy as can be seen from Pasquale Mansueto's, research, a research conducted in Ghana which indicated that, in Ghanaian school children (5– 16 years), there were high rates of reported food reactions (11%), and from this it can be inferred that there are more unreported cases than reported ones (Mansueto, 2006).

It has been traditionally alleged that Food allergy is uncommon in Africa. However, the prevalence of other allergic manifestations such as asthma and atopic dermatitis continue to increase in African countries with high GDP. Apart from the foods that frequently cause allergy in westernized countries, other regionally significant or novel food allergens may include pineapple (Ghana), okra (Nigeria), and mopane worm (Botswana) (Kung SJ,2014).

From the above, it can be concluded that Africa might have a mounting problem with food allergy; even though the ensuing diseases are well attended to, the direct cause is not given much attention and more resources need to be routed into research in this area and appropriate interventions put in place.

1.2 Problem Statement

There is a paucity of information on this emerging disease and there needs to be an investigation to unravel the question of people's awareness of the existence of food allergy, especially allergy in children, and if they are what is being done in the area of management or if not, what can be done to sensitize the above parties knowledge of the issue and how to manage it. There is also the need to know whether mothers who claim to know about food allergy can identify the symptoms .Why some children develop allergy and some do not is also a question worth exploring as well as children who might have the condition but have not been diagnosed with it. Through this research I can find out what is actually prevailing in our country especially whether the local people can identify a food allergic reaction and take the appropriate precautionary measures. The Educational status of mothers will be studied to ascertain whether their level of education affects their awareness of the condition.

1.3 OBJECTIVES

1.3.1 General Objective

The general objective of the study is to explore the understanding mothers have about food allergy in children under five years of age.

1.3.2 Specific Objectives

i. To determine the knowledge mothers have of food allergies in children between the ages of 6months to 5 years ii. To investigate the experiences of mothers on food allergies and their management in children iii. To investigate whether mothers can identify symptoms of food allergy when they present in their children

1.4 RESEARCH QUESTIONS

i. What is the level of knowledge mothers have of food allergies in children between the ages of 6months to 5 years?

ii. Can mothers identify symptoms of food allergy when they present in their children.

iii. How do mothers manage the symptoms of food allergies in children?

1.5 Justification of study

This research will fill the present knowledge gap of the extent of awareness of food allergy in the general public. According to Kung (2014) food allergy has been traditionally perceived as being uncommon in Africa. However, the existence of allergic manifestations such as asthma and atopic dermatitis continue to mount in the African countries with high GDP, this research is aimed at investigating, creating and raising the awareness of the

condition in both parents and the general populace, so that the condition can be detected earlier and managed. This research will also help deepen awareness among policy makers, opinion leaders, health planners and health professionals in order to plan appropriate interventions for mothers to be educated about this condition and its management.

1.6 Scope of the study

This study involves mothers of children under five in the Asokwa children's hospital and Maternal and Child Health Care hospital (M C H) at Adum in the Kumasi metropolis. My choice of children in this age gap is mostly due to a research conducted by Mansueto (2006) which concluded that, in countries reporting an increase in food allergy, (73%) reported that this was seen in children less than 5 years of age, although this was generally based on changing health care burden rather than published data. Of the 45 countries reporting an increase, 12 (27%) reported the greatest increase in infants < 1 year, 18 (40%) in 1–5 year olds, and only 2 (4.4%) in children older than 5 years. Of the remainder, 10 (22%) did not specify an age group and 3 countries (7%) indicated only that the increase was in children < 5 years (without specifying further), and the patronage of mothers with children under five is high in these two hospitals (Mansueto, 2006).

It is an undeniable fact that food is an integral part of life; however, for some, it can also be deadly. Sufferers of food allergies must avoid, for example, certain cereals, nuts or fish at all costs, and scrutinize the list of ingredients of every food item to make sure that it is safe. The consequences of accidentally eating just a tiny morsel of the wrong food can be serious: breathing difficulties, swelling of the lips and throat, abdominal cramps and vomiting, and possibly death FAAN (2008). The plight of children who might have this condition will be further worsened if their mothers or caregivers have no knowledge of the

condition and since the star intervention of treating food allergy is to remove the offending food and in this case it's only the parents or caregivers who can fulfill this role since the children are dependent on the mothers for feeding (FAAN, 2008).

Furthermore, in this era of globalization, it is not only people who migrate but also foods, as people embrace foreign diets and import unusual products, it becomes necessary that a closer look be taken at this problem.(Hadley, 2006).“There are still too many situations where people do not recognize that food allergy is a medical condition, not a food preference,” said Anna Muñoz-Furlong, founder and CEO of the Food Allergy & Anaphylaxis Network (FAAN; Fairfax, VA, USA)—a non-profit organization dedicated to raising public awareness, providing advocacy, education and advancing research on food allergy” (FAAN.,2008).

1.8 Organization of the study

This study is divided into six main chapters which are organized as follows. Chapter one deliberates on the nature and background of the research problem and it also includes the objectives, rationale, and scope of the study. Chapter two deals with the literature reviews related to the concept of food allergy, its prevalence in the world and in Africa as well as studies conducted on the awareness of the condition in the general public and what is being done in the area of management in Africa. Chapter three describes the study area and discusses the methods and techniques that were used for data collection. Chapter four is on the results of the data collection in relation to the awareness of food allergy. Chapter five is the discussion of the main results.

1.8.1 Operational definition of terms

For the purpose of this study, key terms and their definitions are as follows

Food Allergy: Food allergy is an immune system reaction that occurs soon after eating a certain food. Even a tiny amount of the allergy-causing food can trigger signs and symptoms such as digestive problems, hives, atopic eczema or swollen airways.

Awareness: knowledge that something exists, or understanding of a situation or subject at the present time based on information or experience.

Knowledge: understanding of or information about a subject that you get by experience or study, either known by one person or by people generally:

Exploration: the activity of searching and finding out about something.

CHAPTER TWO

2.0 LITERATURE REVIEW

Introduction

This chapter examines the existing literature on the research objectives. It discusses the concept of food allergy in perspective, the prevalence of food allergy globally as well as the awareness level in mothers, the public and health workers.

2.1 Food allergy in perspective

Food allergies are the body's abnormal responses to harmless foods; the reactions are caused by the body's immune system's reaction to some food proteins (Medical dictionary,2014).

The work of the immune system is to get rid of foreign substances like viruses and bacteria; however in people with allergic reactions the immune system is ultrasensitive and identifies certain harmless substances in food as dangerous to the body and therefore causes the reactions which can sometimes be fatal (AAFA.,2005).

Findings from John (2010) agree with the fact that most reactions are immunologic in nature and other reactions due to hypersensitivities. Symptoms range from mild pruritus such as atopic dermatitis to gastro intestinal disturbances like diarrhea, colic and vomiting, respiratory problems like asthma, rhinitis and life threatening anaphylaxis (Gupta *et al*, 2011).

Mostly symptoms typically develop within minutes to 2 hours of consumption of the responsible food allergen. These consist of nausea, abdominal pain, colic, vomiting within 1 to 2 hours, and/or diarrhea. Local IgE-mediated mast cell activation provokes the rapid onset of pruritus, burning, tingling and swelling of the lips, tongue, palate and throat and, occasionally, a sensation of pruritus in the ears and/or tightness in the throat. (John,2010 Sampson, 2011).

Nocerino (2014) seems to agree with Sampson *et al* (2010) on the effects food allergy has on children. These are generally common in infants and adolescents, with symptoms including vomiting, abdominal pain, anorexia, early satiety, hematemesis, failure to thrive, gastric outlet obstruction and atopic manifestations. Foods which commonly cause allergic reactions include wheat, eggs, milk and soy including certain nuts and tree nuts (Hadley, 2006). In addition to this, studies show that children allergic to dairy products are also allergic to beef products. Sensitization to bovine serum albumin is an indicator of cow's milk allergy in children with beef allergy. Removal of beef from the diet of children with

cow's milk is recommended according to a study by Martelli *et al* (2002). Looking at its prevalence globally, food allergy varies widely with age and geography. For example, selfreported prevalence in the US is 9.1% (8% for children) and 5.3% for respondents with a physician diagnosis. In Canada, overall prevalence of food allergy is 7% and others report that food allergy in children under five years stands at 5-6% which is a significant number (Lu, 2014).

2.2 Awareness and management of food allergy.

2.2.1 The role of parents and health professionals.

Food allergy symptoms are confused with other non-allergic conditions. The National Institute of Allergy and Infectious Diseases working with 34 professional organizations, federal agencies and patient support groups, led the advancement of clinical procedures for the controlling and diagnoses of food allergy; the procedures were formulated based on these broad subheadings, they are as follows: Gastrointestinal, Respiratory and Cutaneous food allergies.

Gastrointestinal manifestations of food allergy include a spectrum of disorders that result from the immune systems response to allergens found in diet. These conditions are described as follows;

Immediate Gastrointestinal hypersensitivity; which refers to immunoglobulin E mediated food allergy which can occur in the upper and lower respiratory regions immediately or after several hours, most immediate reactions include manifestations of anaphylaxis and others may include vomiting, other late symptoms could be failure of the child to thrive or diarrhea after ingestion of the culpable allergen.

Also Cutaneous reactions to foods are some of the most common presentations of food allergy presenting as urticaria, flushing, pruritus, contact dermatitis, dermatitis herpetiformis, and atopic dermatitis reactions or atopic eczema. Lastly, respiratory manifestations of food allergy occur frequently during allergic reactions and are an important pointer of severe anaphylaxis. Food allergy however is a rare cause of respiratory symptoms, namely those of rhinitis and asthma (Boyce et al, 2010).

Other researchers have tried to determine the relationship between food allergy and asthma, and food allergy and rhinitis. It was realized that for children with food allergy induced atopic dermatitis 43% developed asthma and 47% developed chronic rhinitis before age 7. The risk of developing asthma was associated with children with heredity of atopic dermatitis. An early onset of eczema was associated with an increased risk of sensitization to inhalant allergens, and development of urticaria (Gustafsson et al, 2000). The trend seems to show that even though food allergy is an uncommon cause for asthma and rhinitis as stated by Boyce et al (2010), there is a strong relationship between the two as can be seen from Gustafsson et al (2000).

The effects of food allergy on the lives of the whole household is immense the meal preparation has to be carefully considered by the mother and this brings a lot of stress as there is no freedom to eat what one wishes to eat probably because of one child's illness, in some 60% of families the condition affects meal preparation and 49% of families say it affects their social life. Looking at stress levels, food allergy affected 41% of families 34% reported of it affecting school attendance (Bollinger *et al*, 2006). Looking at the problems one faces sometimes it seems *ignorance is bliss*. Where the family is unaware the condition exists and therefore continues to eat whatever they want, at least they won't have to worry

about anything Goosens et al (2013) but then the allergy situation is very risky and could even lead to death inspite of this there is no current treatment for food allergy, it can only be managed by allergen avoidance or treatment of symptoms and awareness is a must. It is estimated that more than 20% of the world's population experience some form of allergic diseases however despite its high prevalence it is underestimated, undertreated and underdiagnosed (Kalpaklioglu et al, 2011).

Having some knowledge about the condition is a first step in its management but how aware is the public currently on food allergy? As already stated by Kalpaklioglu (2011), 'studies within allergy is deep, and studies addressing the aspects of immunology, symptoms, and managements are reported continually. But the knowledge of even, the allergy patient's view of own disease and of its concerns is still scarce. This causes requirement of a range of measures like public information, patient education, health promotion, and guidelines. With such interventions, early identification and optimal treatment are expected.

In the adult population there is a knowledge gap about what autoimmune disorders are and how to manage them. In a study that was conducted to assess the awareness of the public on the identification of asthma symptoms it was realized that 57% of the sample population were aware whereas the remaining 43% had no knowledge of it even though a percentage of the sample population recruited had the condition and they lived in ignorance (Barker et al, 2009).

Food allergic children are dependent upon their parents and health professionals for identification and management of the symptoms and their effects. If a parent is unknowledgeable about the disease, innocent children will suffer in silence and possibly face a preventable death.

Similar studies by Prawirohartono (2001), in Scotland revealed the fact that there was an inability to tell of symptoms even among highly educated women who thought that the (rash) atopic eczema a (symptom of food allergy) they were seeing on their babies' cheeks were there as a consequence of breastmilk pouring on the babies' cheeks.

The parents are responsible for the education of others including the child's school, peers, other relatives and acquaintances about the child's condition to prevent cases of allergic reactions. This is because the treatment available for food allergic reactions is the removal of offending foods and education of people about the condition to prevent an occurrence (Goossens et al, 2013).

Half of Americans do not know of food allergy. A survey of 1031 adults showed that (49%) had no knowledge the condition existed. There has to be extensive public health education on the condition to enable people gain information on the subject (ACAA, 2014). Asia is no exception where mothers had wrong perceptions and a high level of unawareness. A survey of 114 mothers in Indonesia revealed that, (48.2%) believed that you cannot inherit food allergy and that food allergy cannot cause respiratory symptoms (Munasir and Muktiarti, 2013).

Further studies in Africa on the contrary show that women have some knowledge about allergies and the causes of allergy making them the preferred subjects in this study. In a particular study 66% of the sample population who were women had 60% of them reporting to have had an allergic reaction due to the following allergens; food 16.7%, animal waste and hair 15.4%, pollen 13.3%, %, house dust 11.7%, medicines 8.3%, cosmetics 5.8, and plants 6.3% a response which was brought out by the researchers. Interestingly quite a number of the women were unaware of the basis of their allergy. Quite a number (40.4%)

subjects had some understanding about allergy, and they indicated that the information was through different sources such as mass media, school, friends, other families etc. In terms of prevention, 39.2% had some knowledge of how the allergies could be stopped, and 41.2% had knowledge on appropriate medicines for the control and management of different allergic symptoms. Skin allergies 35.9%, respiratory allergies

13.3%, and allergies of the eye 10.8% were realized to be the most common complaint. Observing the on-going analysis there is an increased perception of the prevalence of the food allergy disorder but it is associated with poor understanding on the possible causes and preventive measures. This highlights the need to conduct public education to raise awareness of allergy with a focus on causes and avoidance of exposure to allergens to mitigate effects of allergy in the society (Temu et al, 2008).

A study conducted by Gupta et al (2010) on primary care physician's knowledge of the condition reported that 99% had cared for food allergic patients and 90% were familiar with the idea that number of food allergic children was rising in the United States. Interestingly just about 30% of the physicians felt comfortable interpreting lab reports to diagnose food allergy or felt sufficiently prepared by their medical training to care for children with food allergy. The lack of knowledge about food allergy and its management is evident in the above research of health professionals as well as parents or the general public.

The researchers concluded that the awareness of food allergy among primary care doctors was fair, chances for improvement exist, as acknowledged by participants' own views of their clinical abilities in the management of food allergy. Based on this report it is safe to say that a research has to be conducted to know the level of knowledge the public has on

the above subject. Gupta et al (2010) concluded that the knowledge of primary care physicians on the above subject was fair implying that more studies have to be conducted and education carried out to raise the awareness of the general public and health service to the need to pay attention to this rising health problem.

In addition Kalpaklioghi et al in 2011 found that carers of household members with food allergies had uncertainties about the nature and management of the condition making them not confident in the knowledge of the disorder and how to help their family members who include children, manage the condition; a study conducted in Turkey. It was also realized that inadequate patient –clinician communication may be a contributory factor as to why there is poor adherence to therapy despite the availability of effective treatments. This two fold problem of lack of parent/public knowledge of allergy as well as clinician unawareness was further explained when 75% of pediatricians according to a study 21 years ago felt that specialty in allergy had no great significance whereas 21 years later 99% of the pediatricians believed it is important. Of 58% of patients diagnosed with food allergy only 45% had been asked to go for skin tests. This stresses the need for intense efforts to raise allergy awareness among health professionals.

Allergy impacts all age groups, from early stages to youthful, from adolescent to later life. The continuum of the disease or "allergic march" is a problem for health care systems. Moreover, patients often need help in accepting their condition and reassurance to continue with the recommendations to see the improvement in their quality of life. Research within allergy is deep, and studies on the aspects of immunology and symptoms are well addressed however research on how the public views allergy or the knowledge level of allergic patients are rather scarce (Kalpaklioglu *et al*,2011).

Contrary to popular researches and authors, Kalpaklioglu et al (2011), again on another level seems to indicate that " awareness of allergy was usually underestimated among the population sourced from multicenter studies, as about a half of the allergic symptoms were recognized. Although their results cannot be said to be representative due to the relatively small size and biased toward women and non-professionals, the knowledge in this group of participants increased significantly in compliance with the education level but not with the diagnosed allergy. Generally, the nasal and skin symptoms were evaluated as "allergic," probably because they are the most popular sites of allergic diseases. However, the symptoms related with nasal and/or chests were not found to be significantly recognized more as allergic in subjects with symptoms compared with the ones without reactions. These results showed the degree of unawareness about the subjects "own possible allergic symptoms".

2.3 Prevalence and why some people have food allergies

An allergic sensitization occurs once the immune system reacts to an allergen as though it is harmful as it would treat for example an infection. It produces a type of antibody called Immunoglobulin E (Ig E) to fight off the allergen. When the body comes into contact with the allergen again the body fights it as would fight an infection and the IgE antibodies are released causing inflammatory mediators to be produced which causes the allergic symptoms (Valovirta,2007).

Interestingly researchers have explored the reasons why some people have food allergies and others do not.

In one study, it was realized that atopic dermatitis and a high GDP were positively related. This seems to suggest that a higher socio economic status could be a predisposing factor

for the food allergy disorder. The researcher based his research on the hygiene hypothesis which suggests that autoimmune and allergic disorders are as a result of the decrease in infectious diseases in the western countries and the gradual decrease in the African countries. It means literally that the immune system is fighting against the body because there is no intruder to fight. The hygiene hypothesis ideology is based upon a foundation of epidemiological data, particularly migration studies, showing that immigrants transitioning from a low-incidence to a high-incidence country acquire the immune disorders with a high incidence at the first generation (Okada et al, 2010).

In effect people who migrate to high incidence regions with immunologic disorders have their first generation acquiring the condition. Africa plagued by poverty and high mortality due to infectious diseases such as HIV/AIDS, malaria, tuberculosis and so on has channeled its resources to the research and resolution of these problems to the neglect of food allergy. There is therefore a perception that food allergy is rare in Africa but recent studies suggest otherwise (Kung, 2006). There is a paucity of information on the awareness of food allergy in Ghana and this study is intended to fill that gap.

Hardley (2006) agrees with Kung (2006) on the fact that food allergy is not rare in Africa because she recognized that foods are migrating along with people and so more attention has to be paid to the possibility of regional allergic reactions crossing over to other regions. Also Kung (2006) found that though food allergy has been traditionally classed as being uncommon in Africa, the existence of other allergic reactions such as asthma and atopic dermatitis continue to rise in the African countries with a high GDP. Their hypothesis was that ”since the food allergy epidemic in advanced countries has fallen behind that of allergic

respiratory conditions, they propose that food allergy is increasing in Africa". Their article systematically reviewed the evidence for food allergy in Africa. Information was found for 11 African countries: Botswana, Democratic Republic of Congo, Ghana, Kenya, Morocco, Mozambique, Nigeria, South Africa, Tanzania, Tunisia, and Zimbabwe. Majority of the studies report of sensitization to food or self-reported symptoms. However, a few studies had more stringent diagnostic testing that is convincing for food allergy, mostly conducted in South Africa. Apart from the foods that commonly cause allergy in westernized countries, other regionally significant or novel food allergens may include pineapple (Ghana), okra (Nigeria), and Mopane worm (Botswana). Food allergy is definitely an emerging disease in Africa and resources need to be diverted to study, diagnose, treat, and prevent this important disease (Hardley,2006; Kung,2006).

Globally, in a study on the period prevalence of food allergy there showed an increase as compared to previous studies. In a study of children in the United Kingdom followed from when they were born to 10 years of age, the period prevalence of atopic eczema was 9.6% at age 1 year, increasing to 10.3% at 2 years, 11.9% at 4 years and 14.3% at 10 years. Lifetime prevalence of atopic eczema was 41% at 10 years of age. Of the 41% of children who had ever had atopic eczema, 56.3% still had the condition at age 10 years (n = 1456).

A study in the United States assessed national data from the Infant Feeding Practices Study II, a longitudinal mail survey from 2005 to 2007 of women who gave birth to a healthy single child after a pregnancy of at least 35 weeks. The survey began in the final trimester of pregnancy and continued at set times thereafter up to age 1 of the infant, in this analysis, probable FA was defined either as a doctor-diagnosed FA or as the presence of food-related symptoms (i.e., swollen eyes, swollen lips, or hives). Of all the mothers, 60% answered all

serial questionnaires with detailed questions about problems with food. Approximately 500 infants were characterized as having a food associated problem, and (6%) were identified as probable FA cases by 1 year of age (National Institute for Health and Care Excellence Guidelines, 2010).

2.4 Identification of symptoms and management

Inspite of the feats and heights medical science has reached in both developed and developing countries there leaves much to be desired when the question of the identification of symptoms and management of food allergy is confronted especially in Africa. To diagnose food allergy there needs to be careful exploration of history, laboratory studies, elimination diets and food challenges to confirm diagnoses. Treatment is currently based on the identification and removal of offending food allergen (Sircherer and Sampson 2006).

Tepper *et al* (2008) agrees with other researchers on the fact that family histories of atopy, asthma, food allergy and atopic dermatitis are strong indicators that the succeeding generations or infants will have asthma, therefore the exploration of histories will be very important in determining the food allergy status of an infant. In Ghana currently surveys by the researcher show that laboratories conducting food allergy tests are in short supply and it is only the Noguchi Memorial Institute which specializes in that which is woefully inadequate. In addition to the family history of food allergy there is also the double blind placebo-controlled trial which is considered to be the best standard for diagnosing food allergy. There is also the physician supervised food challenge test, skin prick tests and lastly patch testing (Sicherer and Sampson ,2006).

The age old procedure for the management of food allergy is the removal of the offending allergen. Approximately half of patients are believed to respond to allergen-elimination

diets, but resolution of symptoms often requires 3 to 8 weeks after the elimination of responsible food allergens (frequently only a few foods). Symptoms also respond to systemic steroids (e.g., 2 mg/kg per day) but generally return when steroids are tapered. Antihistamines are also administered to help bring down symptoms. Symptoms due to one or two foods (e.g., milk) frequently resolve in 1 to 2 years. One study of children less than 1 year of age with gastroesophageal reflux found that 40% of infants studied had cow's milk hypersensitivity and a characteristic phasic pattern on 24-hour pH probe studies. (Sampson, 2004).

A novel management procedure investigated by Werninghaus *et al(* 2005) named *SPECIFIC ORAL TOLERANCE TEST* (SOTI), seemed to help with some form of tolerance to identified food allergens however it was still unclear as to whether the tolerance would be temporary or permanent. Patients were treated at home by being fed with a daily maintenance dose of the allergen for a number of months and after that put on a strict elimination diet and then the allergen was reintroduced. It was realized that the patients tolerated the allergen during the maintenance period but soon developed moderate to severe systemic allergic response when it was reintroduced after the strict elimination period. It was here concluded that the tolerance to the allergen could not be measured as permanent or temporary using the SOTI procedure.

CHAPTER THREE

3.0 METHODOLOGY

Introduction

This section presents the methods which were used for the study, data collection techniques, sampling procedure, data analysis procedure, ethical considerations and the limitations of the research.

3.1 Research approach and design

The study was a cross sectional survey assessing the knowledge or awareness of a group of women at a certain point in time. The Maternal and Child Health Hospital and the Asokwa Children's hospitals were the sites because they provide a fair representation of the target population and also serve children from different segments of the metropolis limiting the probability of interviewing mothers from a single community.

A quantitative study approach was used to assess the knowledge, awareness, identification and management of symptoms in the mothers. As a result a questionnaire was designed based on the above objectives to investigate the knowledge of the study sample on the subject and through a cross sectional survey, to determine their awareness of the problem as well as their experiences and also the methods used in managing this situation.

Participants for the interview were recruited using purposive sampling.

3.2 Study Population

Kumasi was chosen mainly because Kumasi is centrally located at about 270km north of the national capital, Accra. Kumasi is the capital city of Ashanti Region. It covers a total land area of 254 square. It has about ninety suburbs and divided into ten sub-metropolitan

areas (KMA, 2010). Kumasi's population as at 2010 stood at 2,035,064 with 972, 258 males and 1,062,806 females (GSS, 2012). The unique location of Kumasi coupled with its tertiary level infrastructure and services as well as its economy make it a viable place for a host of commuters (KMA, 2010). Indeed, over a third (34.3%) of Kumasi's population consists of both internal and international migrants including children (Baah, 2007; KMA, 2010; Kwankye et al., 2007) (cited in Adusei, 2014; Amoah, 2014),

3.3 Quantitative research methods

A quantitative study approach was used to assess the knowledge, awareness, identification and management of symptoms in the mothers. This method was used because data collected through quantitative methods yield more objective and accurate information because they can be replicated and analyzed using statistical techniques. As a result a questionnaire was designed to investigate the knowledge of the study sample on the subject and through a cross sectional survey, determine their awareness of the problem as well as their experiences and the methods used in managing this situation.

3.4 Study Population, sampling and sample size.

Population includes all mothers of children under five in the Kumasi metropolis and the participants for the interview were recruited using a purposive sampling.

The sample size was calculated using Corchran's formula to approximate the number of mothers who may be aware of food allergy. These mothers in the two hospitals were chosen because they represent the principal target group. The sample size was calculated as

$$n=z^2(pq)/d^2$$

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

= 384 respondents

Where n =sample size z= score of the confidence interval and for 95% confidence interval, Z =1.96 p=Proportion and for maximum variability p =0.5 q= Proportion of what you are looking for out of 1 and for this q= 0.5 d is the desired precision

The sample size was calculated as 384. 20% was factored in for those who might not know about food allergies and the fact that this was a condition with such a low awareness and therefore mothers might not be able to give complete data. This brought the number to 460. The number was rounded up to 500 to make room for errors in data gathering and incomplete responses during the data collection process.

3.5 Data collection

The principal instrument for data collection was a questionnaire and this was given to mothers who could read and write. For those who were not able to read and write responses were taken from them by interviewing them and completing the forms on their behalf. To ensure data quality and validity field assistants were trained to support the process and a pre-testing of the questionnaire was carried out in the Asokwa children's Hospital. Due to this pre-testing some questions were modified or changed to enable respondents to easily understand the purpose of the research and to ensure the accuracy of the answers. A sample of mothers were obtained from the two hospitals with questions based on age of children, awareness of food allergy, ability to identify symptoms and whether these symptoms can be traced to a particular food. It is common knowledge in Ghana that most babies are taken to herbalists at birth up till a few months because of constant rhinitis and or snoring and

mothers and grandmothers put various concoctions into their baby's nostrils with the aim to suppress the problem. This study also sought to find out if this condition suffered by the children could be traced to allergies.

3.5 Data Analysis techniques

The SPSS statistical software was employed to analyze the data. The data was categorized, ordered and presented in a form which will make it possible for the interpretation of the research problem to be understood and conclusions were drawn from the results obtained from these relationships.

3.6 Ethical considerations

Permission was sought from the mothers for their participation in the study. An introductory letter was collected from the Kwame Nkrumah University of Science and Technology and the Kumasi Metro Health Directorate to present to the two hospitals. The Medical Superintendent and the Director of Nursing introduced the researcher to the various Heads of Departments in the hospitals where the research was to be conducted and they in turn introduced the researcher to the parents of the children who were the subjects of the study. Informed consent was sought from the mothers after they had been told of the reason for the study and after they had been told what the research entailed and asking for their consent to be interviewed. Mothers were informed and assured of the confidentiality of the information which was being collected and also to assure them of the anonymity to protect respondents. Number codes were assigned to guard the anonymity of the respondents. They were also assured that the information gathered was purely for academic purposes.

3.7 Assumptions

There was an assumption that the respondents will be truthful and give reliable and truthful responses. It was also assumed that the responses which were obtained would be considered representative of the mothers in the Kumasi Metropolis.

3.8 Limitations

The study had to be conducted during a set time from 2015 to 2016. It is assumed that conditions which prevailed at that time should not be in any way different from what prevails at other times of the year with respect to attendance of mothers to the health facilities and that the information which was obtained was a true reflection of what pertains.

There is also the possibility that the mothers who were interviewed were a convenience sample and not a random sample might affect results in terms of representativeness.

Due to the fact that allergy is quite a technical subject, there is the possibility that some of the questions might have been misunderstood and this could also have affected the responses which they subsequently gave.

CHAPTER FOUR

4.0 RESULTS

Introduction

This chapter presents the results of the quantitative analysis of the data which was collected. It covers the background of the respondents, their knowledge of the condition, ability to identify symptoms and their methods of management. The details of the analysis are presented below.

4.1 Awareness of food allergy

Background (socio-economic, educational) of respondents and their knowledge of food allergy, children's age and food allergy status. A total of 500 mothers of children under five were interviewed from the Maternal and Child Health Care Hospital and the Asokwa Children's Hospital. They were asked questions about their knowledge of food allergies, symptoms and methods of management.

Most of the mothers (50.6%)had an elementary education and (23.8%) had secondary education and only (17%) had been educated to a tertiary level and (8.2%) had no education at all. Results from their responses on their employment status revealed that majority of the mothers were self-employed (59%) and (13.8%) were unemployed. Analysis of awareness of allergy showed that (63%) had no knowledge that such a condition ever existed.

The children were mostly (65.2%) within the age range of (7-23 months) and it is during this period that mothers initiate complementary feeding. Four percent (4%) of the 500 mothers had had their children diagnosed with food allergy.

4.1.2 Table1. Demographic information of respondents

Respondents		**Percentage**
Educational level of mothers	None	8.2
	Primary/J.S.S	50.6
	SSS/Post Sec-Post-Mid	23.8
	University/Tertiary	17.0
	No response	0.4
Employment status of mothers	Self-employed	59.0

	Unemployed	13.8
	Formally Employed	13.0
	Informal Sector Employee	12.8
	No response	1.4
Mother's food allergy awareness	Yes	37.0
	No	63.0
Child's age in months	0-6	15.4
	7-23	65.2
	24-47	14.4
	48-60	4.8
	No response	0.2
Child diagnosed with food allergy	Yes	4.4
	No	95.4
	No response	0.2

Response from 500 mothers

4.1.3 Effect of level of educational and employment status of mothers on awareness of food allergy at Asokwa Hospital (AH) and Maternal and Child Health Hospital (MCHH)

Assessment of the respondents educational and employment status against their awareness revealed that of the 500 mothers 315 (63%) did not know anything about food allergy. The assessment of their educational background and their knowledge in food allergy resulted as follows, of the (63%) the mothers who had no knowledge of the condition, 32(6.4%) had no education at all, and 174 (34%) only had elementary education. Secondary and postsecondary education stood at (13.8%) and University and tertiary (7.8%). Interestingly there was a significant difference between the level of education and awareness of food allergy ($p=0.002$). Of all the various levels of education, it was only the tertiary stage that had the percentage of people with knowledge in food allergy being higher than those

without; this seems to indicate that they may be more exposed to information which their counterparts with limited education may not have.

When their employment status was compared to their awareness to ascertain if socioeconomic status had any effect on awareness it was realized that, (39%) were selfemployed, (8.2%) unemployed, (6%) in formal employment and (8.8%) who were employees in the informal sector all had no knowledge of food allergy.

4.1.4 Table 2. Cross Tabulation of the effect of level of education and employment status of mothers on their food allergy awareness

		Percentage response on Food Allergy awareness		**p-value**
Mothers educational status		Yes %	No %	
	No education	1.8	6.4	0.002
	Primary/J.SS/Mid School	15.8	34.8	
	SHS/Post Sec/Post/Mid	10	13.8	
	University/ Tertiary	9.2	7.8	
	No response	0.2	0.2	
Mothers employment status	Self-employed	20	39	0.31

	Unemployed	5.6	8.2
	Formally employed	7	6
	Informal sector Employee	4	8.8
	No response	0.2	1.0

4.2 MEDIUM OF AWARENESS in (AH) and (MCH)

Table 3. Medium of allergy information

Medium of Awareness	Frequency	Percent
Through health education only	52	10.4
Symptoms from sick child only	75	15
Through media	28	5.6
Through family history only	8	1.6
Seen in a neighbor only	31	6.2
Through Health education, symptoms from sick child and the media	3	0.6
Through Health education and neighbors	5	1.0
Combination of health education and media	3	0.6
Family History and Neighbors	1	0.2
No response	3	0.6
None of the above	291	58.2

Most mothers (15%) became aware of the condition by observing the symptoms in their child. The second most pronounced medium of awareness was through health education only (10.4%), followed by symptoms observed in a neighbor (6.2%) before the media information (5.6%). Family history was the least single medium of awareness.

4.3.1 MANAGEMENT OF FOOD ALLERGY AMONGST MOTHERS IN (AH) AND (MCH)

Management and control of food allergy amongst mothers in (AH) and (MCH)

This section of questions assessed the mother's proposed methods for managing the symptoms of food allergy in their own children if they were to have food allergy. Figures from table 4 shows that of the sample of mothers, (39.4%) believed in taking their children to the hospital for symptoms management were they to have food allergy while another huge percentage (31%) did not respond implying they wouldn't know what to do and (0.8 %) said they would do nothing about it.

4.3.2 Table 4. Mothers proposed methods of allergy management.

Methods of management	FREQUENCY	Percent
Seek health care	198	39.6
Herbal health care	5	1.0
Health Care and Herbal	4	0.8
Remove offending food	76	15.2
Self-management	52	10.4
Do nothing at all	4	0.8
A combination of seeking health care and removal of offending food	1	0.2

Seek health care and self-management at home	3	0.6
No response	157	31.4

4.4 Table 5. Mother's observation of respiratory, gastrointestinal and cutaneous (skin) symptoms in children.

Condition	Symptoms /Evidence	FREQUENCY	Percent
Respiratory	Regular herbal nasal drop application only	41	8.2
	Regular orthodox nasal drop application only	33	6.6
	Snoring during sleep only	5	1.0
	Constant runny nose and sneezing	20	4.0
	Wheezing at play And /or asthma	3	0.6
	Persistent cough only	7	1.4
	Nasal drop application, snoring, sneezing and coughing	1	0.2
	A combination of 2 symptoms	150	30.0
	A combination of three symptoms	145	29.0
	None of the above	91	18.2
	All of the above	4	0.8
Gastrointestinal			
	Vomiting often only	56	11.2

	Failure to thrive only	17	3.4
	Diarrhea only	28	5.6
	Regular vomiting, failure to thrive and diarrhea	11	2.2
	Vomiting and diarrhea	38	7.6
	Regular vomiting and failure to thrive	6	1.2
	Failure to thrive and diarrhea	7	1.4
	None of the above	337	67.4
Cutaneous (skin)			
	Chronic rash only	21	4.2
	Persistent itchy skin, rash and nodules under skin	12	2.4
	Evidence of uticaria only	3	0.6
	Periodic skin cream application	5	1.0
	Persistent uticaria, rash and exhibition of nodules under skin	1	0.2
	Regular medicated powder application only	11	2.2
	A combination of two symptoms	90	18.0
	A combination of three symptoms	57	11.4
	None of the above	300	60.0

Figures from Table 5 show that children exhibiting more than two symptoms of respiratory conditions (sneezing, coughing, wheezing, nasal drop applications, asthma and snoring) constituted a rather high percentage (30%) whereas symptoms of gastrointestinal

conditions (vomiting, failure to thrive, diarrhea), were seen in about (11.2%) and (18.4%)of the children. The predominant single (11.2%) symptom of gastrointestinal symptoms was regular vomiting after feeding. Cutaneous reactions were also evident in the group with the highest exhibition (18.0%) being a combination of two of these reactions (urticaria, chronic rash in flexures, nodules under skin, itchy skin and regular skin cream and medicated powder application). With respect to the severity of the symptoms, respiratory conditions (81.8%) were the most observed symptoms amongst children followed by cutaneous conditions at 40% and 31.6% for gastrointestinal issues.

Mothers actual management of symptoms of food allergy.

Upon the extraction of information on the symptoms presenting in their children the mothers were required to explain their actual methods of management and tables 6, 7 and 8 provides the information of how they actually managed the symptoms observed in their children.

4.4 Table 6. Evident Symptoms in children and percentage of mothers who seek Healthcare

Symptoms	**Frequency**	**Percentage**
Respiratory only	36	7.2
Gastrointestinal	15	3.0
Disturbing Cutaneous reactions	22	4.4
Respiratory and skin	12	2.4
Gastrointestinal and skin	13	2.6
Respiratory, gastrointestinal	5	1.0
All three	135	27.6
None of the above	259	51.8

In table 6. figures show the symptoms presenting in the children and the percentage of mothers 48.8% who sought that the hospital manages their symptoms. They therefore seek health care services in the management of the symptoms.

4.5 Table7. Home management of symptoms.

Type of Symptoms	Frequency	Percent
Gastrointestinal	16	3.2
Respiratory	14	2.8
Skin	41	8.2
Gastrointestinal and respiratory symptoms	13	2.6
Gastrointestinal and skin	8	1.6
Respiratory and skin	5	1.0
All three symptoms	3	11.0

Table 7 gives us the picture of the percentage of mothers who prefer to manage the symptoms of food allergy at home. (30.4%) of mothers prefer to treat the symptoms at home and for children who all exhibited all three symptoms (11%) their mothers preferred to manage it at home highlighting the risk of self- medication in the children by their mothers. Below is the table showing how they actually managed the symptoms at home.

4.5.1 Table 8. Methods used in Home management

Methods used	Frequency	Percent %
Herbal	17	3.4
Orthodox medical (Pharmacy drugs)	272	54.4
Removal of offending food	21	4.24
A combination of herbal treatment and removal of offending food	1	0.2

A combination of Herbal and orthodox medical treatment	5	1.0
Orthodox medical treatment and removal of offending food	0.6	3.0
None of the above	181	36.2

Mothers with children exhibiting food allergy symptoms felt secure using orthodox medical treatment for their children and only 4.2 percent knew of the ideal treatment by removing offending food.

4.5.2 Table 9. Foods avoided based on doctor's advice

Type of food	**percentage**
Seeds	0.2
Palmnut	0.4
Groundnut	0.4
Canned foods	0.4
Dairy products	0.4
Banana	0.6
Other (hen's egg,)	1.6

Of the 4.4% children who had been diagnosed with food allergy, the Mothers had been asked upon doctor's advice to avoid certain foods such as eggs(1.6%), banana(0.6%), dairy products(0.4%) with the least foods to be avoided being seeds(0.2%).

4.6 Identification of food allergy symptoms by mothers and health sector

Figure 1: 4.6.1 Mother's ability to identify respiratory, gastrointestinal and skin symptoms and relate them to food allergy.

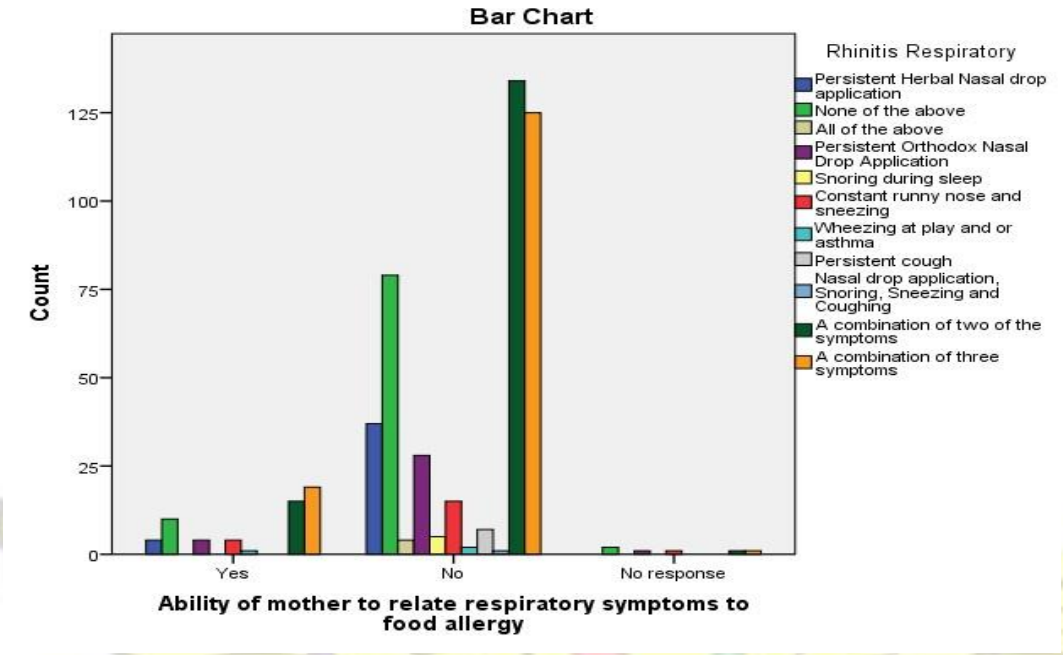


Figure 1 presents the awareness of mothers as against the presentation of symptoms in their children. In figure 1 mothers who said they were not aware that these symptoms pointed to food allergy, had a high percentage of their children exhibiting the possibility of being allergic with two of the symptoms (26.8%)as well as 25% exhibiting three or more of the symptoms of the condition. Their unawareness will invariably affect their health seeking behavior.

Figure 2 : 4.6.2 Gastrointestinal symptoms and mothers ability to relate it to

food allergy

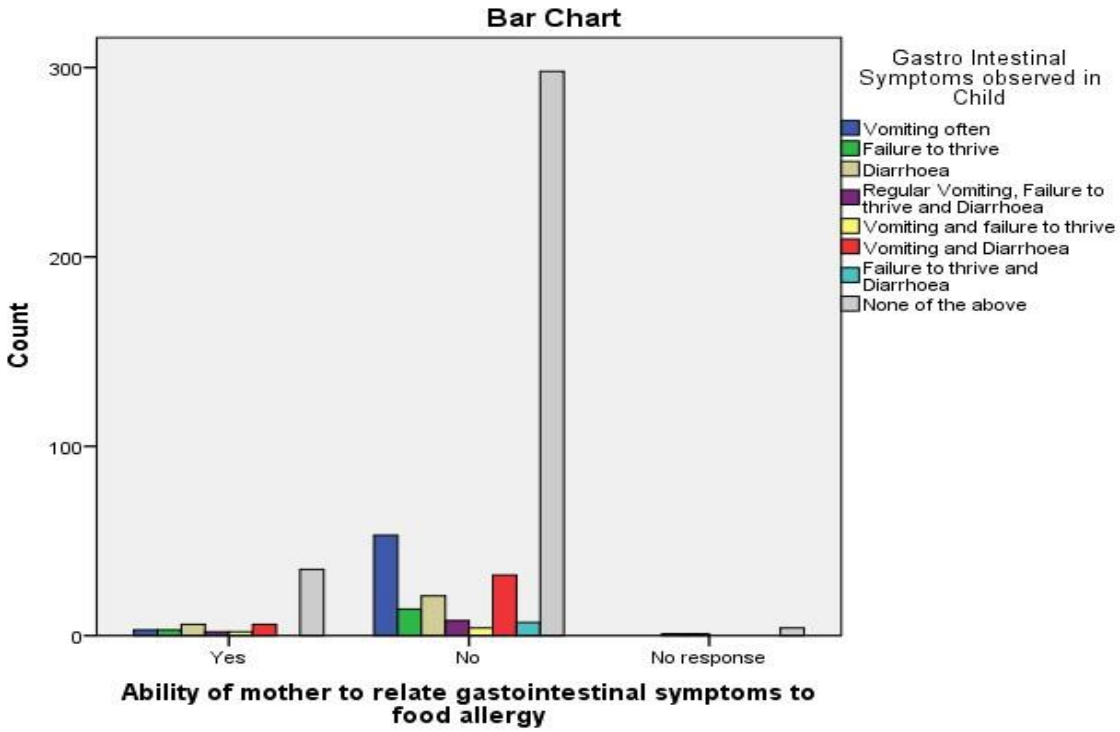


Figure 2 also shows some of the children exhibiting signs of frequent vomiting (10.6%) anddiarrhea (5.6%) and a combination of two or more symptoms showing their likelihood of being allergic but mothers were unaware that they may have the food allergy condition, these mothers answered no to their being aware that these symptoms pointed to food allergy.

Figure 3 : 4.6.3 Skin symptoms and mothers ability to relate to food allergy

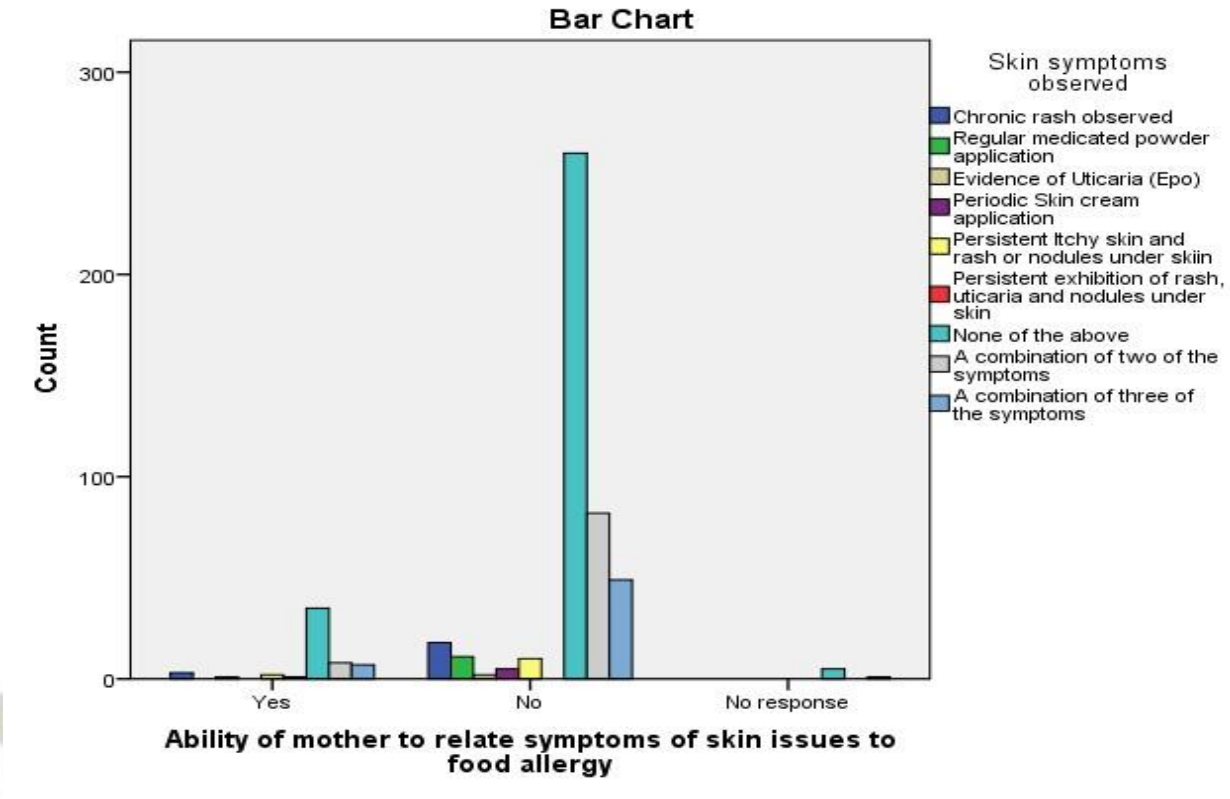


Figure 3 also shows children exhibiting symptoms of chronic rash, (3.6) regular medicated powder application, nodules under skin and rash in flexures - a combination of three symptoms(9.8) as well as a combination of two more symptoms (16.4%)of cutaneous reactions whereas their mothers answered no to their awareness of these symptoms being evidence of food allergy.

4.7 Medically diagnosed children with food allergy as against evidence of respiratory, gastrointestinal and skin conditions.

Figures 4,5 and 6 give a representation of the number of children with respiratory, gastrointestinal and skin conditions who have been diagnosed with food allergy and those

who have not. Examination of the chart shows that a high number of children exhibiting symptoms of food allergy had not been diagnosed with the condition nor did their mothers they have any knowledge of it.

4.7.1 Respiratory symptoms observed in child

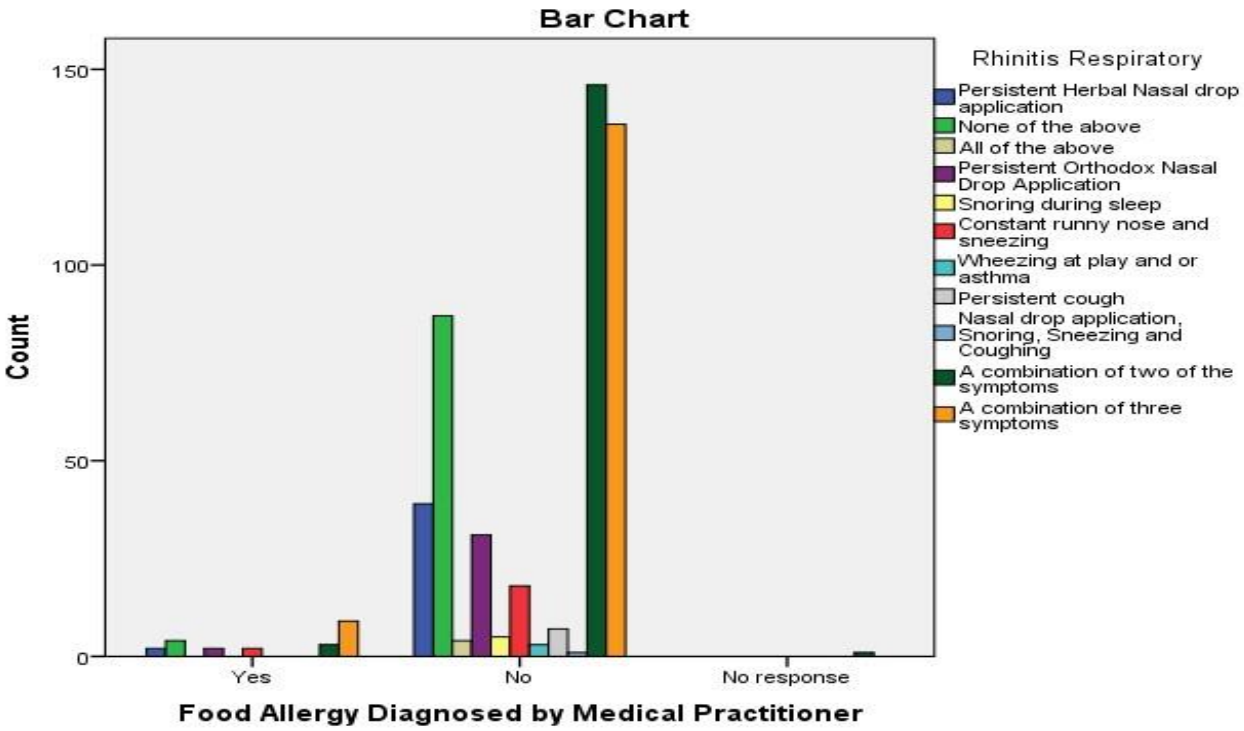


Figure 4 - Respiratory Symptoms observed in child

In this section, 1.8% of children exhibiting three or more symptoms of respiratory issues had been diagnosed with food allergy and 27.2% of the children exhibiting the same symptoms who had been to the hospital had not been diagnosed with the condition. About (0.6 %) of children with three or more symptoms had also been diagnosed with food allergy.

Figure 5: 4.7.2 Gastrointestinal symptoms observed in child

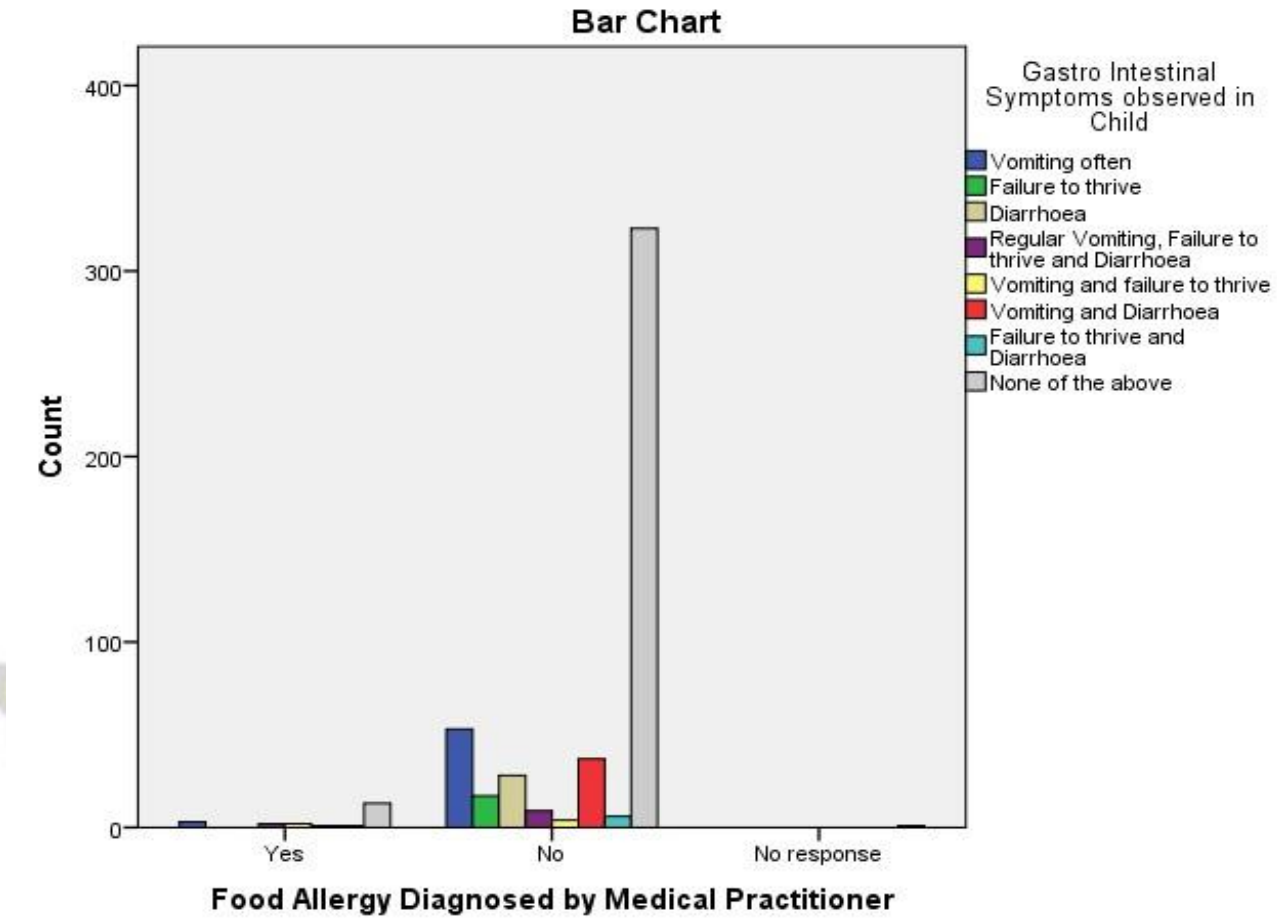
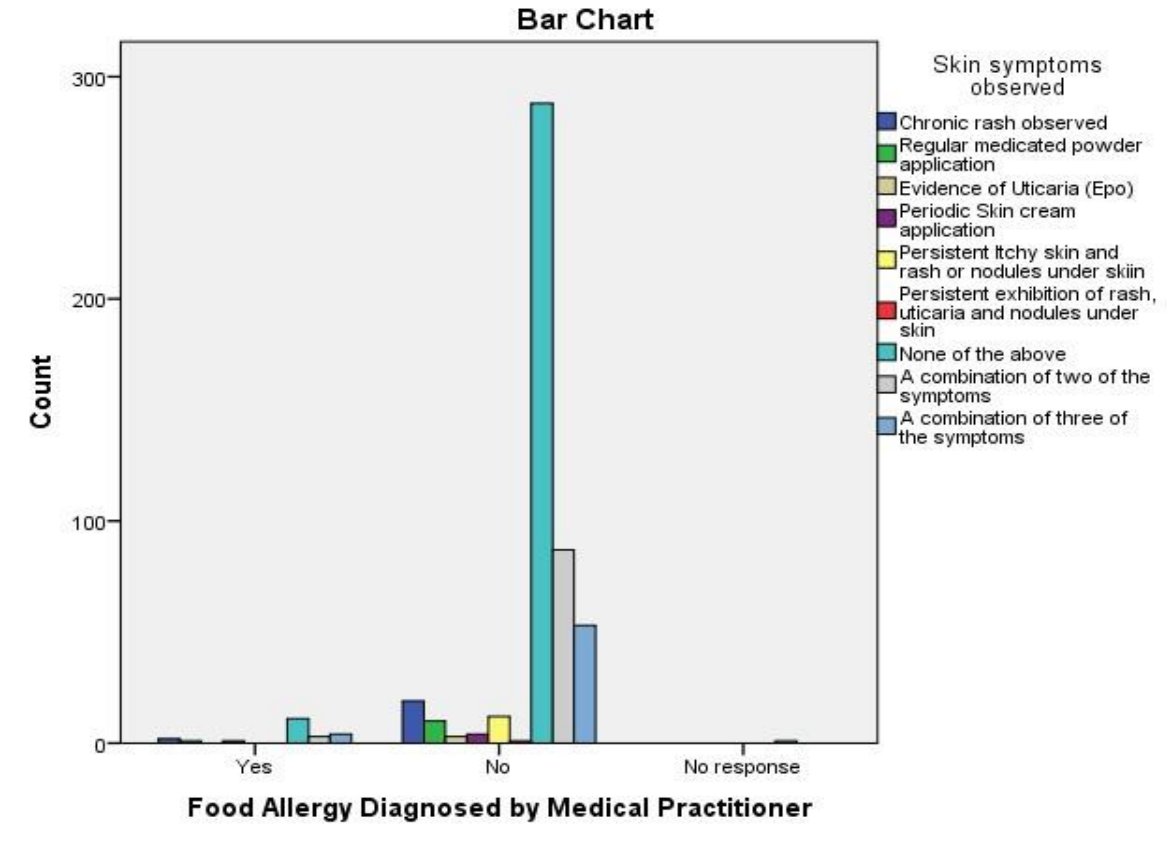


Figure 5 shows 10.6% of children with allergy symptoms (vomiting and diarrhea) who have not been diagnosed. Gastrointestinal symptoms seems to be the least symptom being linked with food allergy to be diagnosed by doctors.

Figure 6 : 4.7.3 Cutaneous reactions observed in child.



Information available in figure 6 shows 17.4% of children with three or more combinations of symptoms who have never been diagnosed with the condition. Another 10.2% also had two or more of the symptoms but they had not been diagnosed.

CHAPTER 5

5.0 DISCUSSION

Introduction

This chapter discusses the knowledge mothers have of food allergies and their symptoms. It also discusses their methods of managing allergies and how the health sector is creating awareness.

5.1 Awareness of food allergy among the mothers in (AH) and (MCH)

There was a high level of ignorance of food allergies and when mother were asked directly about their knowledge of the condition (63%) had no knowledge of the condition. It was realized that there was a significant association between level of education and knowledge of food allergies (P=0.002). It was observed that it was only women who were at the tertiary level of education who had some knowledge of food allergies.

This may be due to the fact that they are more likely to have been more exposed to information due to their level of education. Recent findings from ACCAI (2014) in the USA agree with the findings which suggest that where there were high levels of ignorance (49%) among the adult population on food allergies. Mothers in Indonesia also showed a high lack of knowledge (48.2%) of food allergies ((Munasir and Muktiarti, 2013).

The percentage of unawareness in this study is slightly higher (63%)than what exists in current literature. Barker et al (2009) also identified unawareness of allergies in (43%) of respondents who even had symptoms of food allergy induced asthma. The high unawareness in this study could be attributed to the high percentage of mothers with predominantly low levels of education which does not expose such mothers with the information necessary to identify the condition.

When the medium of knowledge about awareness of the mothers was assessed it was realized that the percentage (15%) of mothers who said they knew of food allergy had the knowledge from managing the symptoms in their own children. The next highest medium of awareness (10.4%). was through health education

The awareness level of the mother will influence their health seeking behavior, of the 500 mothers who were asked of what they would do if their child had food allergy, (39%) said they will seek health care whereas only 15% knew that they would remove the offending food as soon as they were aware of it.

Education has a strong influence on awareness and therefore women should be encouraged to aspire for higher levels of education since it enables them to be better able to take care of themselves.

5.2 Identification of symptoms

This study sought to look at the symptoms which were exhibited by the children and their mother's knowledge of the condition to ascertain if they were able to identify the symptoms when they present in their children. It was realized that knowledge of food allergy and gastrointestinal symptoms had no association symptoms of respiratory conditions and skin were not associated with food allergy.

Mothers were unable to associate symptoms of skin, gastrointestinal and respiratory conditions to food allergy. This shows that though (37%) (Table 1) mothers know of food allergy, their ability to tell of the presentations of symptoms rather is low. This study is line with findings from Munasir and Muktiarti, (2013) who reported that mothers were not able to relate respiratory problems to food allergy and thought breast milk is the cause of the various reactions they were seeing in their children.

A look at figure 1 reveals a percentage of children with respiratory (26.8, a combination of two or more respiratory symptoms) problems, which included persistent runny nose, cough, wheezing at play, regular application of nasal drops, persistent cough, etc who

showed evidence of respiratory issues related to food allergies but whose mothers had said they were unaware these symptoms were related to food allergy.

Similar studies by Prawirohartono (2001) Scotland revealed the fact that there was an inability to tell of symptoms even among highly educated women who thought that the (rash) atopic eczema they were seeing on their baby's cheeks was there as a consequence of breast milk pouring on the baby's cheeks. There is evidence in figure 3 to show that mothers with children (16.4%) exhibiting persistent rash on face, neck, flexures and regular episodes of urticaria answered no to the presence of food allergy in their children. There is low symptom identification among mothers even though some of them have children who exhibit signs of food allergy.

Symptoms of food allergy were also found in children who had been to health facilities but had not been diagnosed with food allergy. Because food allergy symptoms can mimic symptoms of infections and other conditions medical personnel are careful not to make a misdiagnoses.(Alvares et al., 2013). Evidence of a strong link to food allergy were found in (27.2%) of (Figure 4) children with three combinations of respiratory symptoms who had been to the hospital but had not received any food allergy diagnoses. Children with two symptoms of gastrointestinal issues(vomiting and diarrhea) which were persistent had not been diagnosed as per their symptoms but the persistence of their symptoms showed a strong causal link to food allergy. The case of food allergy being diagnosed in children who are a few weeks old is evident in some studies with the children exhibiting loose and watery stools and regurgitation after feeding, were linked to food allergy Brill (2008) however in this study children exhibiting these symptoms were not diagnosed with food allergy. Children who show gastrointestinal symptoms of food allergy are possibly not diagnosed

because of the wide differential diagnoses of these symptoms and medical doctors are careful not to eliminate diets of children in this critical age group of 0 – 5years. (Mansueto P., 2008)

Children with atopic dermatitis which is characteristic for rash on neck, in flexures and face as well as regular urticaria presentations (17.4) had not received any diagnoses of food allergy, they had been to the hospital and had had their symptoms treated but they were not tested for food allergy.

The identification of symptoms by mothers and even the medical staff shows the ignorance level in the country according to this study. Because of its rarity, the condition is not known and there has not been enough education to sensitize the above party's knowledge of the condition. This is evident from this study (refer to table 3) where only 10% of mothers had information through health education.

Studies have shown that the cause of under diagnoses of food allergy in emerging economies can be linked to fewer trained medical staff with expertise in pediatric allergy. (Prescott, et al 2013)

Other studies have shown a prevalence of (10%) rate of food allergy in preschool children. (Prescott S.et al 2013). In this study (Table 1)4% of children had been diagnosed with food allergy which can be both good news and bad news. Bad news because of the probability of a 0.6% difference who have not been diagnosed but are living with the condition in spite of the probability of dying from anaphylaxis.

5.3 Methods of Management.

Assessments of the respondent's food allergy management attitudes revealed that, 48.8% would seek health care for the management of their children's food allergy. Another 30%

said they would manage symptoms at home through the use of orthodox medicine, herbal medicine, removal of offending food and another group spoke of doing nothing at all and waiting the symptoms out.

Food allergy globally is managed through the avoidance of offending allergens and the use of steroids, antihistamines and the use of ultra violet rays. (Sicherer. and Sampson,2006).

Food allergy management in the home affects the quality of life of everyone where children have to be carefully managed in order to prevent an occurrence of a reaction. This means family members will have to be careful of the places they visit with the child and the school would also have to be advised on what the child can and cannot eat to prevent a reaction. (Goossenset al, 2013). This study revealed that 4.4% of the respondents after reporting of the symptoms showing evidence of food allergy said they will remove the offending food. These mother's studies reveal as stated above experience anxiety and low self-confidence and are very careful around strangers or at parties and social events because of the risk of their child ingesting an allergen this affects social life and invariably their quality of life.(Manassis.,2011).

There is however a positive aspect to this finding because this percentage of mothers know that the first line of treatment of children with allergy is the removal of offending allergen.

The question of whether the respondents can actually identify the offending food and the process of identification is another area of study worth exploring but which this study did not explore.

5.3.1 Health sector/ Hospital management

The high percentage of mothers who decided to seek health care for their children was positive 44% because it reveals that the respondents believe and have confidence in the health systems though of those who decided to manage symptoms at home, a whopping 54% spoke of seeking self- medication through orthodox drugs. Though these are acquired at the pharmacy, they are dangerous because they have not been prescribed by a doctor and they need to be prescribed before they are acquired because antihistamine and steroids affect the immune system.(Eichenfieldet al, 2003)

Gastrointestinal symptoms were the least of the symptoms linked to food allergy. (3%) of mothers sent their children to the hospital with gastrointestinal related issues which were not linked to food allergy.

5.3.2 Home Management

For respondents who responded positively to management of symptoms at home, 8.2% reported of managing skin symptoms at home with herbal drugs, orthodox drugs, with just 3.2% managing gastrointestinal issues at home and 2.8 managing respiratory symptoms at home. This shows that atopic dermatitis or other cutaneous allergic manifestations of food allergies are not classed as very important requiring hospital attendance but are treated like any other skin reaction with creams and powders. These respondents clearly cannot link food allergy to the skin but results also show a high percentage (16.4%) of children exhibiting two or more symptoms of cutaneous reactions resembling food allergy symptoms. refer (Figure 3).

5.4 Foods avoided based on doctors' advice

Of the 4.4% children who had been diagnosed with food allergy, the Mothers had been asked upon doctor's advice to avoid certain foods such as eggs(1.6%), banana(0.6%), dairy products(0.4%) with the least foods to be avoided being seeds(0.2%).

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

Introduction

This last section presents conclusion inferred from the discussion from the previous chapter on the awareness, management and identification of food allergy amongst mothers of children under five. The chapter also outlines recommendation for policy makers.

6.1 Conclusion

The percentage of mothers who are unaware of food allergy is high (63%). Statistics on their educational level showed that mothers with a higher level of education were more aware of the condition than respondents who had moderate to no education.

Sixty three percent of mothers had no knowledge of the condition refer to (Table 2), and upon grouping them according to their educational status it was realized that 32(6.4%) had no education at all, and 174 (34%) only had basic education. Secondary and post-secondary education stood at (13.8%) and University and tertiary (7.8%). Interestingly there was a significant difference between the level of education and awareness of food allergy (P=0.002). Of all the various levels of education, it was only the tertiary stage that had the percentage of people with knowledge in food allergy being higher than those without; this seems to indicate that they may be more exposed to information which their counterparts with limited education may not have.

The unawareness of mothers affected their ability to identify symptoms of food allergy and possibly link it to some other cause though their children had some evident reactions their ability to relate it to food allergy was minimal. Majority of mothers were not able to associate respiratory, gastrointestinal and skin/cutaneous reactions to food allergy.

Medically only 4.4% of the children were diagnosed of being food allergic, 29.2% had a combination of two symptoms of respiratory problems, 17.2% had a combination of cutaneous symptoms resembling reactions due to food allergy and 10.6% had symptoms resembling reactions due to food allergy which were all not identified by the hospital as food allergy symptoms. The hospital's ability to manage food allergy is based on their

ability to test and diagnose food allergy but as can be seen from figures 3,4 and 5 that is not what pertains currently.

6.2 Recommendation

This recommendation is premised on guiding the major stakeholders; government and its ministry of health, district health and child welfare centers of the various hospitals, schools and parents/children in the devising and implementation of policy programs aimed at creating awareness of the food allergy condition and for laboratories to be set up that can test the existence of food allergy.

1. Government/Ministry of Health (Policy Makers) i Government must show commitment and a will to the prevention and management of food allergy by allocating adequate resources for the education of specialist pediatricians in allergy to enhance the early detection and management of the condition.

ii Government must allocate funds into research to unearth effective preventive and treatment measures food allergy. In conjunction with the research, government in collaboration with experts and the private sector should set up laboratories which will facilitate the work of the medical staff and as a result the assessment of symptoms would not be based only on guess work, history taking or food challenges but facts with which they can work.

iii Government must task its security agencies and regulatory bodies like the FDB to be strict on the labeling of products to enable mothers choose products which wouldn't be harmful to their children.

2. District Health Directorates

The media is invaluable in the dissemination of health information. District directors as a matter of urgency considering the high rate of unawareness should engage the media to assist them make the public aware of the existence of the condition, the symptoms which typically manifest and the methods of management.

The district directors should design educative programs for the child welfare clinics in the various hospitals to educate mothers on what to do when they identify signs of food allergy in their children, since almost every mother visits the child welfare clinic, and they trust the information received from these centers.

Parents and Children

i. Mothers should desist from giving their children medications not prescribed by a competent physician for all symptoms of food allergy. Symptoms of food allergy can mimic symptoms of other conditions and self-management at home is not the best.

ii. Mothers and children should desist from feeding their children products which do not have the clearly stated ingredients on the label.

Suggestions for future research

This study indicates future research avenues comprising

1. The assessment of foods causing allergies in Ghana.
2. The effect of ethnicities and socio economic status on food allergy in children in Ghana.

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