



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## Study On Ige Mediated Allergic Disorders At Khulna District In Bangladesh

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### ABSTRACT

Allergic diseases are prehistoric and very common. None is immune to this condition. Every person has an experience of one form of allergies in their lifetime. Incidence and prevalence of allergic lesions are increasing day by day. There is also a huge financial involvement to treat the allergic diseases. Bangladesh is a developing country with about 170 million populations. However the present study has conducted to explore the prevalence of allergic patients in Khulna district in Bangladesh and to identify the allergic patient's treatment modalities at Khulna district in Bangladesh. The study was conducted at Khulna city in Bangladesh. It was a Descriptive type of Cross-Sectional Study. The study was conducted at private hospitals at Khulna district in Bangladesh. All patients who were attended to allergic treatment at private Hospitals at Khulna district in Bangladesh. Purposive sampling method was used for the study. Total 400 patients were selected for the Study. Data were collected from primary and secondary sources. Primary data were collected from the patients of the study area. Secondary data were collected from books, research reports, journals, annual reports, Website of Ministry of Health and family planning, internet etc. A pre-designed semi-structured questionnaire was developed as data collection instrument. Prior to the interview, the purposes of data collection were explained to the patients and verbal consent was obtained. Data were collected by face-to-face interview by the investigator. Collected data were analyzed by computer program Statistical Package for the Social Sciences (SPSS). From the result it was found that male patients faced more IgE mediated allergic disorders than female. IgE mediated allergic disorders found more in autumn (August-November) season followed by winter (December-January). Illiterate people suffered more IgE mediated allergic disorders than educated people. IgE mediated allergic disorders occur more in working people. More people suffered IgE mediated allergic disorders due to fungi. Most of the respondents had allergic rhinitis. Most of the respondents had family history of IgE mediated allergic disorders. Respondents had food allergy for Milk, Wheat, Peanut, Soy, Egg, beef, shrimp, white and Egg yolk. Many respondents replied that itching on skin was symptoms of allergy. Some respondents noticed Urticaria as the symptom. Most of the respondents did not know about the reason of Urticaria. Hidden illness, food and drug allergy was the reason of Urticaria. So to stop or minimize IgE mediated allergic disorders it is very much essential to early detection of underlying cause and proper treatment. Responsible Government authorities should take immediate initiatives to diagnose and stop or minimize IgE mediated allergic disorder.

**Key words:** Allergy, Urticaria, Itching, Immunoglobulin E (IgE), Food, Serum immunoglobulin-E level, Sign and Symptoms, Diagnosis

### INTRODUCTION

Adverse reactions to food, i.e. food allergy and intolerance have gained considerable attention. This overview focuses on the diagnosis and management of IgE mediated food allergy that is believed to be responsible for most immediate-type food-induced hypersensitivity reactions. Clinically, these reactions are characterized by a variety of signs and symptoms that occur within minutes or hours after consumption of the offending food. Reactions may be limited or more generalized with involvement of the skin, nose, eyes,

and/or lungs. In more severe cases, cardiovascular symptoms including hypotension, shock, cardiac dysrhythmias and death can occur. In food-allergic individuals, IgE is produced against naturally occurring food components, primarily glycoproteins that usually retain their allergenicity after heating and/or proteolysis. While adults tend to be allergic to fish, crustaceans, peanuts and tree nuts, children tend to be allergic to cow's milk, egg white, wheat and soy more frequently. "Emerging" food allergens include tropical fruits, sesame seeds, psyllium, spices and condiments. These allergies frequently represent a cross-allergy to an allergen derived from another source, e.g. pollens or natural rubber latex. The evaluation of IgE-mediated food allergy relies on a careful history, physical examination, appropriate skin testing or in vitro testing with food extracts, and/or double blind, placebo controlled food challenges. Avoidance remains the mainstay of therapy. However, allergens may be "hidden" and labeling can be non-precise or misleading, thereby severely hampering prevention. Patients with severe allergies should keep at hand an emergency kit with adrenaline, an antihistamine and an injectable rapid onset- of-action corticosteroid. At present there is no evidence to support the use of immunotherapy, except for research purposes. Production of "hypoallergenic" food is hampered by incomplete methods for assessing the allergenic potential of such novel foods. Skin conditions are the fourth leading cause of nonfatal disease globally. A key contributor to the burden of skin disease is atopic dermatitis (AD), a chronic inflammatory skin disorder that begins before age five in 90% of cases and is estimated to affect nearly one in five children. AD can have severe psychosocial impacts on people and their families; in one study AD was second only to cerebral palsy in negatively impacting people's quality of life. With AD patient can experience physical distress, mood changes, sleep dysfunction, and behavioral problems. Families experience the financial burden of treatment and impacts such as sleep deprivation, anxiety, depression, social isolation, and marital problems. Data from an international study using validated questionnaires found that AD prevalence is increasing in low- and middle-income countries (LMICs), and developing country like Bangladesh. However, as healthcare access improves in LMICs, increased care-seeking and case detection and reporting may also contribute to higher prevalence estimates. Psychosocial impacts associated with AD are well-known in high-income countries (HICs), including in Asia. In Bangladesh the prevalence of allergic disease is more in case of low income people specially the day labourer, farmers, drivers, garments workers. Khulna is an industrial area. There are many industries in Khulna. Day labourers, jute workers, factory employees are more in Khulna. So prevalence of allergic disease is more in Khulna. For this reason this type of research is very much essential.

## DEFINITION OF KEY TERMS

**Atopy** is an exaggerated IgE-mediated immune response; all atopic disorders are type I hypersensitivity disorders

**Allergy** is any exaggerated immune response to a foreign antigen regardless of mechanism.

Thus, all atopic disorders are considered allergic, but many allergic disorders (eg, hypersensitivity pneumonitis) are not atopic.

**Atopic disorders** most commonly affect the nose, eyes, skin, and lungs. These disorders include conjunctivitis, extrinsic atopic dermatitis (the most common type of eczema), immune-mediated urticaria, some forms of angioedema, acute latex allergy, some allergic lung disorders (e.g., allergic asthma, IgE-mediated components of allergic bronchopulmonary aspergillosis), allergic rhinitis, and allergic reactions to venomous stings.

Type I reactions underlie all atopic disorders. Type I hypersensitivity reactions develop < 1 hour after exposure to antigen.

**Atopic IgE-mediated allergic disorder** a genetic predisposition to form IgE antibodies in response to exposure to allergens and therefore, for the development of immediate (type I) hypersensitivity and atopic conditions, such as allergic rhinitis, bronchial asthma, atopic dermatitis, and food allergy.

## Definition of Immunoglobulin E (IgE)

Immunoglobulin E (IgE) are antibodies produced by the immune system. If anyone has an allergy, then immune system overreacts to an allergen by producing antibodies called Immunoglobulin E (IgE). These antibodies travel to cells that release chemicals, causing an allergic reaction. This reaction usually causes symptoms in the nose, lungs, throat, or on the skin. Each type of IgE has specific "radar" for each type of allergen. That's why some people are only allergic to cat dander (they only have the IgE antibodies specific to cat dander); while others have allergic reactions to multiple allergens because they have many more types of IgE antibodies.

### Definition of Type 1 Hypersensitivity

Immediate hypersensitivity reaction - type I reaction, involves immunoglobulin E (IgE)-mediated release of chemical mediators from mast cells and basophils. Th2 cells produce IL-4 and IL-13, which then act on B cells to promote the production of antigen-specific IgE. Reexposure to the antigen can then result in the antigen binding to and cross-linking the bound IgE antibodies on the mast cells and basophils. This causes the release of preformed mediators (histamine, tryptase, tryptase, chemotactic factors), newly synthesized mediators (leukotrienes, prostaglandin, thromboxane, platelet-activating factor, adenosine, bradykinin), and cytokines from these cells that results in structural and functional changes to the affected tissue.

Type I hypersensitivities include atopic diseases, which are an exaggerated IgE mediated immune responses (i.e., allergic: asthma, rhinitis, conjunctivitis, and dermatitis), and allergic diseases, which are immune responses to foreign allergens (i.e., anaphylaxis, urticaria, angioedema, food, and drug allergies). The allergens that result in a type I hypersensitivity may be harmless (i.e., pollen, mites, or foods, drugs, etc.) or more hazardous such as insect venoms. The reaction may be manifested in different areas of the body and may result in instances such as: Nasal allergic rhinitis or hay fever

Ocular allergic conjunctivitis, potentially due to seasonal allergens such as pollen or mold spores

Dermatological hives, atopic eczema, or erythema

Soft tissue angioedema

Pulmonary reactions, such as allergic asthma or hypoxia

Systemic reaction, which is a life-threatening medical emergency, and also known as anaphylaxis.

### Allergy

In general Allergy is an acquired, abnormal reaction, such as running nose, rash, or breathing difficulty, in persons sensitive to certain substances (allergens) that don't normally cause a reaction. In other word ,Over reaction of the immune system to certain foreign substances causing symptoms like sneezing, runny nose, red watering eyes, vomiting, diarrhea, rashes, and itching due to certain allergens that may come in contact with the body through inhalation, ingestion, injection, or physical (skin) contact. The allergy-producing substances or allergens are all around us. Animal danders, pollen produced by different trees and flowers, house dust, etc. are examples of common allergens; but there may be an endless list of allergens, many of which are seemingly innocent substances. Allergic conditions include eczema, allergic rhinitis or coryza, hay fever, bronchial asthma, urticaria, and food allergy. Allergens may be introduced by contact, ingestion (eg, food), inhalation (eg, pollen), or injection (eg, drugs). Pollen belongs to the class of allergens known as inhalants because they are breathed into the respiratory tract. Other allergens in this group are the airborne, free-floating spores of fungus, house dust, animal dander, and cosmetics. Foods are a frequent source of trouble. Too many people the common food items that produce an allergic reaction are milk, egg, prawn and shrimp, wheat, some type of fish, beef, etc. The potential allergens such as furs, leather, plants, flowers, dyes, cosmetics, industrial chemicals, and insecticides may cause inflammation of the skin. The bronchial asthma and some types of eczema are in fact due to allergic reactions. In Bangladesh most sensitive persons are not sensitive just to one substance but to a number of them. Allergies are among the commonest of disorders; surveys have shown that at least 10 percent of the population suffers from them in either acute or chronic form. Heredity appears to play a part in many cases of allergy. If there is an allergic person in a family, there is a greater chance that his or her children will show a similar allergy. Emotional factors may also contribute to some allergies. Records of allergy patients in different hospitals of Bangladesh indicate that allergies can show up at any stage of life, from childhood to old age. Severity often depends upon how much of the allergen the patient is exposed to and for how long. Some persons, even those with severe allergies, lose their sensitivities and recover spontaneously. Many individuals lose their allergic tendencies as they grow old. For numerous allergies, medications provide relief. Antihistamines have wide effectiveness although they are not successful in all cases. The best way to get rid of allergic reactions is to identify the substance provoking the disorder and avoid it. If it is animal dander, the pet responsible will have to depart. When the cause is a food, drug, or article of clothing, it must be avoided at all costs. In case of dust allergy, the house must be vacuum-cleaner or wiped with wet cloth regularly.

**Pollen allergen** The fertilizing element of flowering plants produced by the male sexual organ may induce allergy. Pollens are fine, powdery, yellowish grains or spores, and sometimes remain in masses. Many airborne pollen types are considered to be the major component of allergens. They cause widespread upper respiratory tract and naso-bronchial allergy with manifestations like seasonal rhinitis, asthma, hay fever, and various types of bronchial troubles. The magnitude of incidence of an area depends on the genetic constituents of the population, meteorological influence and type of the availability of allergenic pollen

plants. It is estimated that 10-35% of the population suffers from allergenic diseases at one time or the other. Pollen grains of grasses and conifers are the principal group of allergen producers in the world. In Bangladesh the incidence of allergen pollen is high. The important allergenic pollen grains are released by plants such as *Lantana camara*, *Acacia species*, *Cassia fistula*, *Cocos nucifera*, *Eleusineindica*, *Datura metel*, *Amaranthusspisus*, *Cydonactylon*, *Achyranthesaspera*, *Albizzialebeck*, *Brassica campestris*, *Cannabis sativa*, *Carica papaya*, *Mangiferaindica*, and *Xanthium stramarium*.

## OBJECTIVES OF THE STUDY

The Objectives of the Study are as follows:

1. To explore the prevalence of allergic patients in Khulna district in Bangladesh
2. To identify the allergic patients treatment modalities at Khulna district in Bangladesh

## METHODOLOGY OF THE STUDY

**Study area:** The study was conducted at Khulna city in Bangladesh.

**Study Design:** It was a Descriptive type of Cross-Sectional Study.

**Study place:** The study was conducted at private hospitals at Khulna district in Bangladesh.

**Sample Population:** All patients who were attended to allergic treatment at private Hospitals at Khulna district in Bangladesh.

**Sampling method:** Purposive sampling method was used for the study.

**Sample size:** Total 400 patients were selected for the Study.

**Sources of Data:** Data were collected from primary and secondary sources.

**Sources of Primary:** Primary data were collected from the patients of the study area.

**Sources of secondary data:** Secondary data were collected from books, research reports, journals, annual reports, Website of Ministry of Health and family planning internet etc.

**Inclusion Criteria:** All patients who were attended to allergic treatment at private Hospitals at Khulna district in Bangladesh.

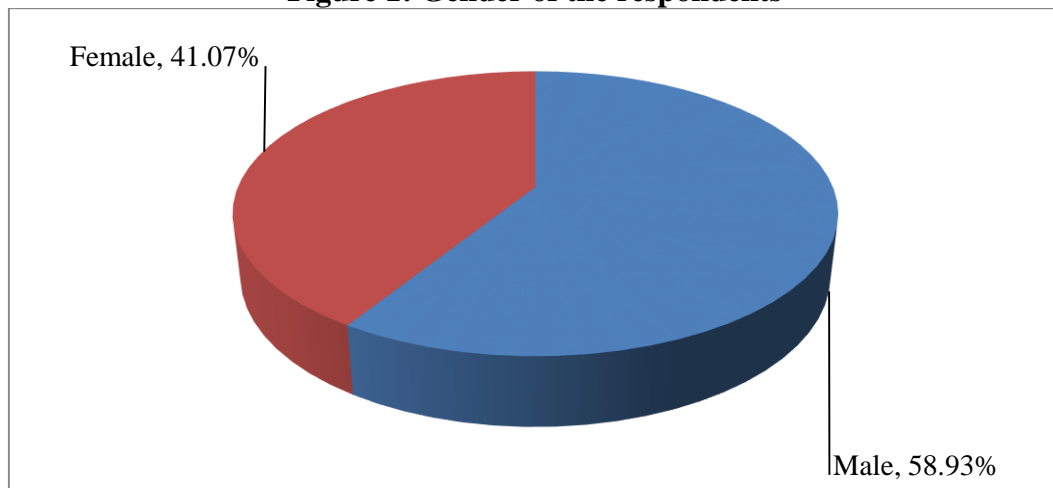
**Exclusion criteria:** All patients who suffered other disease except allergic diseases at private Hospitals at Khulna district in Bangladesh were excluded in the study. Those were not interested to participate were also excluded in the study.

**Duration of the Study:** The duration of the study was 24 months.

**Tool of Data Collection:** The tool was prepared by keeping the objectives of the study as the framework that reflect the study variables. A pre-designed semi-structured questionnaire was developed as data collection instrument.

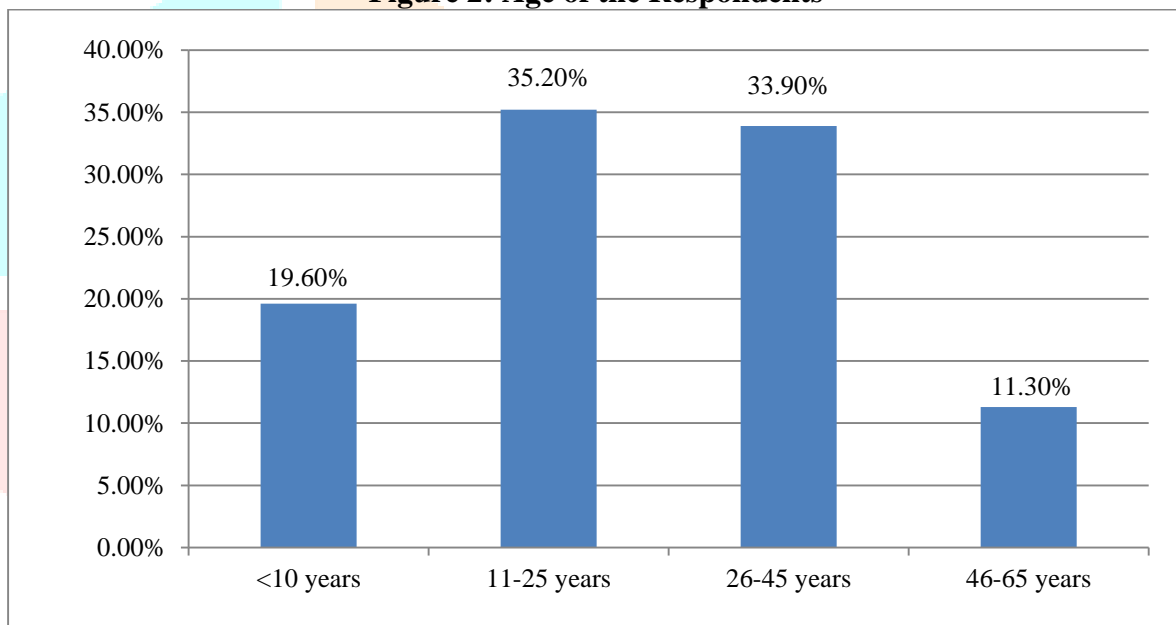
**Procedure of Data Collection:** Prior to the interview, the purposes of data collection were explained to the patients and verbal consent was obtained. Data were collected by face-to-face interview by the investigator.

**Data Analysis:** Collected data were analyzed by computer program Statistical Package for the Social Sciences (SPSS).

**RESULTS AND DISCUSION****Figure 1: Gender of the respondents**

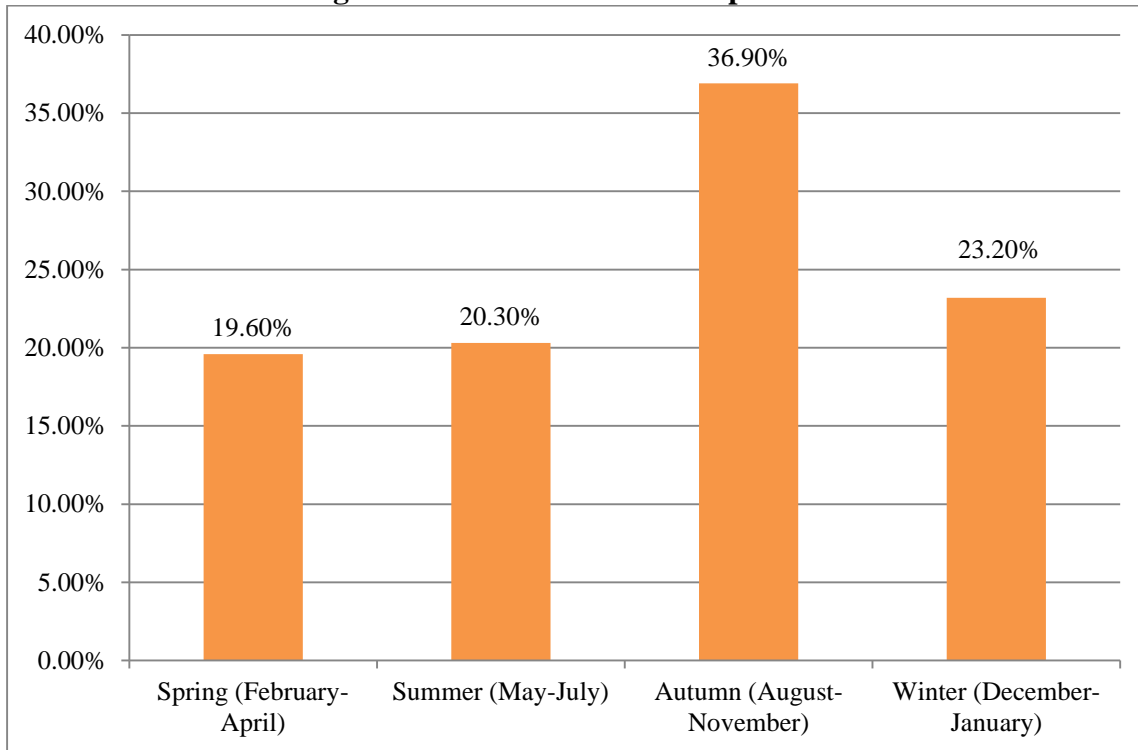
Source: Field survey, 2022

Gender of the respondents has shown in the above graph. From the result it was found that 41.07% respondents were female and 58.93% respondents were male.

**Figure 2: Age of the Respondents**

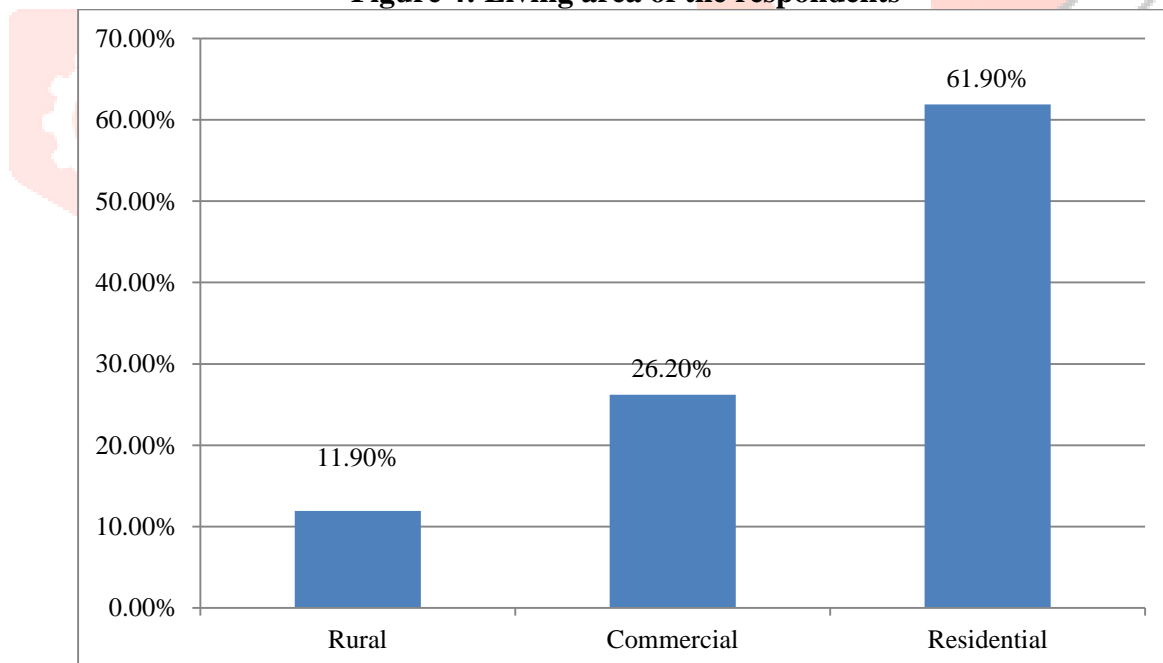
Source: Field survey, 2022

Age of the respondents has shown in the above graph. From the result it was found that 35.20% respondents had age group 11-25 years which was maximum but 11.30% respondents had had age group 46-65 years which was minimum. On the other hand 19.60% respondents had age less than 10 years, 33.90% respondents had age group 26-45 years.

**Figure 3: Season of birth of respondents**

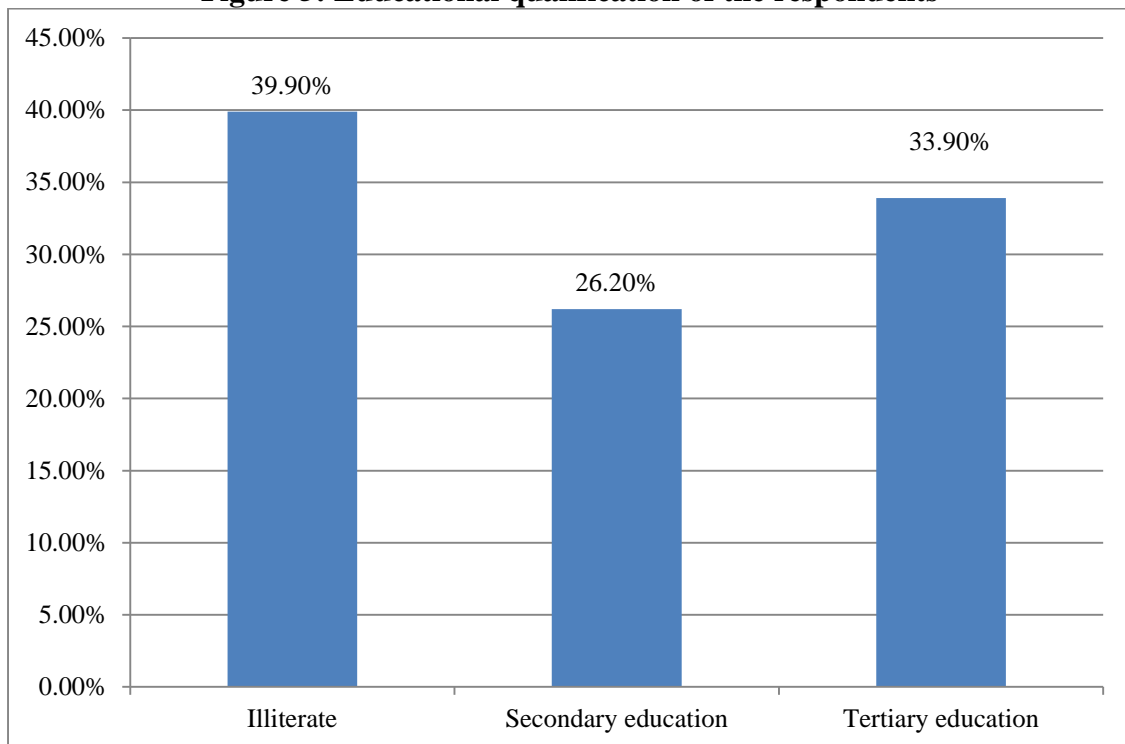
Source: Field survey, 2022

Season of birth of respondents has shown in the above graph. From the result it was found that 36.90% respondent born in autumn (August-November) season which was maximum but 19.60% respondents born in Spring (February-April) season which was minimum. On the other hand 20.30% respondents born in summer (May-July) season and 23.20% respondents born in winter (December-January) season.

**Figure 4: Living area of the respondents**

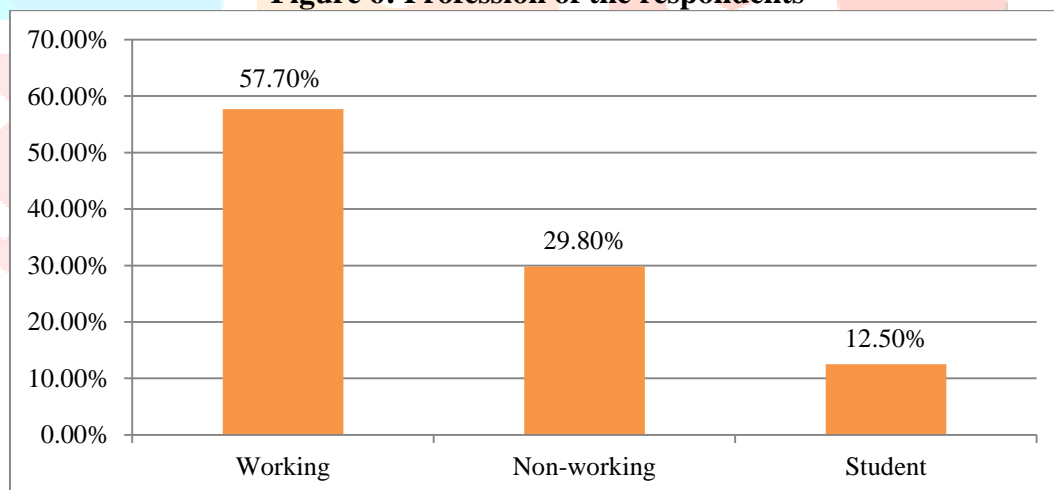
Source: Field survey, 2022

Living area of the respondents has shown in the above table and graph. From the result it was found that 61.90% respondents lived in residential areas which were maximum but only 11.90% respondents lived in rural areas which were minimum. On the other hand 26.20% respondents lived in commercial areas.

**Figure 5: Educational qualification of the respondents**

Source: Field survey, 2022

Educational qualification of the respondents has shown in the above table and graph. From the result it was found that 39.90% respondents were illiterate which was maximum but only 26.20% respondents had secondary education. On the other hand 33.90% respondents had tertiary education.

**Figure 6: Profession of the respondents**

Source: Field survey, 2022

Profession of the respondents has shown in the above table and graph. From the result it was found that 57.70% respondents were working people which was maximum but only 12.50% respondents were students which were minimum. On the other hand 29.80% respondents were non-working group.

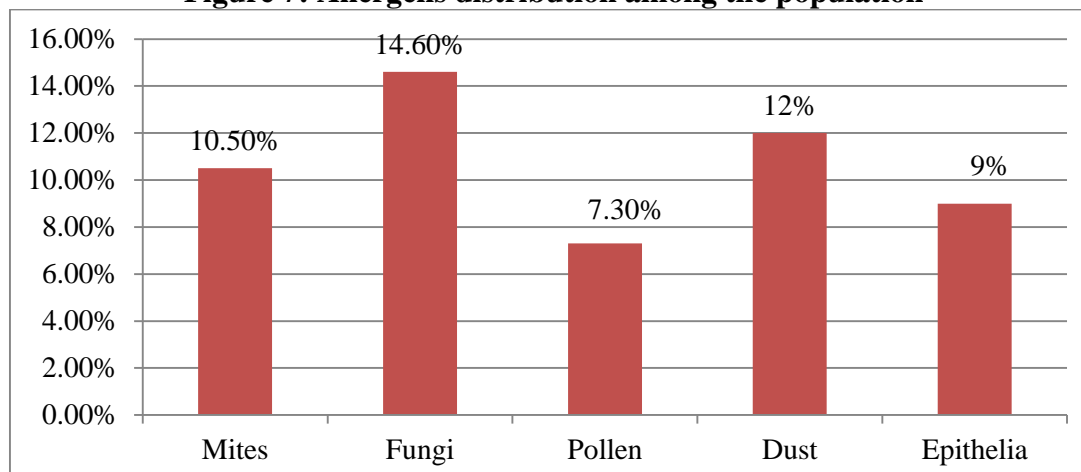
**Table 1: Serum immunoglobulin-E level according to age group**

Serum Immunoglobulin-E level (total)	Reference value (IU/mL)
< 1 year	1.5
1-5 years	<60
6-9 years	<90
10-15 years	<200
Adults	<100

Source: Field survey, 2022

Serum immunoglobulin-E level according to age group has shown in the above table. From the result it was found that age group 10-15 years had Serum Immunoglobulin-E level <200 which was maximum but age group <1 year had Serum Immunoglobulin-E level 1.5 which was minimum. On the other hand age group 1-5 years had Serum Immunoglobulin-E level <60, age group 6-9 years had Serum Immunoglobulin-E level <90 and adults had Serum Immunoglobulin-E level <100.

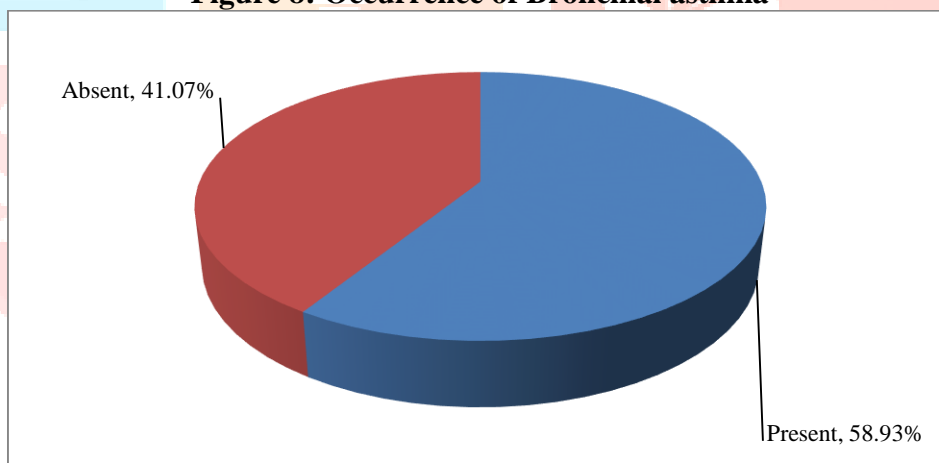
**Figure 7: Allergens distribution among the population**



Source: Field survey, 2022

Allergens distribution among the population has shown in the above graph. From the result it was found that 14.60% respondents suffered allergies due to fungi which was maximum but 7.30% respondents suffered allergies due to pollen which was minimum. On the other hand 10.50% respondents suffered allergies due to mites, 12% respondents suffered allergies due to dust and 9% respondents suffered allergies due to epithelia.

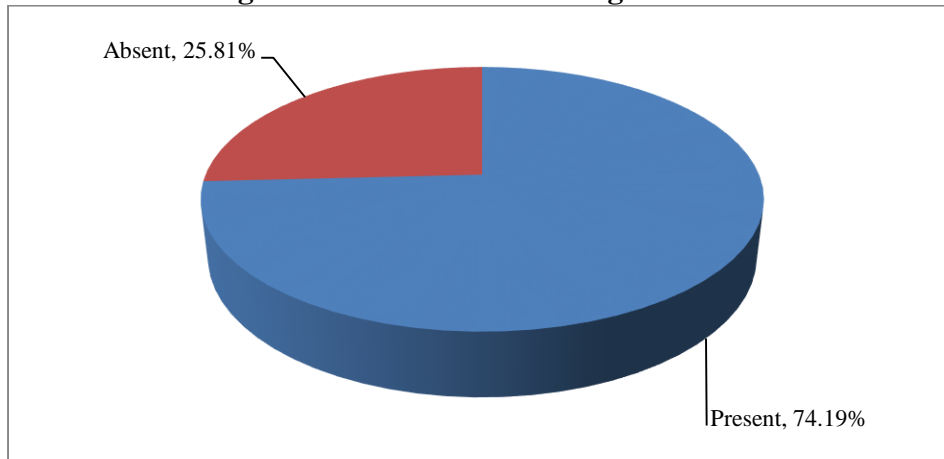
**Figure 8: Occurrence of Bronchial asthma**



Source: Field survey, 2022

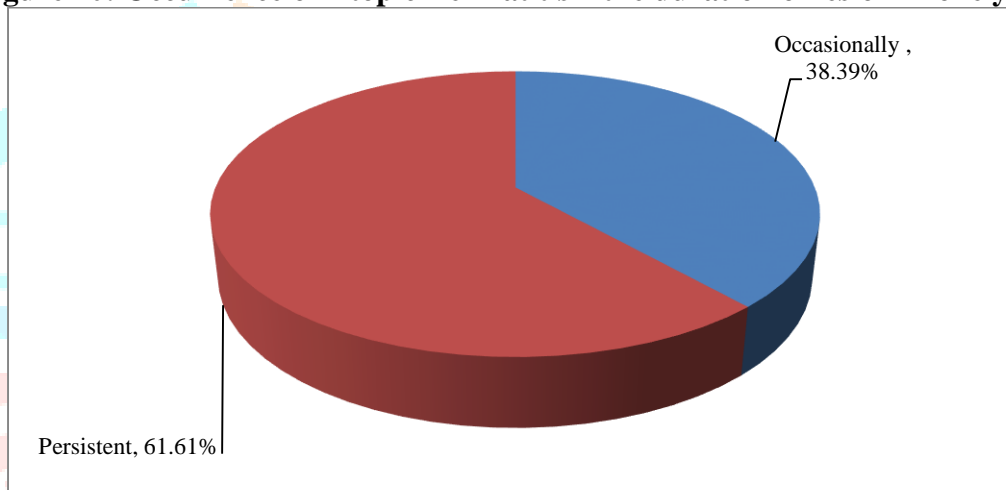
Occurrence of Bronchial asthma has shown in the above graph. From the result it was found that 41.07% respondents had Bronchial asthma and 58.93% respondents had no Bronchial asthma.



**Figure 9: Occurrence of allergic rhinitis**

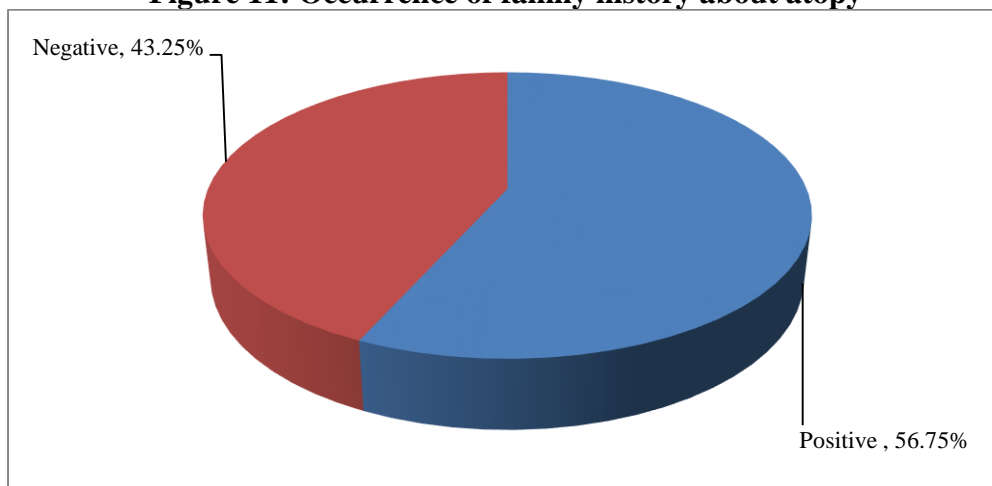
Source: Field survey, 2022

Occurrence of allergic rhinitis has shown in the above graph. From the result it was found that 74.19% respondents had allergic rhinitis and 25.18% respondents had no allergic rhinitis.

**Figure 10: Occurrence of Atopic Dermatitis – the duration of lesion in one year**

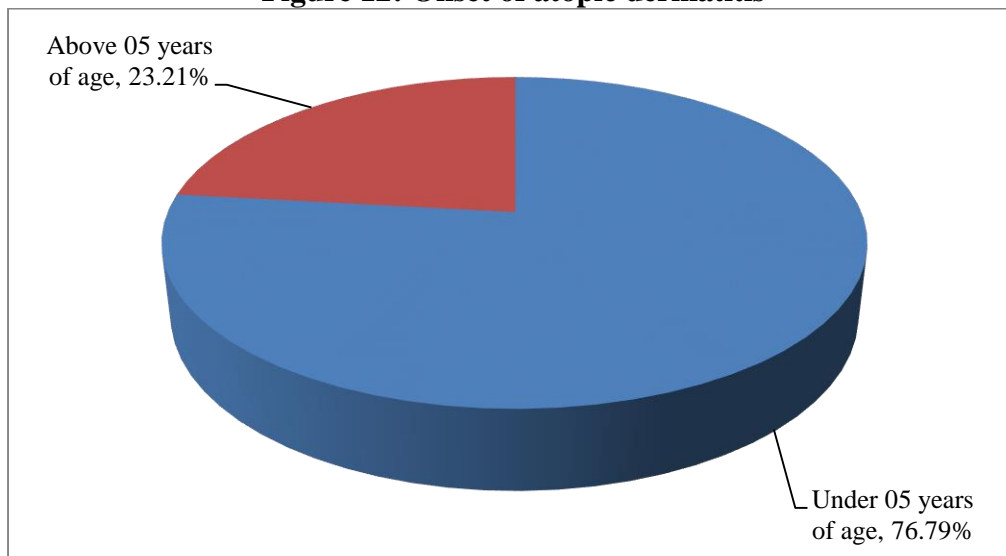
Source: Field survey, 2022

Occurrence of Atopic Dermatitis – the duration of lesion in one year has shown in the above graph. From the result it was found that 38.39% respondents had atopic dermatitis occasionally-the duration of lesion in one year and 61.61% respondents had atopic dermatitis persistently-the duration of lesion in one year.

**Figure 11: Occurrence of family history about atopy**

Source: Field survey, 2022

Occurrence of family history about atopy has shown in the above graph. From the result it was found that 56.75% respondents had family history of atopy and 43.25% respondents had no family history of atopy.

**Figure 12: Onset of atopic dermatitis**

Source: Field survey, 2022

Onset of atopic dermatitis has shown in the above graph. From the result it was found that 76.79% respondents found atopic dermatitis less than 05 years of age but 23.21% respondents found atopic dermatitis above 05 years of age.

**Table 2: Number of patients with confirmed allergy and with sensitization to examined foods (n=112)**

Name of Food	Food allergy confirmed	Sensitization
Milk	0.89	11.61
Wheat	2.68	13.39
Peanut	21.43	16.07
Soy	3.57	23.21
Egg white	6.25	15.17
Egg yolk	0.00	20.54
Total	34.82	65.17

Source: Field survey, 2022

Number of patients with confirmed allergy and with sensitization to examined foods has shown in the above table and graph. From the result it was found that respondents had food allergy for Milk, Wheat, Peanut, Soy, Egg white and Egg yolk.

**Table 3: Symptoms of food allergy (n=112)**

Food	Confirmed allergy	Oral allergy syndrome	Pruritus	Worsening of atopic dermatitis	GIT symptoms	Anaphylactic reaction breathlessness
Milk	1	1	1	1	0	0
Wheat	3	0	3	3	0	0
Peanut	24	19	4	4	4	2
Soy	4	2	2	2	2	0
Egg	7	2	5	5	0	1
Total	39	24	15	15	6	5

Source: Field survey, 2022

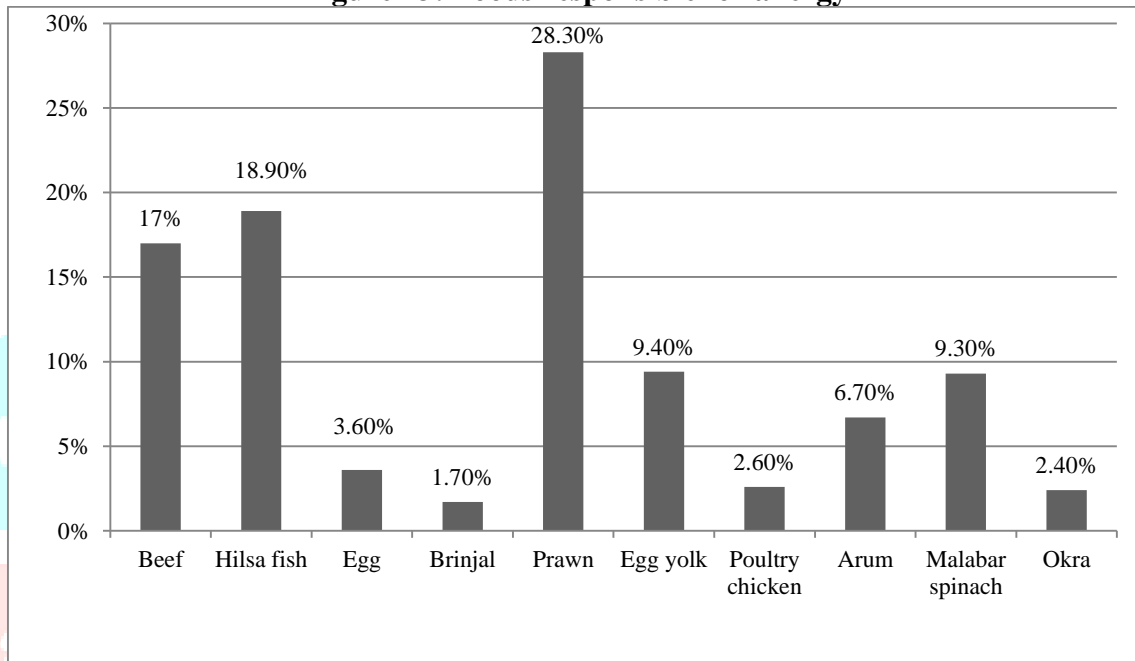
Symptoms of food allergy have shown in the above table. From the result it was found that food milk, wheat, peanut, soy and egg were responsible for allergy for some respondents.

**Table 4: Occurrence of bronchial asthma in patients suffering from allergy and in patients without allergy to examine foods. (n=112)**

Number of patients	BA present	BA absent	Total	P-value
FA present	18	13	31	<0.014
FA absent	27	54	81	
Total	45	67	112	

Source: Field survey, 2022

Occurrence of bronchial asthma in patients suffering from allergy and in patients without allergy to examine foods has shown in the above table. From the result it was found that the p value is less than 0.005 which was statistically significant.

**Figure 13: Foods responsible for allergy**

Source: Field survey, 2022

Foods responsible for allergy has shown in the above graph. From the result it was found that 28.30% respondents replied that prawn was responsible for allergy which was maximum and only 1.70% respondents replied that Brinjal was responsible for allergy which was minimum.

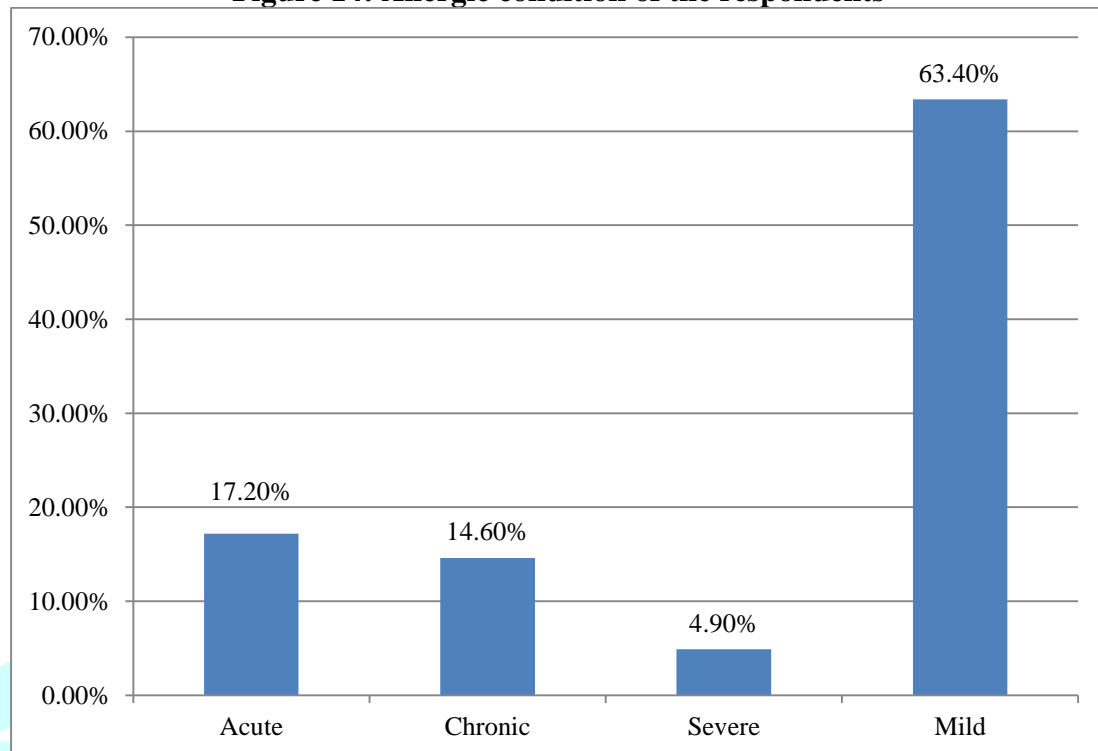
**Table 5: Symptoms of the respondents**

Symptoms	Percentage
Itching of the throat	7.90%
Itching of the mouth	9.30%
Hives	5.90%
Lip or tongue swelling	3%
Dyspnoea	4.10%
Diarrhea	1.30%
Swelling of the throat	2.40%
Difficulty swallowing	1.90%
Abdominal pain	3.30%
Rash in skin	22.70%
Itching on skin	28.50%
Vomiting tendency	4.30%
Anaphylaxis	0.1%
Itching on the eyes	5.30%

Source: Field survey, 2022

Symptoms of the respondents have shown in the above graph. From the result it was found that 28.50% respondents replied that itching on skin was symptoms of allergy which was maximum but only 0.1% respondents replied that Anaphylaxis was symptoms of allergy which was minimum.

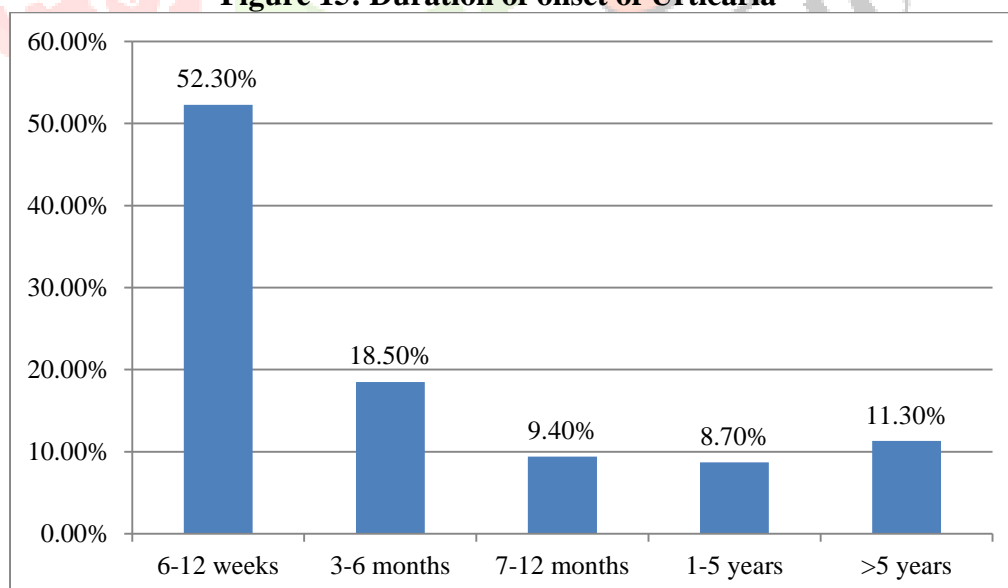
**Figure 14: Allergic condition of the respondents**



Source: Field survey, 2022

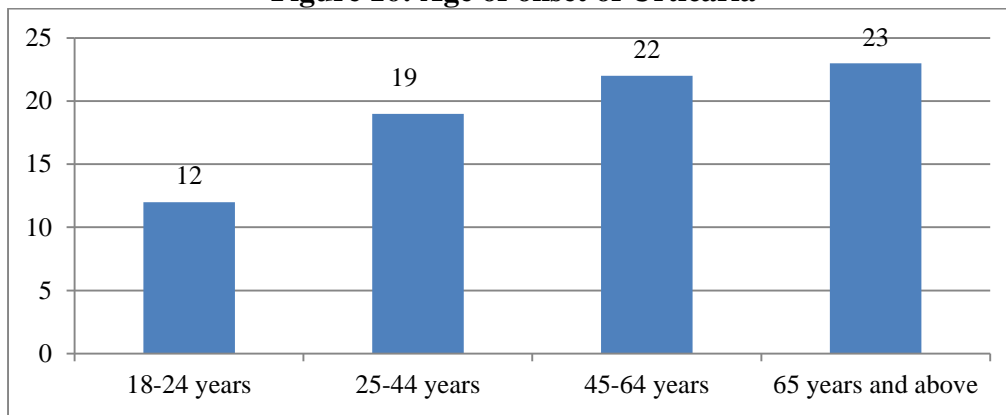
Allergic condition of the respondents has shown in the above graph. From the result it was found that 63.40% respondents had mild allergy which was maximum but only 4.90% respondents had severe allergy which was minimum. On the other hand 17.20% respondents had acute allergy and 14.60% respondents had chronic allergy.

**Figure 15: Duration of onset of Urticaria**



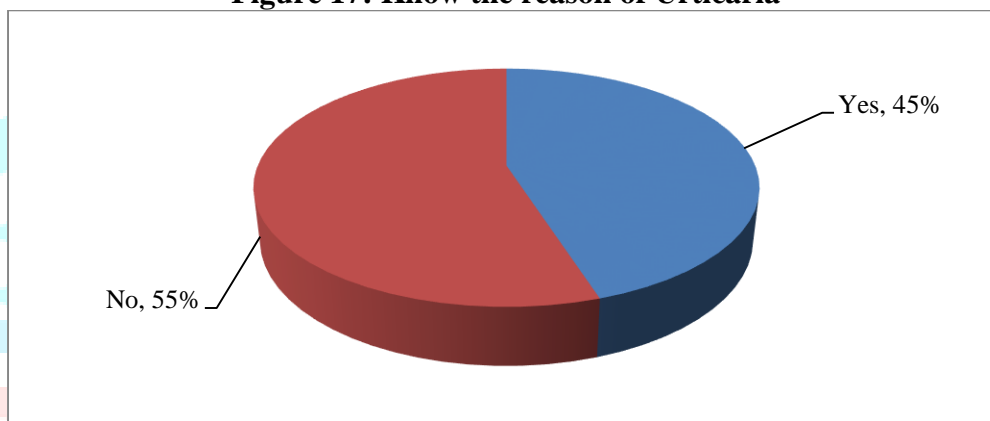
Source: Field survey, 2022

Duration of onset of Urticaria has shown in the above graph. From the result it was found that 52.30% respondents replied that they had Urticaria 6-12 weeks which was maximum but 8.70% respondents had Urticaria 1-5 years which was minimum.

**Figure 16: Age of onset of Urticaria**

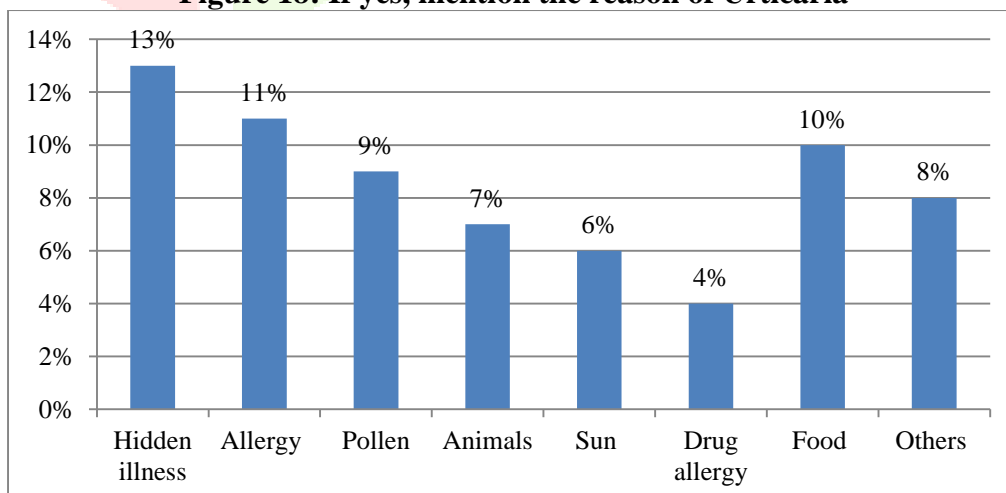
Source: Field survey, 2022

Age of onset of Urticaria has shown in the above graph. From the result it was found that 23 respondents noticed Urticaria 65 years and above which was maximum but only 12 respondents noticed Urticaria 18-24 years and above which was minimum.

**Figure 17: Know the reason of Urticaria**

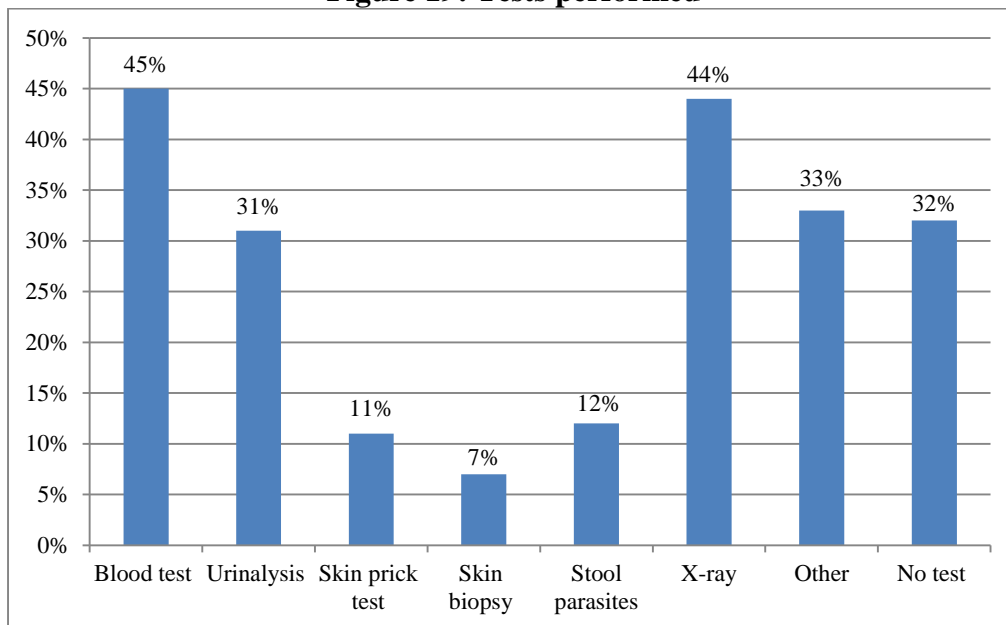
Source: Field survey, 2022

Whether the respondents know the reason of Urticaria has shown in the above graph. From the result it was found that 45% respondents knew about the reason of Urticaria but 55% respondents did not know about the reason of Urticaria.

**Figure 18: If yes, mention the reason of Urticaria**

Source: Field survey, 2022

Reason of Urticaria has shown in the above graph. From the result it was found that 13% respondents replied that Hidden illness was the reason of Urticaria which was maximum but only 4% respondents replied that drug allergy was the reason of Urticaria which was minimum.

**Figure 19: Tests performed**

Source: Field survey, 2022

Name of Tests has shown in the above graph. From the result it was found that 45% respondents replied that they did Blood test which was maximum but only 7% respondents replied that they did skin biopsy which was minimum.

### CONCLUSION AND RECOMMENDATION

From the result it was found that male patients faced more IgE mediated allergic disorders than female. IgE mediated allergic disorders found more in autumn (August-November) season followed by winter (December-January). Illiterate people suffered more IgE mediated allergic disorders than educated people. IgE mediated allergic disorders occur more in working people. More people suffered IgE mediated allergic disorders due to fungi. Most of the respondents had allergic rhinitis. Most of the respondents had family history of IgE mediated allergic disorders. Respondents had food allergy for Milk, Wheat, Peanut, Soy, Egg, beef, shrimp, white and Egg yolk. Many respondents replied that itching on skin was symptoms of allergy. Some respondents noticed Urticaria 65 years and above which was. Most of the respondents did not know about the reason of Urticaria. Hidden illness and drug allergy was the reason of Urticaria. So to stop or minimize IgE mediated allergic disorders it is very much essential to early detection and proper treatment. Responsible Government authorities should take immediate initiatives to stop or minimize IgE mediated allergic disorders.

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