

## ANALYSIS OF ALLERGIC REACTIONS CAUSED BY VARIOUS FOODS AND THEIR EFFECT ON INDIVIDUALS RESIDING IN LUCKNOW CITY

---

Deepti Mishra\*

### ABSTRACT

Allergy means altered or abnormal tissue reaction after exposure to an antigen (also called allergen). Allergic reactions occur if the body tissues are sensitive to allergen. Allergic reactions are caused by wide variety of substances and conditions. We have seen a rapid rise in incidence of food allergy in recent years. Oral allergy syndrome is now the commonest food allergic manifestation in adults. There are wide variety of foods that cause allergy like milk, eggs, vegetables, fruits, sea foods and meat etc. Since they are commodities consumed almost daily so, there is a need to know which one is the most allergic and what symptoms do they cause during allergy. There are various causes of these allergies like natural salicylate in foods, lactose, amino acids. Apart from growth of pests and molds also lead to allergic reactions which reach out body by various means. The survey conducted by me was depicted the quite often we do not hear complains of allergic reactions. Out of the 105 respondents 33.43% population was found to be allergic and rest were non allergic. The standard deviation was calculated to be 11.89. The common allergic foods were sea foods, milk and wheat. The most common test used to detect was skin prick test. It is not believed that adverse food reactions are responsible for many undiagnosed health complaints. As a result numbers of health practitioners are using allergy avoidance diets to identify food allergies and food intolerance in their patients so; allergy is a current topic of discussion. The research will help me find out the most common allergy causing foods and their effect on human body.

**Keywords:** Allergens, Avoidance Diet, Antigens, Food Anaphylaxis, IgE Mediated Allergy, Rhinitis.

---

### Introduction

People use the term “**food allergy**” to refer to virtually any type of problem they have with food. At one extreme are people who believe allergies to milk, wheat, and sugar are to blame for hyperactivity and a host of other behavioral problems in children. At the other extreme are some health professionals who think people who complain of food allergies need to have their heads examined rather than their body’s reaction to foods.

Food allergies are real and can be very serious. At the minimum, true food allergies can cause a rash or an upset stomach. At the maximum, they can lead to death. Unreal food allergies cause problems, too. They can lead people to eliminate nutritious foods from their diets and eventually in health problems. One of the most intriguing aspects of food allergies is the frequency and ease with which foods are falsely blamed for a variety of mental and physical health problems.

It may seem odd that a system that helps the body conquer bacteria and viruses is involved in “protecting” us from normal constituents of food. In people with allergies, however the cells recognize some food components as harmful- just as they recognize bacteria and viruses. Components of food that trigger the immune system are called **food allergens**.

---

\* Assistant Professor, Department of Home Science, Ramadhin Singh Girls Degree College, Lucknow, U.P., India.

Exposure to trace amounts of an allergen in peanuts, nuts, fish, and shellfish can cause anaphylactic shock. This massive reaction of the immune system can result in death, caused by the cutoff of the blood supply to tissues throughout the body. Symptoms of food allergies may occur within seconds after the body is exposed to the food allergen or they may take up to two hours to occur. The symptoms often disappear within two hours after they begin.

Many foods may cause allergic reactions in susceptible individuals. Nevertheless, approximately 90% of all food allergies are caused by four foods: cow's milk, eggs, peanuts, and nuts and wheat. Soy and fish are also relatively common sources of food allergies. Food challenges are best undertaken under medical supervision. True food allergies can serious reactions, and immediate help may be needed. They are totally omitted from the diet.

After a food allergy is confirmed the food is eliminated from the diet. This is the only treatment available for food allergies. If the eliminated food is an important source of nutrients or is found in many food products, consultation with a registered dietician is recommended.

People with food allergies have to be careful about what they eat and should have a plan of action ready in case they develop a serious reaction. Becoming highly knowledgeable about which foods and food products contain ingredients that cause an adverse reaction is essential.

### **Objectives**

- To analyze various allergy causing foods.
- To identify the effects of these allergic reactions on individuals.
- To determine the basic cause of these allergic reactions by various foods.
- To see the consumption pattern of food commodities in diet of the people and know their case history and other specific details by questionnaires.

### **Review of Literature**

Adverse food reactions, also called food allergies and food intolerances, affect millions of people, and are believed to cause a variety of common health complaints and disease. Many nutritionists and physicians believe that the only definitive way to identify and manage adverse food reactions is through an Allergy Avoidance Diet.

Some health care practitioners prescribe an Elimination Diet followed by food challenges. In an Elimination Diet, any food that is suspected of causing an allergy or intolerance is eliminated for a period of four days to three weeks, until symptoms are gone. Depending on the severity and type of symptoms, an Elimination Diet may range from moderately to severely restrictive in the amount of foods allowed.

Once the body has adjusted to the absence of suspected foods, these foods are systematically added back into the diet, and any resulting symptoms are eaten only once every four days. An Allergy Avoidance Diet may be especially An alternative way to manage adverse food reactions is to follow a Rotation Diet.

### **Principles**

Although the term "food allergy" is sometimes used to describe all adverse reactions to food, the term is more often used to refer specifically to food reactions that are mediated by the immune system. To protect us from illness and disease, our immune systems are continuously trying to lessen the danger represented by substances called antigens. Antigens are parts of proteins that our bodies recognize as dangerous and take steps to neutralize. Antigens can be found most anywhere there is protein – in foods, of course, but also in microorganisms like bacteria.

Allergic reactions to food, also called food hypersensitivities, are further classified as either immediate or delayed. Immediate hypersensitivity reactions occur within hours or even a few minutes after a food is eaten, typically causing very obvious physical symptoms such as a rash, the hives, a running nose, or a headache.

For example, some food intolerances are caused by enzyme deficiencies, while others are caused by poor function of the digestive tract or a sensitivity to a natural or synthetic chemical.

This re-addition of foods is called the "challenge" phase of the diet. On the first day of food challenges, a food is eaten one to three times during the day. Over the next few days, the dieter returns to the Elimination Diet, and watches for the return of any symptoms.

### **True Food Allergy**

True Food Allergy, is an Immediate IgE Mediated Allergic Hypersensitivity reaction, which involves antibodies that cause tissue Mast Cells to release histamine, resulting in tissue inflammation and swelling. A small protein particle called an allergen is responsible for triggering the antibody response. The antibody called Immunoglobulin E (IgE) accounts for 90% of True Food Allergic reactions. A reaction can occur to minute traces of the offending allergen and in exquisitely sensitive individuals, even airborne food allergen can trigger anaphylaxis – as in fish and peanut allergy.

In adults, the foods commonly implicated in anaphylaxis are Peanuts, Tree nuts, Shellfish, Fish and Egg. Another interesting immediate food allergic phenomenon is that of the Oral Allergy Syndrome. Here the allergic reaction is localized to the mouth and throat and is triggered by allergy to Fruit and Vegetables such as Apple, Peach, Celery, Tomato and Cherry. In adults we also see exacerbations of eczema and rhinitis in food allergy but rarely isolated asthma due to food allergy. Other manifestations involving the lower GI tract are vomiting and diarrhea.

### **Food Intolerance (Non-allergic food Hypersensitivity)**

Food Intolerance (or Non-Allergic Hypersensitivity) is an adverse reaction that is not immune mediated and generally doesn't lead to anaphylaxis as no specific IgE response is generated. Reactions are dose-dependent – smaller amounts of the offending food are tolerated, but at a certain dietary threshold a clinical response will occur. This may be due to an enzyme deficiency as in Lactose Intolerance. Here the enzyme Lactase is depleted resulting in cramps, flatulence and frothy diarrhea after drinking cows milk. It is an inherited trait and affects up to 10% of the population, beginning in teenage years and gets worse with advancing age.

Intolerance to Sucrose in table sugar and fruit can lead to similar symptoms There is a great deal of cross-reactivity between the various nuts and several nut allergens are often implicated. The oils of nuts contain very little protein of the nut allergen, and are often safe to consume in nut allergic people. However beware of low quality cold pressed oils that may contain nut allergen. Roasting and processing of nuts paradoxically increases their allergenicity.

The major nut culprits are predominantly Peanuts, Brazil nuts, Almond, Hazelnuts, and then to a lesser extent Walnuts, Cashew, Pecan, Coconut, Pistachio, Chestnut, Poppy and Sesame seeds.

### **Food Anaphylaxis**

The aim of nut anaphylaxis management is to clearly identify the culprit nut by skin testing, RAST testing or provocation testing. Once identified strict avoidance is the main strategy - Patients are particularly at risk when eating out in restaurants, at children's birthday parties, school dinners and processed ready to eat warm up meals from supermarkets.

### **Food Toxic Reactions**

Food Toxic reactions have no immune basis, but are due to bacterial endotoxins and contaminants. This results in vomiting, diarrhea, flushing and certain neurological symptoms in all individuals who consume the food. Other biologically active toxins include algae that infest shellfish with paralytic neurotoxins, glyco-alkaloids in potatoes and amatoxin in mushrooms. Mycotoxins in grain produce such as wheat, rye, barley and oats can cause Ergotism with gangrene and convulsions. Scombrotoxicity occurs when fish putrefies and releases histamine causing allergy-like reactions.

### **Typical IgE Mediated Allergy**

This usually presents with an acute urticarial rash that starts on the face and neck then spreads to the rest of the body experience diffuse itching, even experience throat tightening with edema and wheezing after eating fruit and nuts.

True IgE mediated food allergy occurs within minutes and most reactions will have evolved within one hour of contact with the triggering food. While minute traces of the food ingested will trigger a reaction, even inhalation of food essence or skin contact with the food can trigger life-threatening anaphylaxis.

The common offending foods in pediatric practice that account for 90% of pediatric food allergy are Cows milk protein, Hen's egg white, Wheat, Peanuts, Cod fish and Soya bean. 20% of cow's milk allergic people will also develop allergy to soya milk.

### **The Natural History of Food Allergy**

The natural history of food allergy in adults is slightly different from that in children, who tend to rapidly outgrow their allergies. As a result food allergy is more common in children but most will outgrow it. Up to 6% of children suffer with true food allergy, while only 1-2% of adults have true IgE mediated food allergy.

If foods are completely avoided, up to 30% of adults will become clinically non-reactive to an offending food over a 2-year elimination period. They will however remain atopic - that is maintain a positive Skin Prick Test or retain specific IgE antibodies to the food, but have no reaction if they eat the food. Certain foods are highly allergenic and allergy to them is unlikely to be outgrown - these are usually foods with heat resistant allergens. Peanuts, Nuts, Shellfish and Fish fall into this category. Food allergy also arise from country to country depending on local eating habits - the more a food is consumed in a country - the higher the incidence of allergy to it.

### **Nut Allergy**

Cases of suspected Nut allergy and anaphylaxis are frequently referred to the allergy clinic. It is becoming more and more common and is a serious cause of fatal and near-fatal allergic reactions. Once sensitized in childhood allergy is usually lifelong and rarely decreases in severity. Only 10% will outgrow nut allergy, while 80% or more will outgrow.

### **Oral Allergy Syndrome**

The Oral Allergy Syndrome is a fascinating disease entity. It has more recently been renamed Pollen-Food allergy syndrome.

### **Other Food-Pollen Allergic Reactions**

As mentioned, the Birch pollen-Apple oral Allergy Syndrome is commonly seen in Apple, Hazelnut, Carrot, Cherry, Pear, Tomato, Celery, Potato and Peach.

Other pollen-food allergic syndromes include Grass pollen allergic rhinitis who have oral allergy to Melon, Orange, Tomato and wheat. Ragweed allergic people may react to Melon and Banana, While Mugwort allergic react to Apple, Carrot, Celery and Melon. People who are sensitized to natural latex in rubber gloves, catheters etc may react in a similar way to Avocado, Banana, Chestnut and Kiwi fruit and may even develop anaphylaxis to these foods. Fruit, grass pollen allergic people may react to melon, cereals and tomatoes, while those allergic to latex, react to avocado, chestnut, banana and kiwi-fruit. Profilin generally causes milder reactions and is destroyed by heat and cooking

### **The Rising Incidence of Food Allergy — Why?**

We have seen a rapid rise in the incidence of food allergy in recent years. Oral allergy syndrome is now the commonest food allergic manifestation in adult and parallels the rising incidence of pollen allergic Hayfever.

- Cereal containing Gluten and products thereof.
- Crustaceans and products thereof.
- Eggs and products thereof.
- Fish and products thereof.
- Peanuts and products thereof.
- Soybeans and products thereof.
- Milk and dairy products (including lactose)
- Nuts and nut products
- Celery and products thereof.
- Mustard and products thereof.
- Sesame and products thereof.

### **Food Induced Rhinitis**

Rhinitis is a frequent problem in adults and 30 to 50% of adults have allergic rhinitis – mainly triggered by inhalant allergens.

### **Respiratory System**

- Non-seasonal runny nose, nasal congestion

- Allergic rhinitis (hay fever)
- Allergic conductivities (red, itchy eyes)
- Inflammation and fluid in the middle ear
- Asthma
- Throat swelling

#### **Skin**

- Hives
- Eczema
- Swelling of the mouth, eyelids and lips (angioedema)
- Itching skin

#### **Digestive System**

- Diarrhea
- Constipation
- Nausea and/or vomiting
- Burping
- Bloating
- Flatulence
- Upset stomach or indigestion
- Stomach aches

#### **Brain and Nervous System**

- Poor concentration
- Exhaustion
- Insomnia
- Migraine headaches
- Dizziness
- Irritability or Aggression
- Hyper activity, Agitation, Anxiety

#### **Miscellaneous**

- Dark circles under eyes
- Paleness
- Excessive sweating or Slight fever
- Rapid heartbeat
- Muscle aches and pains
- Bed wetting
- Frequent urination and Excessive thirst

#### **Case History**

A careful history is the basis for the diagnosis and management of allergic diseases. The principle of history taking is the same for any medical problem (When, Where & What). General points of particular importance are :

- Family history of allergies (Atopy)
- Dietary factors e.g. hives within 1 hour of eating.
- Diagnosis of Food Allergy

#### **Skin Tests**

Skin test procedures are used by many doctors to identify allergens responsible for the symptoms. There are several methods of skin testing.

**Patch Tests**

Patch testing is used in the investigation of allergic contact dermatitis. The test performed by using a small piece of blotting paper, moistened with the suspected substance, or a prepared strip containing various standard allergens.

**Provocation and Elimination Tests**

These test are performed in the eyes and nose in hay fever sufferers.

**Skin test and RAST Test**

Because of the limitations and disadvantages associated with skin and provocation tests, there has been a need for more convenient and reliable methods. Today there are laboratory tests available that accurately measure IgE, and a small blood sample is sufficient for allergy testing.

**Technique in Food Challenges**

- Should only be conducted in clinic or hospital setting with proper equipment at hand.
- Suspected food allergens should be eliminated for 7-14 days before challenge in IgE-mediated disorders and up to 12 weeks in some gastrointestinal disorders.
- Food challenge administered in fasting state.
- The food can be administered whole (masked in infant formulae or pureed).
- Negative blind challenge should be followed by open feeding under observation.

**Food allergens reliably tested by skin prick test**

- Milk
- Eggs
- Peanut
- Wheat
- Soy
- Fish & Shellfish
- Fruits & Vegetables

**Emergency Treatment**

- People with severe food allergies who are at risk of anaphylaxis need to take precautions. Despite reading menus and ingredients lists carefully, it is easy to eat a problem food by accident. A tiny amount in a dish can still trigger a severe reaction.
- Ensure that your doctor teaches you how to cope if you have an allergic reaction.
- Wear a bracelet or carry a card that details your allergy.
- Carry a pre-loaded adrenaline syringe (eg. EpiPen). You must know how to use it in the event that you have an anaphylactic shock. Let your work colleagues know of your allergy, and how they can help in the event of an emergency.
- If your child has a severe allergy you must make sure that all their carers and teachers have the knowledge and ability to react correctly in an emergency.

**Methodology**

The significant demographic changes noticed mortality statistics is same or only marginally occurring cases of allergy. Basically the middle aged group people suffering from allergy. Allergy does not seem to be a major problem but in India but the cases are increasing from time to time.

“Analysis of different allergic reactions caused by various foods and their effect on the people of Lucknow” was carried out in the present study. The following methodology was adopted for the study.

**Selection of Samples**

Three stages of sampling were adopted for the present study.

- Stage 1 : Selection of city
- Stage 2 : Selection of Hospital
- Stage 3 : Selections of Respondents

### Selection of City

The city of Lucknow was selected purposively for the study as it is the home town and there are many clinics through which required information can be obtained.

### Selection of Health Clinics

From different clinics we could know the various allergic foods, their symptoms, effects on people, various tests for assessing allergy etc.

### Selection of Respondents

List of patients of allergy were selected from the clinics. They were then personally visited to know various things and they mainly belonged to MIG's.

### Method of Enquiry

Dietary survey method was adopted to collect the data from respondents. The respondents were interviewed personally with the help of pre-tested schedule. The schedule information on :

- Demographic data
- Anthropometric data of subjects include present weight and height.
- Specific information
- Dietary pattern

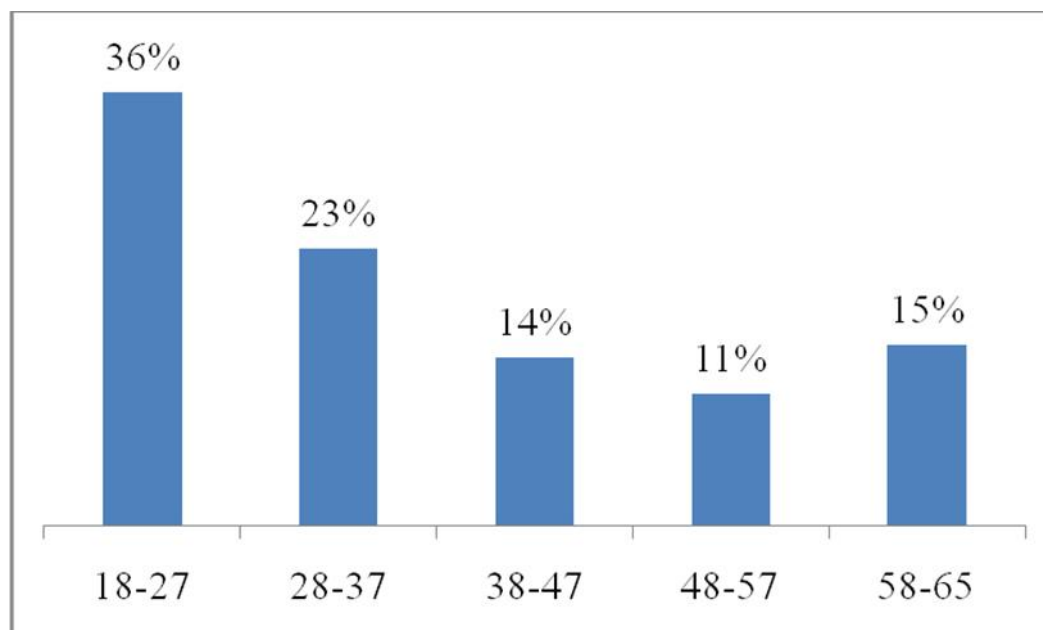
### Method of Analysis

Tabular method and statistical analysis was adopted for the survey and interpretation of results. The result was calculated in the form of Mean, Median, Mode and Standard deviation. Graphs were made according to the given data that was collection through questionnaires.

### Result and Discussion

**Table 1: Age Groups**

Range	Respondents N = 105	%
18-27	38	36%
28-37	24	23%
38-47	15	14%
48-57	12	11%
58-65	16	15%

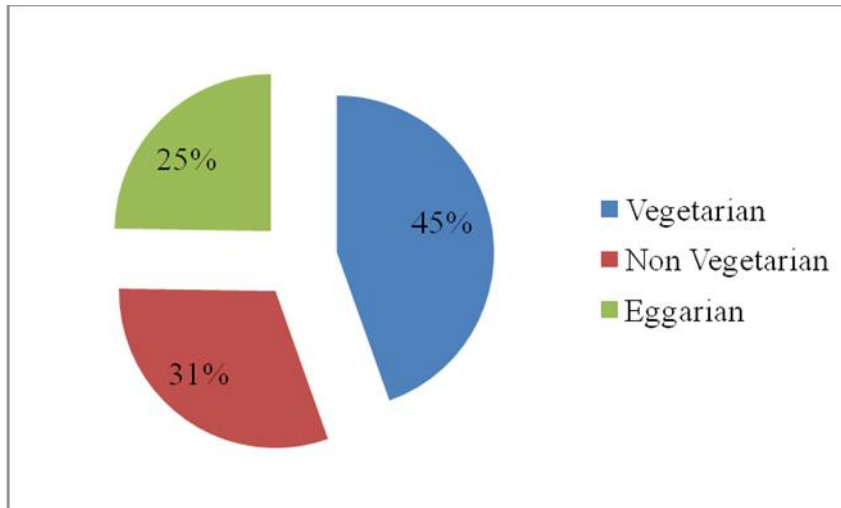


**Fig. 1: % of Respondents according in age groups**

All the respondents for the survey were divided into various age groups. The most no. of respondents were from the age groups 20-30 who were allergic to various foods.

**Table 2 : Food habit**

Food habit	Respondents N = 105	%	O
Vegetarian	47	45%	161
Non-vegetarian	34	31%	110
Eggarian	26	25%	89

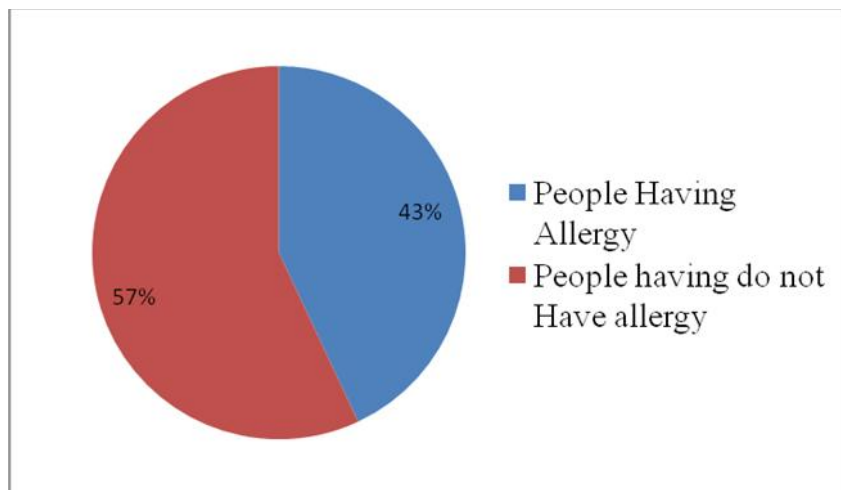


**Fig. 2: Food habit**

The most no. of Respondents were vegetarian including 45% of the population. Last no. of people were Eggarian.

**Table 4.5: % Population Suffering from Allergy**

Condition	Respondents N = 105	%	O
People Having Allergy	45	43%	154
People having do not have allergy	60	57%	206



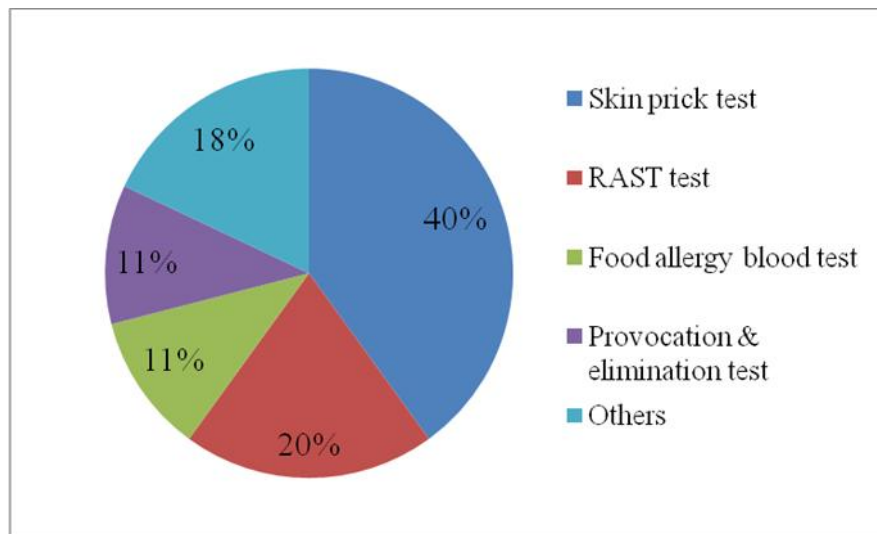
**Fig. 5.5: Population Suffering from Allergy**

Out of the total population 43% of people were suffering from allergy and 57% were free from allergy.



**Table 4.6: Most Common test done**

Test	Respondents N = 105	%	O
Skin prick test	18	40%	144
RAST test	9	20%	72
Food allergy blood test	5	11%	40
Provocation & elimination test	5	11%	40
Others	8	18%	64

**Fig. 5.6: That most common test done**

The common test done or referred by doctors was skin prick test through which people confirmed their allergy 40% respondents had skin prick test.

### Summary and Conclusion

The study entitled "Analysis of various allergic foods and their affect on people of lucknow city" was undertaken with following objectives:

- To analyze various allergy causing foods.
- To identify the effects of these allergic reactions on individuals.
- To determine the basic cause of these allergic reactions by various foods.
- To see the consumption pattern of food commodities in diet of the people and know their case history and other specific details by questionnaires.

The methodology adopted was survey method. The study consisted of three stage sampling technique.

- Selection of city- Lucknow city was selected for the study.
- Selection of health centres and hospitals- Basically private clinics were selected for the purpose.
- Selection of respondents- 105 respondents were selected who were interviewed.

Survey method was adopted for the enquiry. A pretested schedule was used for collection of data which was analyzed by tabular and statistical method. The results withdrawn were as follows:

All the (N=105) respondents were from high and middle income group belonging to the age group of 18 to 65 years from various areas of Lucknow.

The activity level of people was sedentary and some were moderate as well. 57 respondents were female and 48 were male.

By inspection the maximum frequency of person who were allergic to various foods were in the age group 20 to 30.

Among the respondents the dietary habits of people is as follows:

- Eggarian- 24.67%
- Non-vegetarian- 30.47%
- Vegetarian- 44.76%

Health status of the respondents by comparing weight for height was normal however some of them were over weight.

Among the population of people 33.43% respondents were allergic to foods like Egg, brinjal, tomato, flesh foods, sea foods, wheat, nuts, soyabean, milk, orange, carrot, peanut, potato etc.

Respondents also had various tests done for conforming allergy and the most common among them was 'Skin prick test'.

The meal pattern followed by people was 21.67% preferred to had breakfast, lunch and dinner, 20% took morning tea, breakfast, lunch and dinner, 5.00% took breakfast and dinner.

The no of people who were Asthmatic were 30.48% while those who were allergic to food were 42.86% and 20.95 were allergic to spices. Out of the 105 respondents the percentage of people who were suffering from allergy as well asthma were 21.90%.

The people who had allergic got 'skin prick test' done most commonly. From the above data the calculated mean was 33.43, median was 18 and the mode was 26.45. The age group in which allergy occurred the most was 20-30.

### **Conclusion**

It is concluded that there is not very much population of people who are allergic yet those who are allergic face severe problems related to there health.

From the survey we found that the common foods that cause allergy are milk, egg, meat, sea foods, wheat flour, nuts and some vegetables. Some people are also allergic to spices like rye, mustard seeds, red chilli powder etc.

There were several health problems faced by people who were allergic like vomiting, diarrhea, itching, stomach ache, dizziness, high BP, coughing, rashes, fainting, cramping, swelling of lips, face, throat, nasal congestion, sneezing etc. If foods that cause allergy are consumed they may be fatal as well so the best way to prevent these ill effects is to totally omit them from your diet and replace them from other foods to retain the nutritional value.

### **Suggestions**

It is necessary for successful treatment that the allergens are accurately identified. There are three main objectives in the management of allergic disease:

- To eliminate causative factors from the immediate environment, where possible.
- To reduce irritation in the tissue (i.e., to treat the symptoms with different drugs).
- To decrease immunological reactivity by vaccination.
- It is very important to consult your doctor about the treatment and diet most suitable for you.

### **TIPS**

Always carefully read the label of the foodstuffs you use. Sometimes the allergen is used in a dish or a snack. By finding out about the composition of dishes or snacks you may be able to avoid an allergic reaction.

- Avoidance of all foods which contain gluten (wheat, rye, barley, oats) is essential as is adequate vitamin intake.
- Processed foods should be avoided and all labels need to be carefully read. Watch for hidden sources of gluten such as hydrolyzed vegetable protein, textured vegetable protein and hydrolyzed plant protein.
- Avoid all derivatives of wheat, rye, barley and oats such as malt, modified food starch, some soy sauces, grain vinegars, binders, fillers, recipients and natural flavorings.

- People with celiac disease need fibre and foods rich in iron and B vitamins. Rice, nuts, sunflower seeds, raisins, figs, seedy fruits (raspberries, strawberries, blackberries) are suitable.
- Celiac disease causes malabsorption of the B vitamins and the fat-soluble vitamins A, D, E and K so ensure adequate intake of these vitamins in addition to vitamin C.
- Ensure an adequate intake of the minerals iron, zinc (and copper to balance the zinc), calcium.
- Essential fatty acid supplementation is also necessary for the villi in the intestines.
- Proteolytic enzymes to aid in digestion and absorption are also useful.
- Use supplements that are hypoallergenic, wheat-free and yeast-free.
- Drink at least 8 glasses of filtered water per day.
- Because food allergy can be life-threatening, the allergy-producing food must be completely avoided.
- Most life-threatening allergic reactions to foods occur when eating away from the home. It is important to explain your situation and needs clearly to your host or food server. It is very important to know how cross-contact of foods can occur in a restaurant, bakery, or home, in order to safeguard yourself against an allergic reaction.
- Always look at the listings on labels to determine the presence of the eight major allergens. Since food and beverage manufacturers are continually making improvements, food-allergic persons should read the food label for every product purchased, each time it is purchased.

#### References

1. Hannaway. J. Paul, Nature of Food Allergy.
2. Dr. Richardson Alex, Allergies : Ultimate guide on how to handle Allergies & Allergic Reactions.
3. McCann M. Pancreatic enzyme supplement for treatment of multiple food allergies. Ann Allerg 1993; 71:269 (abstr#17)
4. Avakin S. Further studies on the absorption of chymotrypsin. Clin Pharmacol Ther 1964; 5:712-15.

