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Understanding Food Allergy Reactions and Safe Food Products in the Industry

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ABSTRACT

Allergic reactions to food have become more common, especially in Western parts of the world and they can harm people's health. Immune reactions to food proteins can produce anything from slight discomfort to dangerous conditions, including anaphylaxis. As people change their eating habits, more food hypersensitivities are being found, creating health challenges for the entire community. This study examines the causes, working of the body, frequency, signs and understanding about food allergies by society. Full research combines real-world data from a global group of 100 people, illustrating that labelling food clearly, being aware and taking measures upfront are important for allergic reactions. In addition, the study points out that different areas of medicine should collaborate to help manage allergy problems related to the foods we eat.

Keywords: Food Safety Regulations, Food Allergies, Allergen Labelling, IgE-Mediated Reactions, Dietary Restrictions, Allergen Awareness

1. INTRODUCTION

Food allergies happen when the immune system responds unusually to certain proteins in food, often being IgE-mediated or based on other triggers (NIAID, n.d.). When the immune system mistakenly sees a normal food protein as dangerous, it stimulates various parts of the body to act against it. Symptoms can involve skin irritations like hives and eczema, upset stomach with vomiting or diarrhoea and trouble breathing, with wheezing. In the most dangerous situations, being exposed to allergens can cause anaphylaxis, a condition that could be deadly.

An increase in food allergies in countries of all levels of development is a clear sign of a major public health problem. This may be explained by genes passed down in families, outside conditions, diet habits and more people telling authorities. Therefore, it is urgent to consider food allergies from a medical and also a social and official viewpoint. The purpose of this paper is to analyse food allergies from all angles, explain their causes and offer suggestions for their management and prevention.

The goal of this research involves:

- Explaining the body's reactions that occur when someone has a food allergy.
- Noticing the ways a disease appears and the signs it causes in people affected.
- Looking at the ways you treat issues and the emergency procedures you use.
- Showing how it benefits patients when doctors and nurses collaborate in alleviating allergies.

2. LITERATURE REVIEW

2.1 Definition and Types of Food Allergies

According to the NIAID, having a food allergy means that the same health reaction keeps happening when you eat a specific food as a result of your immune system (NIAID, n.d.). Mostly, these reactions fall into IgE-mediated, non-IgE-mediated and mixed-type classes.

- **IgE-mediated :** Most hypersensitivity reactions involve IgE and might have quick symptoms including urticaria, anaphylaxis and angioedema.
- **Non IgE-mediated:** These allergies normally cause digestive symptoms to appear after a delay, for example in FPIES.
- **Mixed Type:** Allergies of this kind use both ways and are commonly linked to conditions such as eosinophilic esophagitis.

Most allergic reactions around the world are caused by milk, eggs, peanuts, tree nuts, fish, shellfish, soy and wheat (FDA, 2022). While in North America, peanut allergies are more likely to happen, people in Asia are more often allergic to fish and seafood (FAO/WHO, 2021).

2.2 Epidemiological Trends

The latest proof suggests that food allergies are now much more common globally, especially in and around industrial regions. It is thought that from 6% to 8% of children and from 3% to 4% of adults worldwide suffer from ADHD (Gupta et al., 2019). Childhood peanut allergies in the United States have more than tripled during the period from 1997 to 2008.

Some people have suggested different ideas to explain these trends.

- Exposure to germs can be protective for developing allergies, so avoiding it may raise the likelihood of allergic diseases.
- Not giving allergenic foods to children may contribute which is why pediatric dietary guidelines have recently changed (LEAP Study, 2015).
- Because awareness and abilities to diagnose have risen, there are now more people reporting such incidents.

Yet, many cases of food allergy in developing countries are unreported because people lack access to both diagnostic resources and proper healthcare.

2.3 Pathophysiology and Risk Factors

Food allergies depend on a series of reactions as part of the immune process. To start with, being exposed to a food antigen leads to sensitization, as T-helper 2 (Th2) cells become active thanks to antigen-presenting cells which induces B cells to make the needed IgE antibodies. If you're exposed to the allergen again, IgE antibodies lead mast cells to release histamine and other body chemicals responsible for allergic symptoms (NHS, n.d.).

Factors that increase the risk are:

- **Genetic predisposition**: If anyone in the family has atopy, it increases the chances for that child.
- **Atopic conditions**: If you have atopic conditions, like eczema, asthma and rhinitis, your risk goes up.
- **Early antibiotic exposure**: Using antibiotics in early life may upset the gut microbiome and have an influence on immune system growth.
- **Environmental factors**: Changes in our surroundings, pollution and differences in diet help influence health.
- **Delayed epinephrine administration**: Not giving epinephrine on time during an anaphylaxis reaction can make the outcome more severe and raise the risk of death (FDA, 2022).

Researchers are learning that epigenetics and the health of the gut microbiota may help modulate allergy symptoms and could be important for developing preventive measures.

2.4 Regulatory Framework and Consumer Protection

When it comes to food allergens worldwide, the focus is on being open, teaching consumers and responsible industry. If a food product in the United States has any of the eight major allergens, it must be clearly marked by law, thanks to the Food Allergen Labelling and Consumer Protection Act (FALCPA) of 2004.

Besides, the FSMA (Food Safety Modernization Act) requires food companies to consider risks and take preventive steps for allergens. The department will inspect factories, impose strict rules on imports and recall the products if allergic substances are left unlisted on ingredients.

Internationally, the Codex Alimentarius rules ensure that allergen labeling and risk management are performed the same way, yet not every country follows them the same. A lot of food service businesses have started following the best practices listed below.

- Menus showing allergy concerns and warnings
- Providing proper training to the staff in food handling
- Safe zones that are reserved just for allergen-free cooking

They have been important in pressing for better labelling rules and informing the public with their campaigns and lessons.

3. RESEARCH METHODOLOGY

3.1 Research Design

The study is designed to report current views and experiences of food allergies among a wide range of people. The choice of this design allows for data collection about food allergy, how people respond, the foods they choose and how they react to warnings and labelling.

3.2 Research Objectives

The objectives of this research are mainly these:

- To find out how aware and affected global respondents are by food allergies.
- To learn which substances cause the most allergic reactions and what symptoms usually appear?
- To assess how people who have allergies manage to get allergen-free dishes when eating out.
- To assess how people feel about allergen labelling and how safe they consider food is.
- To know the age when allergic responses first appear and the kinds of reactions they have in each dietary group.

3.3 Data Collection Method

The researchers collected primary data by creating a Google Forms questionnaire. We made the questionnaire easy to use and safe for anonymity and it featured multiple-choice, Likert-scale and open-ended questions.

Topics discussed in the questions were:

- Demographic details (age, location, dietary habits)
- The history of food allergies and when they began
- The kinds of reactions an allergy can cause
- Using allergen-friendly food when ordering takeout
- Views on how allergens should be included on food labels

Links to the questionnaire were posted on social networks, sent to mailing lists and shared on academic sites so that a varied group would take part.

3.4 Sampling Size and Population

- Sampling Technique: Purposive Sampling
- Sample size: 100 respondents
- Geographic scope: India , Mauritius, Switzerland

3.5 Data Analysis

Collected data was studied with descriptive statistical techniques using percentages and frequencies. Pie charts and bar graphs were employed to communicate information about the categories dietary preference, allergies and symptom types. Qualitative information helped to find similar trends in understanding and behavior.

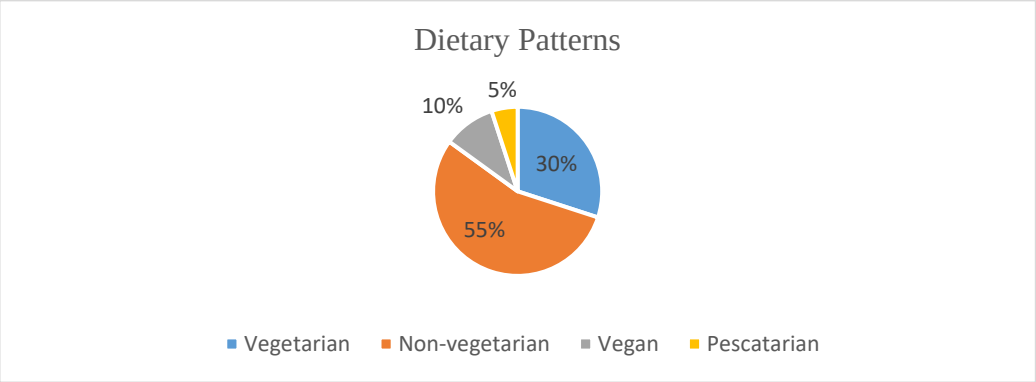
4. RESULTS

4.1 Demographic and Dietary Patterns

i. Region: The responses are majorly from India, partially from Switzerland and Mauritius.

ii. Diet: 55% non-vegetarian, 30% vegetarian, 10% vegan, 5% pescatarian.

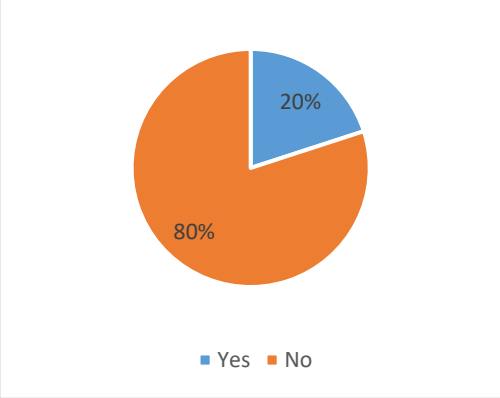
Figure 1: Dietary Patterns



4.2 Food Allergy Prevalence and Onset

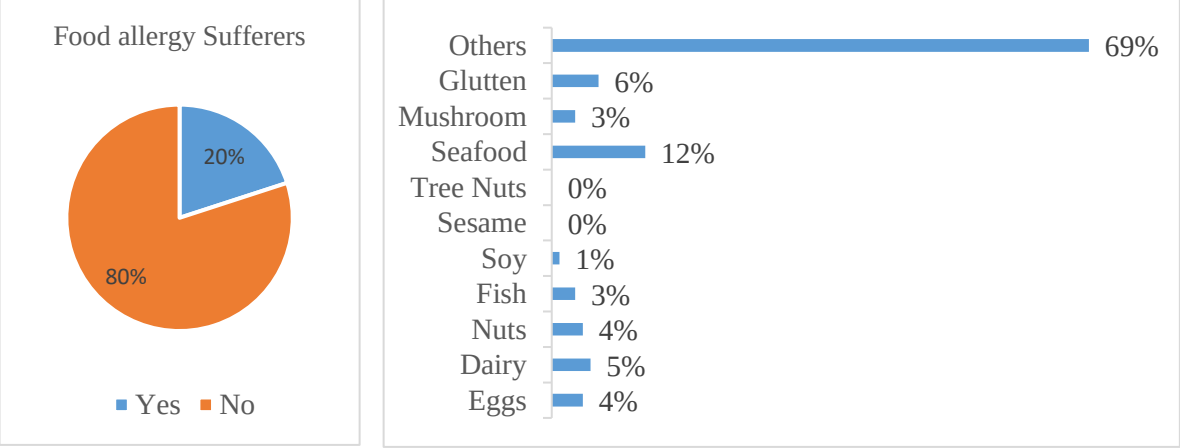
- More than half of the people have noticed some or the other harmful effect after consuming a certain food item.

Figure 2: Population noticing harmful effects of certain food item



- Majority of respondents around 80% were not found of suffering from any kind of food allergies whereas only 20% of the respondents admitted of having some food allergies, which were namely from Dairy, Eggs, Fish, Soy, Tree nuts, Seafood, Gluten, Garlic and onion.

Figure 3: Sufferers and different types of Food allergy



- **Age of onset**: Most of the respondents were not having the food allergies since they were born but developed them during the ages of 12 – 20.

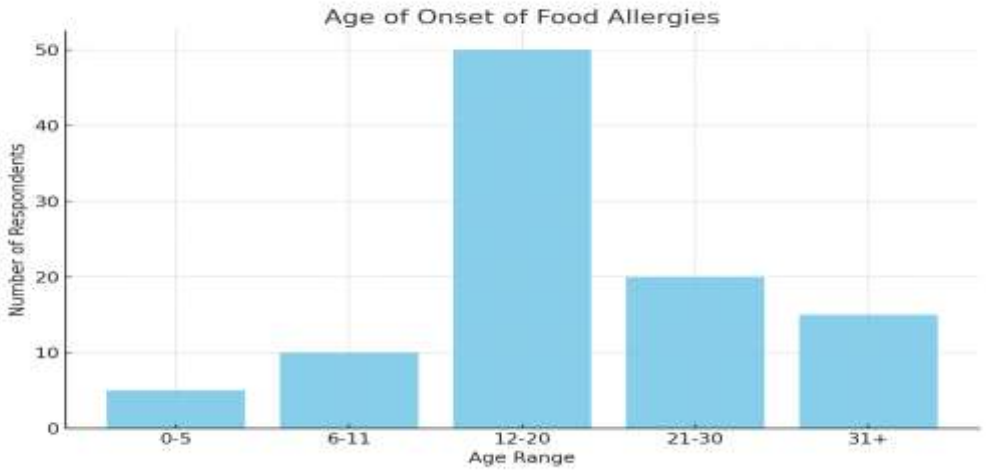


Figure 4: Age group of respondents

4.3 Symptoms Reported:

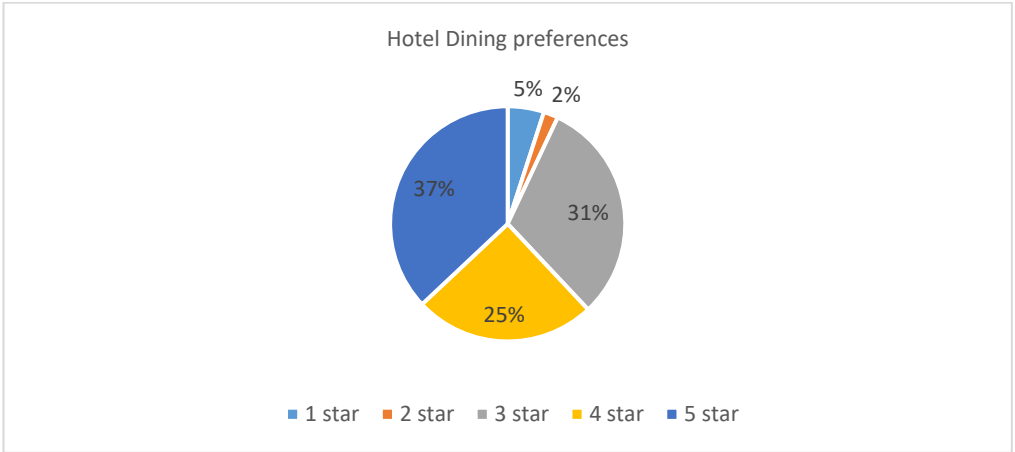
Side effects that the respondents noticed are:

- Hives
- Eczema
- Diarrhea
- Sore throat
- Headaches
- Bloating
- Respiratory distress

4.4 Dining Out Preferences

- According to most of the respondents around 70%, they had not faced any problem in finding allergen free food while dining out.
- As per the data, the percentage of preferring dine out on a holiday in a star category hotel/restaurant is similar for a 3 Star & a 5 Star property, then the respondents prefer 4 Star property with least preference for 1 Star & 2 Star property.

Figure 5: Hotel Dining preferences of respondents



- According to the data, more than half of the respondents have noticed food allergens mentions that were displayed according to their presence in the dish.

5. CONCLUSION

This study points out that the importance of food allergies in public health is rising and it's most noticeable among adolescents and young adults. According to the analysis of the global survey, only a few people reported food allergies, though many respondents developed allergic reactions from age 12 to 20. Symptoms can be as light as rashes and headaches and as heavy as asphyxia and anaphylaxis.

The research recommends that consumers know their rights and that industries take responsibility. Nearly all participants said that they could easily get allergen-free food options during their meals out in cities, mostly in high-quality eateries. Therefore, more and more food service providers are using clear labelling and appropriate rules in the kitchen to handle allergy risks.

Furthermore, the data support the importance of an early approach and ready emergency measures. Those with known allergies should understand what to look for in symptoms and make sure they always carry epinephrine auto-injectors with them. It is extremely important, according to FALCPA, to ensure that products are properly labelled with food allergens in the U.S. All major food safety bodies should work together to guarantee that food allergens are clearly stated and potential contamination is controlled.

Even so, there are big differences in people's knowledge and access to suitable foods, depending on where and how much money they have. Teaching both consumers and people who handle food will help us solve the problem.

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