Int. J Med. Pharm. Res.
E-ISSN: 2958-3683 | **P-ISSN**: 2958-3675
Available on: https://ijmpr.in/

International Journal of
Medical and Pharmaceutical Research

ORGINAL ARTICLE OPEN ACCESS

A study on Prevalences of Shellfish Consumption and its Allergy (Type I Hypersensitivity Reaction) and its Clinical Medical Management in a Tertiary Care Hospital of Haldia, West Bengal: A cross-sectional observational study

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OPEN ACCESS

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Received: 22-06-2025
Accepted: 13-07-2025
Available Online: 21-08-2025

ABSTRACT

Background: Shellfish is a common dietary component in coastal Bengal. However, shellfish allergy, a form of IgE-mediated Type I hypersensitivity reaction, is increasingly recognized as a health concern. This study investigates the prevalence of shellfish consumption, prevalence of shellfish allergy, associated risk factors, and clinical management among patients in a tertiary care hospital in Haldia, West Bengal. **Methods**: A cross-sectional observational study was conducted on 36 patients attending the tertiary care hospital. Data regarding shellfish consumption, allergic reactions, demographic profile, risk factors, and management were collected using structured questionnaires and medical records. Statistical analysis included calculation of prevalence, odds ratio (OR), and association between risk factors and shellfish allergy. **Results**: The prevalence of shellfish consumption was 77.7% (28/36). The prevalence of shellfish allergy among consumers was 21.4% (6/28). Major clinical manifestations included urticaria (50%), angioedema (33.3%), and anaphylaxis (16.7%). Significant risk factors included family history of allergy (OR = 3.2), asthma (OR = 2.8), and atopic dermatitis (OR = 2.5). Management primarily consisted of antihistamines (100%), corticosteroids (66.7%), and adrenaline for severe cases (16.7%). **Conclusion**: Shellfish allergy is an important health concern in coastal West Bengal. Early recognition of risk factors, public awareness, and prompt clinical management are essential to reduce morbidity.

Keywords: Shellfish allergy, Type I hypersensitivity, Prevalence, Risk factors, Clinical management.

INTRODUCTION

Shellfish is a widely consumed dietary item in coastal regions such as West Bengal. However, shellfish allergy is one of the most common food allergies worldwide and is mediated by an IgE-dependent Type I hypersensitivity reaction. The condition can present with mild symptoms such as urticaria and gastrointestinal upset, or severe reactions like angioedema and anaphylaxis[1].

Shellfish allergy prevalence varies, but generally falls between 0.5% and 2.5% of the general population, depending on factors like age and geographic location, Shellfish allergy is more common in adults than children and is a significant food allergy, particularly in the Asia-Pacific region. Here's a more detailed breakdown: General Prevalence: Estimates for shellfish allergy range from 0.5% to 2.5% of the general population, according to the National Institutes of Health

(NIH). Adults vs. Children: Shellfish allergy tends to be more prevalent in adults, with some studies showing a higher prevalence in adulthood. Geographic Variation: Prevalence can vary significantly by region[2-6]. For example, in the Western world, it's approximately 0.5%. In Asia, shellfish allergy is a leading food allergy, with higher rates observed in some regions like Hong Kong, the Philippines, and Singapore, according to ScienceDirect. Allergen Specificity: Crustacean allergy (like shrimp, crab, and lobster) is more common than mollusk allergy (like clams, mussels, and oysters). Factors Influencing Prevalence: Factors like dietary habits, age of onset, and diagnostic methods (like oral food challenges) can influence reported prevalence rates[7].

Shellfish allergy is more common in adults than children, and among adults, it's more prevalent in women. In children, the allergy is more common in boys. Other factors like ethnicity and income level can also play a role in the prevalence of shellfish allergy[8-11].
Age and Gender: Adults: Shellfish allergy is the most common food allergy in adults, Adult Women: Shellfish allergy is more common in women among the adult population. Children: While shellfish allergy can occur in children, it is more common in boys. Other Factors: Ethnicity: One study suggests that African American children may be more likely to have shellfish allergy. Income: A study suggests that lower-income households might have a higher prevalence of shellfish allergy[12-15]. It's crucial to remember that shellfish allergy can occur at any age and in anyone, regardless of demographic factors. The factors mentioned above are trends, not guarantees

METHODS

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 36 patients in the department of General Medicine and Supported by Department of Forensic Medicine & Toxicology at a tertiary care centre from July / 2024 to June/ 2025

Total 36 participant were approached to project among them No one were excluded in this study and Total 36 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.
The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination.
Studies using oral food challenges to confirm shellfish allergy tend to show lower prevalence rates than those relying on self-reported allergies or doctor diagnoses. Epidemiological data on shellfish allergy in India, particularly in Haldia, are limited. Understanding the prevalence, associated risk factors, and patterns of clinical management is important to guide healthcare professionals in this region.

This study aims to assess:
1) Prevalence of shellfish consumption.
2) Prevalence of shellfish allergy and hypersensitivity reaction.
3) Associated demographic and risk factors.
4) Clinical management approaches in a tertiary care hospital in Haldia**.**

Study Design: Cross-sectional observational study.
Study Site: Tertiary care hospital, Haldia, West Bengal.
Sample Size: 36 patients.
Study Period: 6 months.
Inclusion Criteria: Patients aged 18–60 years with history of shellfish consumption.
Exclusion Criteria: Patients with non-shellfish food allergies or incomplete medical records.

Data Collection:
- Structured questionnaire on demographics, dietary habits, allergy history.
- Clinical evaluation and documentation of allergic manifestations.
- Medical management noted from treatment records.

Statistical Analysis:
- Prevalence (%) = (Number of cases / Total sample) × 100.
- Odds Ratio (OR) = (a/c) ÷ (b/d), where a = exposed cases, b = exposed non-cases, c = unexposed cases, d = unexposed non-cases.
- P-value <0.05 considered significant.

Statistics and analysis of data

Data is put in excel sheet then mean, median and association is analysed by SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of Value <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software

RESULTS

In this study we found that Shellfish Consumption and its Allergy is associated with demographic profile of patient. Male were more prone to suffered of Shellfish Consumption and its Allergy as compared to Female, its prevalence 55.6% (Table-1).

Age is also associated factors with Shellfish Consumption and its Allergy. Prevalence of Shellfish Consumption and its Allergy is more among 31–45 years years age group. And its prevalence is 44.4% (Table 1). Shellfish Consumption and its Allergy is more predominance among Residence (Urban) as compared to rural residence. Its prevalence is 61.1% followed by 18-30 years age Group.

Demographic Profile of Participants (Table 1)

Demographic Factor	Category	Frequency (n=36)	Percentage (%)
Age (years)	18–30	10	27.8%
	31–45	16	44.4%
	46–60	10	27.8%
Gender	Male	20	55.6%
	Female	16	44.4%
Residence	Urban	22	61.1%
	Rural	14	38.9%

Prevalence of Shellfish Consumption & Allergy

- **Shellfish consumption prevalence:** 28/36 = **77.7%**
- **Shellfish allergy prevalence among consumers:** 6/28 = **21.4%**
- **Overall prevalence in study population:** 6/36 = **16.7%**

Risk Factors Associated with Shellfish Allergy are Family history of allergy, Asthma, Atopic dermatitis, Smoking and Urban residence. among them Family history of allergy is most important, here odds are 3.2. it means chances of shellfish allergy is 3.2 times more as compared to non-family history of Allergy Asthma. Asthma odd is 2.8. it means s chances of shellfish allergy is 2.8 times more as compared to non-asthmatic patients.

Risk Factors Associated with Shellfish Allergy (Table 2)

Risk Factor	Allergy Cases (n=6)	Non-Allergy (n=22)	Odds Ratio (OR)
Family history of allergy	4	6	3.2
Asthma	3	5	2.8
Atopic dermatitis	2	4	2.5
Smoking	2	10	0.73
Urban residence	4	12	1.2

Clinical Presentation of Shellfish Allergy (Table 3)

Symptom	Frequency (n=6)	Percentage (%)
Urticaria	3	50%
Angioedema	2	33.3%
Anaphylaxis	1	16.7%

Medical Management of Shellfish Allergy are Antihistamines, Corticosteroids, Adrenaline (IM) and Avoidance counselling. Among them Antihistamines is first line of medical Management.

Medical Management

Management Approach	Frequency (n=6)	Percentage (%)
Antihistamines	6	100%
Corticosteroids	4	66.7%
Adrenaline (IM)	1	16.7%
Avoidance counselling	6	100%

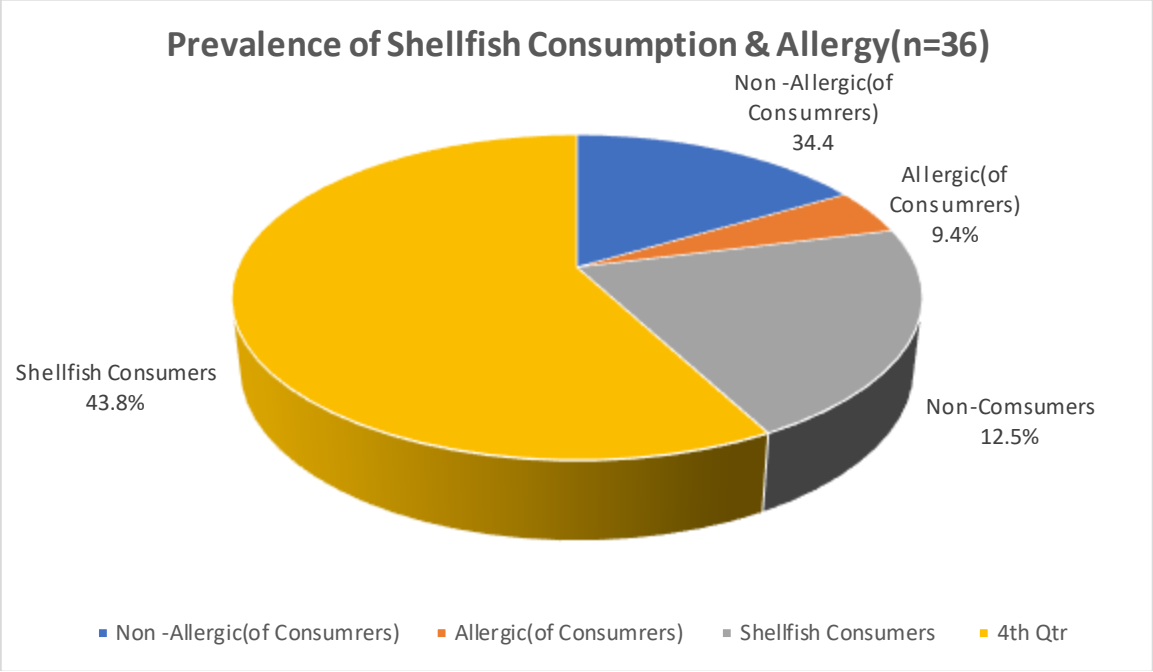

Figure 1

DISCUSSION

The study revealed that the majority of patients (77.7%) consumed shellfish, consistent with its cultural importance in coastal Bengal. The prevalence of shellfish allergy (21.4% among consumers) is significant and comparable to international studies (ranging 10–20%).

Shellfish allergy, more common in adults, can develop at any age, even after previously eating shellfish without issues. A family history of allergies, especially shellfish allergy, increases the risk. Other factors like a history of food allergies, asthma, and being female (among adults) also play a role [16].

Specific Risk Factors: Family History: Having a family member with shellfish allergy significantly raises the risk. Age While it can occur at any age, shellfish allergy is more prevalent in adults, with about 60% of cases first appearing in adulthood. Gender: Shellfish allergy is more common in adult women[17-20]. Other Allergies: A history of other food allergies, especially peanut and tree nut allergies, increases the risk. Asthma: Individuals with asthma have a higher likelihood of developing a shellfish allergy. Anaphylaxis History: A history of food-induced anaphylaxis, a severe allergic reaction, is another risk factor. Extreme Sensitivity: Allergic reactions to very small amounts of shellfish also indicate a higher risk.

Geographic Location Some studies suggest a higher prevalence in coastal areas, possibly due to increased seafood consumption[21].

Risk factors such as family history of allergy, asthma, and atopic dermatitis were strongly associated with allergy, indicating a genetic and atopic predisposition. The presence of urban residence as a mild risk factor may reflect lifestyle and dietary exposure[22-25].

Risk Factors Associated with Shellfish Allergy are Family history of allergy, Asthma, Atopic dermatitis, Smoking and Urban residence. among them Family history of allergy is most important, here odds are 3.2. it means chances of shellfish allergy is 3.2 times more as compared to non-family history of Allergy Asthma. Asthma odd is 2.8. it means s chances of shellfish allergy is 2.8 times more as compared to non-asthmatic patients.

The primary management for shellfish allergy is avoidance. For mild reactions, antihistamines can be used, but epinephrine (adrenaline) is crucial for anaphylaxis, a severe allergic reaction[26]. Individuals at risk should have an emergency action plan and carry an epinephrine auto-injector. Detailed Management: Avoidance: The most effective way to manage shellfish allergy is to avoid all forms of shellfish, including crustaceans (shrimp, crab, lobster) and mollusks (clams, oysters, mussels, etc.). Reading Food Labels: Individuals with shellfish allergy need to carefully read food labels to identify and avoid hidden sources of shellfish in processed foods.

Medical Management of Shellfish Allergy are Antihistamines, Corticosteroids, Adrenaline (IM) and Avoidance counselling. Among them Antihistamines is first line of medical Management. Emergency Treatment: Epinephrine: For severe reactions (anaphylaxis), immediate injection of epinephrine is essential. Individuals at risk should have a prescription for an epinephrine auto-injector and know how to use it. Antihistamines: Antihistamines like can help with mild symptoms like itching or skin rash. Steroids: Steroids may be used to reduce inflammation. Other: Intravenous fluids may be needed for vomiting. Education and Action Plans: Individuals with shellfish allergy should be educated about the condition, how to recognize reactions, and how to use their emergency medications. They should also have a written [27]. Consultation with a Specialist It's important to consult with a clinical immunology/allergy specialist for proper diagnosis and management of shellfish allergy.
Important Considerations: Cross-Reactivity: Shellfish allergies can sometimes extend to other seafood, so careful consideration of potential cross-reactivity is important [28-30].

Cooking Steam: While most people with shellfish allergies don't react to cooking steam, highly sensitive individuals may need to avoid inhaling fumes from shellfish. Medications: Certain medications, like some glucosamine supplements, may contain shellfish extracts and should be avoided [31-32]. The clinical spectrum ranged from mild urticaria to life-threatening anaphylaxis, necessitating prompt recognition. Management strategies in this study were consistent with international guidelines, with antihistamines as first-line therapy, corticosteroids for moderate cases, and adrenaline for severe reactions.

CONCLUSION

Shellfish consumption is highly prevalent in Haldia (77.7%). Shellfish allergy prevalence among consumers is 21.4%. Risk factors include family history, asthma, and atopic dermatitis. Clinical management relies on antihistamines, corticosteroids, adrenaline, and patient education on avoidance. Strengthening awareness and availability of emergency management (epinephrine auto-injectors) is essential.

SOURCE OF FUNDING: No

CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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