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ORIGINAL ARTICLE

Prevalence of Oral Allergy Syndrome among Adults with Prevalence and Linkages with Various Factors

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ABSTRACT

Background: Oral allergy syndrome is the most common manifestation of food allergies in adults. However, population-based studies assessing its prevalence and associated factors remain limited in Pakistan.

Objective: To determine the prevalence of oral allergy syndrome among university students and to describe its clinical characteristics and associated factors.

Study Design: Cross sectional, survey-based study.

Place and Duration of Study: Department of ENT, Hitec Institute of Medical Sciences, Taxilla Cantt from 1st January 2023 to 30th June 2023.

Methodology: One thousand and two hundred patients within 18-35 years of age who walked in the outdoor patient of ENT were enrolled. Out of which oral allergy syndrome was found in 100 cases through clinical diagnostic tests including spirometry and clinical proforma. Each participant was informed through a written consent form of the study background and objectives. A complete nasal examination was conducted before specifying allergic rhinitis cases within total enrolled participants. Each participant was given a well structured proforma (asthma, allergic- rhinitis, and atopic dermatitis), pollen/latex, food allergy. The oral and the extraoral symptoms associated were also documented.

Results: 8.3% cases having oral allergic syndrome. There were 42 males and 58 females with almost no significant variance in the mean ages of the participants in accordance with their gender and 10% vs 6% cases of asthma of males and females respectively. There was a significant variance among patients suffering from allergic rhinitis, while pollen allergy was observed almost similarly among males and females. The associated factors with oral allergies were observed in detail among all the patients. Lip pruritic was observed in 90% of the oral allergy cases followed by lip edema and pharyngeal oppression in 56% and 27% cases respectively. Additionally, among the various associated food items causing oral allergy the highest prevalence of fruit related (69%) allergies.

Conclusions: The prevalence of oral allergy syndrome varies by geographic region. A personal history of pollen or latex allergy was identified as a key risk factor for oral allergy syndrome in this population.

Keywords: Food allergies, Oral allergy syndrome, Prevalence, Pollen food syndrome

INTRODUCTION

Oral allergy syndrome (OAS), also referred to as pollen-food syndrome, is an allergic condition that primarily affects the oral cavity. It is characterized by symptoms such as itching and swelling of the lips, tongue, or palate, which occur immediately after consuming certain foods.[1,2] Oral allergy syndrome arises when allergens present in fruits, vegetables, and pollen trigger a reaction in sensitized individuals. While symptoms are typically confined to the mouth, some individuals may experience additional manifestations, including pharyngeal swelling, skin discoloration, or respiratory issues.[3,4]

The prevalence of OAS varies depending on multiple factors, including regional allergic sensitization patterns and the occurrence of allergic rhinitis. In the general population, estimates suggest that OAS affects between 2.0% and 11.5% of individuals.[5,6] Several food groups have been strongly associated with OAS, spanning various botanical families: Rosaceae (e.g., pear, apple, peach, plum, strawberry, almond), Lauraceae (e.g., avocado, walnut, cinnamon), Musaceae (banana), Bromeliaceae (pineapple), Actinidiaceae (kiwi), and Anacardiaceae (mango).[7]

Other factors influencing OAS prevalence include female sex and allergic sensitization to pollen, the latter of which is also linked to the severity of nasal and ocular symptoms.[8,9] Despite its clinical significance, there is a lack of studies examining the frequency of OAS in young adults in Pakistan. Therefore, this study aims to determine the prevalence of OAS among university students and to analyze its clinical characteristics and associated risk factors.

MATERIALS AND METHODS

The study was a cross sectional survey-based carried out all the individuals within 18-35 years of age who walked in the outdoor patient of ENT and conducted at Department of ENT, Hitec Institute of Medical Sciences, Taxilla Cantt from 1st January 2023 to 30th June 2023. Each participant was informed through a written consent form of the study background and objectives. A total of 1200 patients were enrolled. Out of which oral allergy syndrome was found in 100 cases through clinical diagnostic tests including spirometry and clinical proforma. A complete nasal examination was conducted before specifying allergic rhinitis cases within total enrolled participants. Each participant was given a well structured proforma (asthma, allergic- rhinitis, and atopic dermatitis), pollen/latex, food allergy. The oral and the extraoral symptoms associated were also documented. The clinical symptoms such as oral pruritus or lip edema were also considered during examination. The patients having autoimmune disease resulting intoallergy like symptoms were excluded from the study. The sample size was generated by using WHO sample size calculator wherein the confidence of interval of 95% was taken and 80% power of test, 5% margin of error was applied. The data was analyzed using SPSS version 25.0 wherein chi-square and Odds Ratio tool was applied. The p value <0.001 was considered as significant.

RESULTS

There were 8.3% cases were having oral allergic syndromes. There were 42 males and 58 females with almost no significant variance in the mean ages of the participants in accordance with their gender with 10% vs 6% cases of asthma of males and females respectively. There was a significant variance among patients suffering from allergic rhinitis, while pollen allergy was observed almost similarly among males and females. The most reported allergic disease was allergic rhinitis as 33% within the patients (Table 1).

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The associated factors with oral allergies were observed in detail among all the patients. Lip pruritic was observed in 90% of the oral allergy cases followed by lip edema and pharyngeal oppression in 56% and 27% cases respectively. Skin reddening was observed in 42% of cases while wheezing was presented only in 3% of the patients (Fig. 1).

Additionally, among the various associated food items causing oral allergy the highest prevalence of fruit related (69%) allergies was presented with 20% through peach, kiwi and avocado respectively. The lowest fruit allergies were seen through coconut, melon and guava with only 5% prevalence among patients. This was followed by 22% in vegetables with highest observed through chilies as 10% and lowest by bell paper, cauliflower and mushroom with only 2% through each respectively. Among Fish and shrimps a total of 17% prevalence associated with oral allergies was seen. Dairy product was giving 17% prevalence with milk 15% as highest and cheese 2% as lowest prevalent. Considering nut and seeds a total of 17% prevalence was observed with 12% walnuts prevalence and lowest of peanuts, pistachios and sesame seeds as 2% each respectively. A total of 5% allergic response was observed through legumes (Fig. 2).

Table 1: Demographic and clinical association of oral allergy syndrome (n=100)

Variable	Male (n=42)	Female (n=58)	P value
Age (years)	19.7±5.5	21.2±4.5	0.987
Personal clinical history of allergic disease			
Asthma	10	6	0.92
allergic rhinitis	8	25	<0.001
atopic dermatitis	9	11	0.067
latex allergy	3	2	1.342
Pollen allergy, foods associated with OAS	12	14	1.221

Table 2: Multivariate models of factors linked with oral allergy syndrome

Factor	Unadjusted Model OR (95% CI)	P value	Adjusted Model OR (95% CI)	P value
Age	0.97 (0.81 - 1.12)	0.682	---	0.751
Sex				
Female (reference)	1	---	---	---
Male	1.03 (0.54 - 1.98)	0.942	---	0.911
Asthma				
No (reference)	1	---	---	---
Yes	2.33 (0.69 - 7.82)	0.179	---	0.182
Allergic Rhinitis				
No (reference)	1	---	---	---
Yes	1.03 (0.42 - 2.51)	0.965	---	0.943
Atopic Dermatitis				
No (reference)	1	---	1	---
Yes	2.48 (0.98 - 6.33)	0.059	2.49 (0.99 - 6.29)	0.056
Pollen Allergy				
No (reference)	1	---	1	---
Yes	2.79 (1.12–7.01)	0.031	3.30 (1.54 - 7.11)	0.001
Latex Allergy				
No (reference)	1	---	1	---
Yes	5.54 (1.06 - 29.24)	0.045	5.54 (1.09 - 28.3)	0.041

Table 3: Age association with food allergies

Case	Sex	Age (year)	Foods
1	Female	25	Walnut, Nutmeg
2	Male	18	Apple
3	Female	20	Banana, Cauliflower, Beans
4	Female	23	Coconut
5	Female	25	Kiwi
6	Female	26	Kiwi, Mango
7	Female	19	Strawberry, Kiwi, Lime, Lemon, Orange, Chili, Tomato, Pineapple
8	Male	22	Avocado
9	Male	19	Avocado, Mango, Walnut

Odds ratio was applied among the patients to have a more proper insight of the prevalent oral allergy disease. It was observed that highest oral allergy syndrome was seen on patient suffering from pollen/latex allergies followed by atopic dermatitis. This table clearly presents the unadjusted and adjusted odds ratios (OR), confidence intervals (95% CI), and p-values for each factor (Table 2). The odds ratio of age with the associated factors of oral allergy syndrome presented that younger males were probe higher to fruit allergies while older females were associated with fruit and legume allergies and this table organizes the data clearly for easy reference (Table 3).

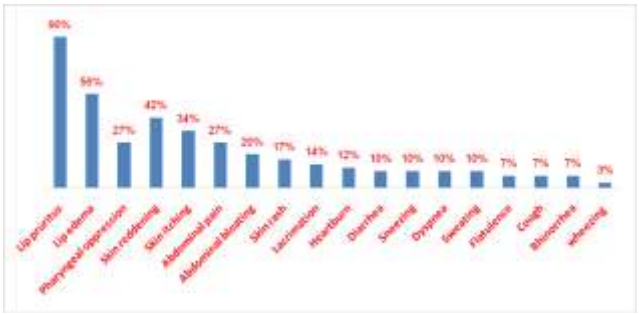

Fig. 1: Association of various clinical factors with the oral allergies

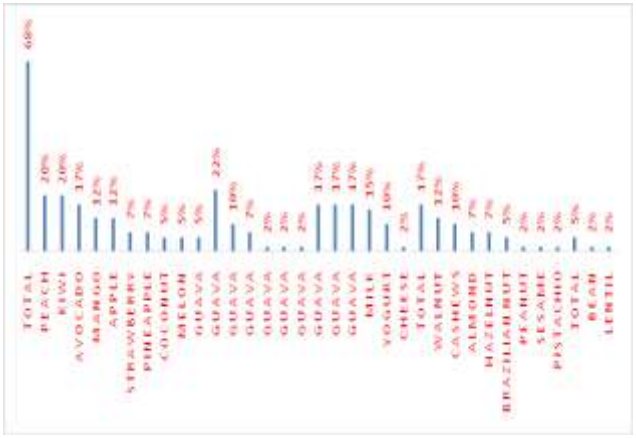

Fig. 2: Tree map of main foods associated to oral allergy syndrome

DISCUSSION

This study found that the prevalence of oral allergy syndrome (OAS) among young adults in a Pakistani public university was with a notable proportion experiencing extra-oral symptoms. Fruits were the most common food triggers, and a strong association was observed between OAS and allergies to pollen and latex.[10-15]

Global population-based studies on OAS prevalence are limited, with most research focusing on clinical samples, particularly patients with allergic rhinitis. Our findings align with similar studies in the UK (2% prevalence) but differ from higher rates reported in Western Mexico (6.2%), Portugal (11.5%), and Eastern Europe (7.7%). These variations suggest that regional differences in food consumption, pollen exposure, and sensitization patterns influence OAS prevalence.[16,17]

A significant portion of individuals with OAS in our study also experienced extra-oral symptoms, such as skin reactions, gastrointestinal discomfort, and respiratory issues. This aligns with previous reports where up to 20% of OAS patients exhibited systemic symptoms. While fruits and vegetables were the primary triggers, as documented in other studies, chilies were more frequently reported in our study, likely due to their prevalence in the Pakistani diet. Interestingly, non-plant foods such as shellfish and dairy products were also linked to OAS, suggesting two possible OAS phenotypes: Type I, characterized by oral symptoms related to pollen sensitization, and Type II, involving extra-oral manifestations triggered by plant-based and animal-derived foods.[18]

Contrary to some reports suggesting a higher prevalence in women, our study did not find a significant association between OAS and sex, consistent with findings from Italy. Pollen sensitization remains the primary risk factor for OAS, though our study did not identify specific pollen types. In Pakistani, Papper Melbury is a major trigger, affecting over 30% of sensitized

individuals. Additionally, a personal history of latex allergy was associated with OAS, likely due to cross-reactive proteins in fruits commonly linked to latex-fruit syndrome.[7]

Our study also estimated the most reported allergic disease was allergic rhinitis as 33% within the patients while 26% suffered from pollen allergies. A notable case involved a female participant with allergic reactions to both plant- and animal-derived foods, highlighting the complexity of these conditions.[19]

CONCLUSION

A total of 8.3% cases were having oral allergic syndrome. The most reported allergic disease was allergic rhinitis as 33% within the patients while 26% suffered from pollen allergies. The major food associated factor was fruits with 69% patients having food allergies.

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