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Research Article

Food Allergy in School-Going Adolescents and Its Association with Depression in Karachi, Pakistan

Sina Aziz[1], Tayyaba Ali[2*], Zainab Qutbuddin[3], Maha Tariq[3], Zonobia Asrar[3] and Tooba Azeem[3]

[1]PhD, DCPS (Health Professional Education), Paediatric unit 2, PICU, Abbasi Shaheed Hospital, Karachi Medical and Dental College

[2]MBBS, Research Associate, Karachi Medical and Dental College

[3]Final Year MBBS students, Karachi Medical and Dental College

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2. Key words

Food hypersensitivity, Adolescents, Depression, School

1. Abstract

1.1. Objective: The aim of this study was to document food allergy in school going adolescents and its association with depression.

1.2. Methods: An observational cross-sectional study was conducted from 2016 to 2018 in middle income schools of Karachi after receiving institutional review board approval of Karachi Medical and Dental College (ref:020/16). Students, male and female, with age range of 11 to 17 years, were included. Students who refused to fill questionnaire were excluded. Standardized Performa questionnaires were administered to all students included questions regarding symptoms of food allergy, allergy to specific foods and symptoms of depression. Each student was also evaluated by Patient Health Questionnaire (PHQ-9) scale for depression. Concerned parents were informed of their child's depression severity.

1.3. Results: Out of 2000 students, 1150 were female. Regarding symptoms, 49.4% experienced pain in the chest that feels like heavy pressure, 52.3% felt physical weakness or emotional tiredness, 62.9% experienced nausea and vomiting and 48.9% emit wind noises from stomach through mouth after eating certain foods. Allergy was documented from foods like eggs 566(28.3%), prawns 523(26.2%), fish 469(23.5%), milk 398(19.9%), soya bean 290(14.8%), peanuts 196(9.8%), wheat/cereals 188(9.4%), walnuts 171(8.6%), cashews 125(6.3%), beef meat 113(5.65%), pistachios 110(5.5%), almonds 82(4.1%). Out of 2000 students, 1121(56.1%) had no depression, 523(26.2%) had mild depression, 235(11.8%) had moderate depression, 87(4.4%) had moderately severe depression and 34(1.7%) had severe depression by Patient Health Questionnaire (PHQ-9) scale.

1.4. Conclusion: Predominant symptoms in school-going adolescents were physical weakness, emotional tiredness, nausea and vomiting. Allergy from eggs (28.3%), prawns (26.2%) and fish (23.5%) was present. Mild, moderate, moderately severe and severe depression by Patient Health Questionnaire (PHQ-9) scale was present in 523 (26.2%), 235 (11.8%) 87 (4.4%), 34 (1.7%) respectively. Majority (56.05%) had no depression.

3. Introduction

Nutrition is an important part of our social and cultural life. In patients with food hypersensitivity the ingestion of a specific nutrition may incite an unfavourably susceptible response, which might be lethal for a few patients [1,2]. Around 8% of children in the United States (US) have food allergy (FA), and roughly 40% have a past filled with extreme responses. As of late, rates of archived FA have risen [3,4] furthermore; emergency department visits for unfavourably susceptible responses have likewise expanded considerably [5,6]. Notwithstanding the physical concerns related with paediatric food allergy, there may be a psychosocial effect in some adolescents. For instance, food allergy (FA) in adolescence is related with debilitations in social, scholarly, mental, and family working and relates to diminished personal satisfaction [7]. Anxiety and stress observed in adolescents with food allergy (FA) are higher than in the general population [8] and youngsters with FA show more stress over risks in their condition and about being far from home than do their healthy counterparts [9].

***Corresponding Author (s):** Tayyaba Ali, MBBS, Research Associate, Karachi Medical and Dental College, Pakisthan, Tel: +92-3331346527, E-mail: tayyabaali_388@hotmail.com*

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Nutrition hypersensitivities are progressively pervasive and represent a noteworthy general wellbeing load [10]. An ongoing National Health and Nutrition Examination Survey (NHANES) contemplate, utilizing particular serum IgE levels as a marker, assessed the predominance of clinical food hypersensitivities to four basic allergens (peanuts, milk, egg, shrimp) at around 2.5% in the United States(US) populace, with higher rates in 1-multi year-olds (4.2%) and 6-multi year-olds (3.8%) than among more established age gatherings [11].

Previously, only one local study is available reporting data from the National Institute of Health (NIH) Islamabad, Pakistan. The prevalence of food sensitization in this report was estimated (only 2.3-3%) in allergy patients against five selected foods like beef, mutton, egg, rice and fish [12]. Daily dinners and tidbits can trigger a quickly advancing, dangerous unfavourably susceptible response. This stressor is both endless and intense: For years, youth confront the everyday risk of unplanned allergen ingestion aggravated by intense worry amid hypersensitivity related wellbeing emergencies [13]. Strict allergen avoidance is the best-known system to oversee sustenance sensitivities [14].

Community data from Karachi, Pakistan of school going adolescent children is lacking, regarding symptoms related to food allergies, type of local foods causing allergy and especially regarding the frequency of depression in children with food allergy. Hence an observational cross sectional study was conducted to document symptoms of food allergy, type of food allergy and depression if any by PHQ-9 scale [15], in school going adolescents four middle-income schools of Karachi.

4. Methods

A cross-sectional study was conducted from 2016 to 2018 in four middle-income schools of Karachi, after receiving permission from the administration of the respective schools, parents and institutional review board approval (ref:020/16) of Karachi Medical and Dental College.

Prospectively data was collected from students of four middle-income schools of Karachi, Pakistan. Sample size was calculated through Raosoft with 0% margin of error, confidence level of 99%, population size was 2000, response of distribution 50% [16]. A non-probability convenient sampling technique was used for this study. Students with age range of 11 to 17 years, both male and female were included and those students who were reluctant to fill questionnaire or permission/consent of the parents was not given were excluded. Standardized questionnaires were administered to all students, which comprised of questions regarding symptoms of food allergy, allergy to specific foods and questions about symptoms of depression. Data was collected from the students during the mid-break, with permission from the school administrative head. There was no experimental procedure involved in this study.

Each student was also evaluated by Patient Health Questionnaire (PHQ-9) scale [15] for depression. In a Patient Health Questionnaire (PHQ-9) scale, every symptom of depression, was given a score according to number of days, student had the symptoms. Students with total score between 0-4 were considered to be with no depression, students with total score between 5-9 had mild depression, score between 10-14 indicated moderate depression, a total score falling within range of 15-19 was considered moderately severe depression and students who scored between 20-27 indicated severe depression. Concerned parents were informed of the depression severity in their child. Data was entered and analysed by using Statistical Package for Social Sciences (SPSS) version 16 on computer. Association of food allergy with depression was calculated with the help of using chi-square test.

5. Results

Out of 2000 study students, 1150 were female and 850 were male. Symptoms of food allergy experienced in school going children included; Pain in the chest that felt like heavy pressure was experienced by 987 (49.4%), physical weakness or emotional tiredness by 1046 (52.3%), nausea and vomiting by 1258 (62.9%), wind noises similar to burp, emitted from stomach through mouth after eating certain foods was seen in 977 (48.9%), migraine headaches or pain in the back of head was experienced by 637(31.9%). Hence predominant symptom experienced by the adolescent was nausea and vomiting, (Table 1).

Around 632(31.6%) experienced a condition in which stool was discharged frequently and in a watery form after eating certain foods, 551(27.6%) students felt nasal passages getting blocked after eating certain foods. Students, which noticed numbness and loss of sensation on face, arms or legs were 353(17.7%), difficulty in breathing after food intake was seen in 345(17.3%), tingling, prickly sensation or itching in the mouth was felt in 286(14.3%). Tingling, redness or itching on the skin, after eating certain foods was in 266(13.3%). Swelling of the lips, face, tongue and throat or other parts of the body was experienced in 248(12.4%), (Table1).

Sensitization to various food allergens was seen and included; eggs 566(28.3%), prawns 523(26.2%), fish 469(23.5%), milk 398(19.9%), soya bean 290(14.8%), peanuts 196(9.8%), wheat/cereals 188(9.4%), walnuts 171(8.6%), cashews 125(6.3%), beef meat 113(5.65%), pistachios 110(5.5%), almonds 82(4.1%), rice 42(2.1%) as shown in (Figure 1)

Table 1: Symptoms of Food Allergy (FA) Observed in School Going Adolescents (n=2000) of middle income schools of Karachi, Pakistan.

Variables	Frequency n (%)	
	Yes	No
Tingling, prickly sensation or itching in the mouth?	286 (14.3)	1714 (85.8)
Tingling, redness or itching on the skin, after you eat certain foods?	266 (13.3)	1734 (86.7)
Swelling of the lips, face, tongue and throat or other parts of the body?	248 (12.4)	1752 (87.4)
Do you feel your nasal passages get blocked after eating certain foods?	551 (27.6)	1449 (72.5)
Do you find difficulty in breathing after food intake?	345 (17.3)	1655 (82.8)
Have you ever experienced pain in the chest that feels like heavy pressure?	987 (49.4)	1013 (50.7)
Have you ever felt physical weakness or emotional tiredness?	1046 (52.3)	954 (47.7)
Have you ever experienced Nausea/ Vomiting?	1258 (62.9)	742 (37.1)
Have you ever experienced a condition in which stool is discharged frequently and in a watery form after eating certain foods?	632 (31.6)	1368 (68.4)
Do you experience migraine headaches or pain in the back of head?	637 (31.9)	1363 (68.1)
Do you emit wind noises from stomach through mouth after eating certain foods?	977 (48.9)	1023 (68.1)
Have you noticed numbness that is loss of sensation on face, arms or legs?	353 (17.7)	1647 (82.4)

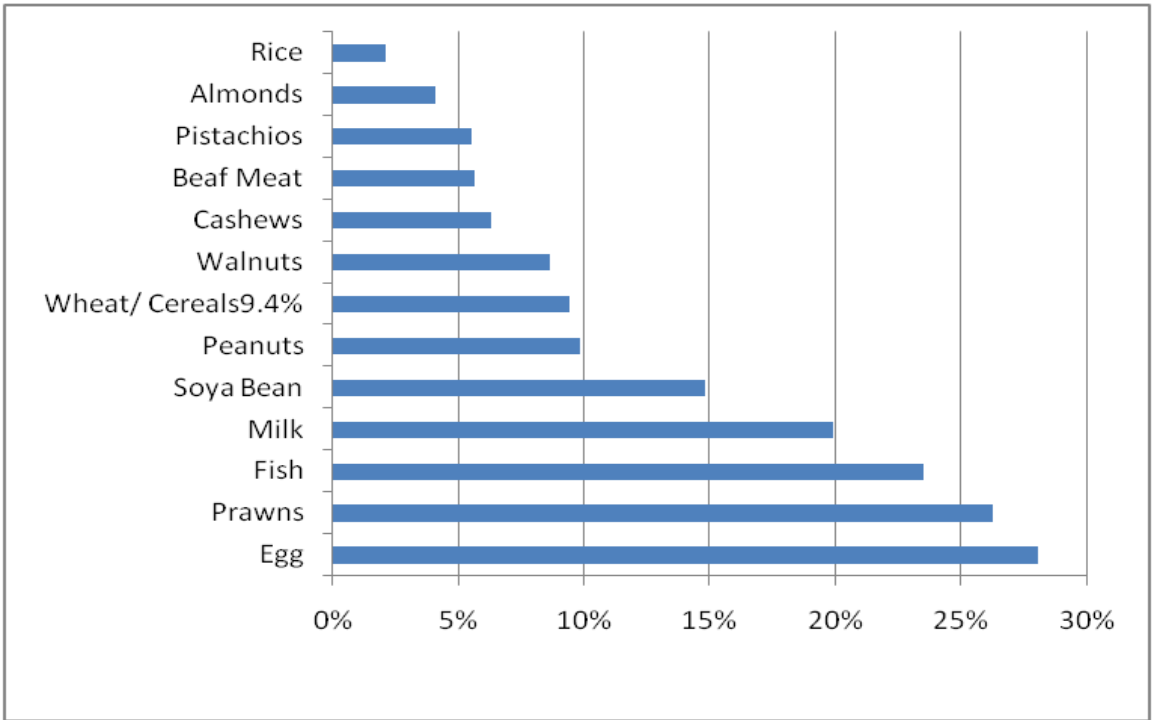

Figure 1: Sensitization (%) to various food allergens in school going adolescents of Karachi (n=2000).

Out of 2000 students, 1121(56.1%) had no depression, 523(26.2%) had mild depression, 235(11.8%) had moderate depression, 87(4.4%) had moderately severe depression and 34(1.7%) had severe depression. Food allergy and its association with depression is shown in (Figure 2).

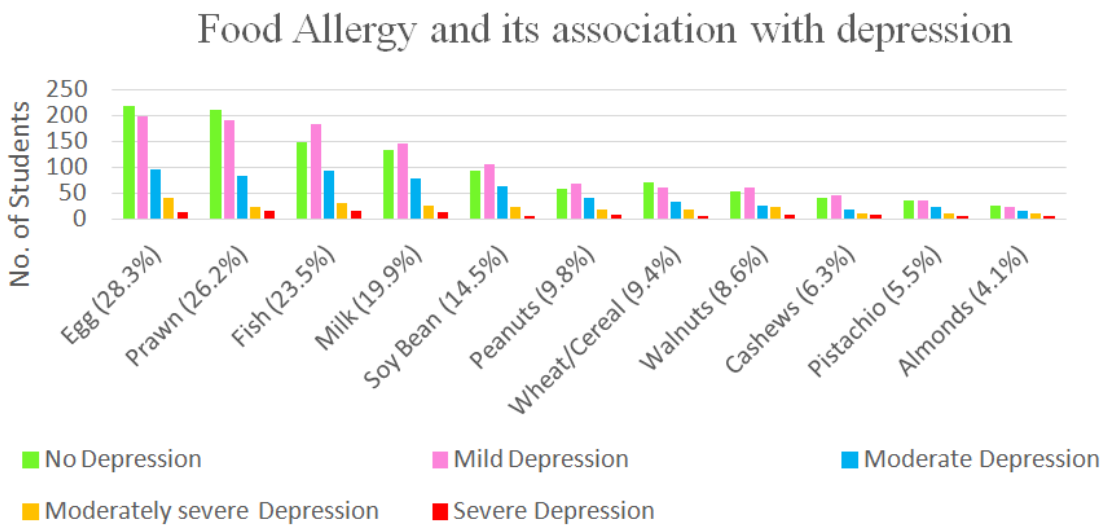

Figure 2: Food allergy (FA) in school going adolescents (n=2000) from middle income schools of Karachi and its association with depression by PHQ-9 scale.

Allergic symptoms and depression by Patient Health Questionnaire(PHQ-9) scale observed in school going children showed that though symptoms such as tingling, redness, swelling of lips, nasal blockage, difficulty in breathing, pain in chest, physical weakness, nausea vomiting, stool discharge, headaches or pain, burping after food, loss of sensation was present in children after eating specific foods predominantly eggs, prawn, fish, milk. However, with no food a statistically significant co relation was found between the food, symptom and the type of depression, whether mild or severe (Table 2). Frequency of allergic symptoms secondary to soya bean, milk, fish and eggs were higher than rice, almonds, pistachios, beef/meat, cashews, walnuts, wheat /cereal and peanuts (Figure 1 and Table 2).

Table2: Allergic symptoms and depression by PHQ-9 scale observed in school going adolescents, secondary to various Food Allergy (FA). Data is presented as n (%) and depression as mild and severe.

*FA n(%)	Tingling, prickly sensation	Tingling, redness	Swelling lips	nasal blockage	difficulty breathing	pain chest	physical weakness	Nausea/ Vomiting	stool is discharged	headaches or pain	Burp	loss of sensation	Depression
Egg 566 (28.3)	34 (6)	39 (6.8)	23 (4)	67 (11)	48 (8.4)	128(22.6)	132(23.3)	146(25.6)	77 (13.6)	78 (13.7)	107(18.9)	33 (5.8)	Mild
	03 (0.5)	04 (0.7)	03 (0.5)	07 (1.2)	05 (0.8)	10(1.7)	12 (2.1)	09 (1.59)	01 (0.17)	10 (1.7)	10 (1.7)	07 (1.2)	Severe
Prawn 523 (26.2)	25 (4.7)	31 (5.9)	32(6.11)	64(12.2)	36 (6.8)	124(23.7)	118(22.5)	150(28.6)	65 (12.4)	85 (16.2)	115(21.9)	44 (8.4)	Mild
	05 (0.9)	01 (0.19)	02(0.38)	06 (1.1)	06 (1.1)	13 (2.4)	15 (2.8)	13 (2.4)	03 (0.5)	11 (2.1)	07 (1.3)	12 (2.2)	Severe
Fish 469 (23.5)	28 (5.9)	34 (7.2)	31(6.6)	57(12.1)	37 (7.8)	122(26.0)	108(23.0)	145(30.0)	71 (15.1)	77 (16.4)	106(22.6)	28 (5.9)	Mild
	07 (1.4)	02 (0.4)	02 (0.4)	09(1.91)	08 (1.7)	16 (3.4)	15 (3.1)	14 (2.9)	02 (0.4)	13 (2.7)	06(1.27)	10 (2.1)	Severe
Milk 398 (19.9)	26 (6.5)	22 (5.5)	22 (5.5)	49(12.3)	37 (9.2)	95(23.8)	101(25.3)	122(30.6)	17 (4.2)	54 (13.5)	83(20.8)	25 (6.2)	Mild
	02 (0.5)	04 (1.0)	03 (0.7)	05 (1.2)	07 (1.7)	10 (2.5)	12 (3.0)	09 (2.2)	01(0.2)	11(2.7)	07 (1.7)	10 (2.5)	Severe
Soy Bean 290 (14.5)	16 (5.5)	19 (6.5)	14 (4.8)	45(15.5)	27 (9.3)	70(24.1)	72 (24.8)	74 (25.5)	44 (15.1)	46 (15.8)	68(23.4)	20 (6.8)	Mild
	01 (0.3)	01 (0.3)	01 (0.3)	04 (1.3)	03 (1.03)	03(1.03)	04 (1.3)	03 (1.03)	02 (0.6)	01 (0.3)	04 (1.3)	04 (1.3)	Severe
Peanuts 196 (9.8)	13 (6.6)	12 (6.1)	15 (7.6)	35(17.8)	16 (8.1)	46(23.4)	39 (19.8)	48 (2.0)	27 (13.7)	31 (15.8)	36(18.3)	11 (5.6)	Mild
	02 (1.0)	01 (0.5)	03 (1.5)	06 (3.0)	03 (1.5)	05 (2.5)	07 (3.5)	05 (2.5)	02 (1.0)	03 (1.5)	04 (2.0)	05 (2.5)	Severe
Wheat/ Cereals 188 (9.4)	10 (5.3)	08 (4.2)	08 (4.2)	31(16.4)	16 (8.5)	46(24.4)	41 (21.8)	48 (25.5)	23 (12.2)	29 (15.4)	40(21.2)	10 (5.3)	Mild
	01 (0.5)	00 (0%)	02 (1.0)	01 (0.5)	03 (1.5)	04 (2.1)	04 (2.1)	03 (1.5)	01(0.5)	04 (2.1)	02 (1.0)	05 (2.6)	Severe
Walnuts 171 (8.6)	13 (7.6)	11 (6.4)	10 (5.8)	27(15.7)	10 (5.8)	38(22.2)	36 (21.0)	51 (29.8)	20 (11.9)	30 (17.5)	39 (22.8)	08 (4.6)	Mild
	04 (2.3)	00 (00)	03 (1.7)	05 (2.9)	02 (1.1)	05 (2.9)	06 (3.5)	06 (3.5)	03 (1.7)	03 (1.7)	04 (2.3)	05 (2.9)	Severe
Cashews 125(6.3)	07 (5.6)	11 (8.8)	06 (4.8%)	16 (8.5)	18 (14.4)	31(24.8)	27 (21.6)	38 (30.4)	23 (18.4)	21 (16.8)	25 (20)	05 (4)	Mild
	05 (4)	00 (00)	01 (0.8)	05(4)	03 (2.4)	07 (5.6)	08 (6.4)	08 (6.4)	01 (0.8)	07 (5.6)	01 (0.8)	04 (3.2)	Severe
Pistachios 110 (5.5)	05 (4.5)	07 (6.3)	04 (3.6)	15(13.6)	07 (6.3)	28(25.4)	23 (20.9)	28 (25.4)	12 (10.9)	19 (17.2)	20(18.1)	04 (3.6)	Mild
	02 (1.8)	01 (0.9)	01 (0.9)	04 (3.6)	03 (2.7)	05 (4.5)	05 (4.5)	04 (3.6)	01 (0.9)	03 (2.7)	03 (2.7)	06 (5.4)	Severe
Almonds 82 (4.1)	04 (4.8)	06 (7.3)	06 (7.3)	11(13.4)	07 (8.5)	14(17.0)	16 (19.5)	21 (25.6)	08 (9.7)	11 (13.4)	14(17.0)	05 (6.0)	Mild
	02 (2.4)	01 (1.2)	02 (2.4)	03 (3.6)	03 (3.6)	04 (4.8)	05 (6.0)	04 (4.8)	01 (1.2)	04 (4.8)	01 (1.2)	03 (3.6)	Severe

*A negative co-relation was found with severity of depression and the type of food the child was allergic to

6. Discussion

Food allergy in children should be diagnosed and treated, with parents and older children being counselled as early as possible, in order to prevent the aftermath of complications including depression secondary to minor and severe allergies.

Few studies have been done in Karachi, Pakistan to document food allergy in school going adolescent. This study focused on food allergy by means of a questionnaire, comprising of symptoms of food allergy, to specific foods in 2000 school going adolescent's age 11 to 17 years of age, male and female in four middle income schools of Karachi. Each student was also evaluated for depression by the Patient Health Questionnaire (PHQ-9) scale [15] for depression. Overall, more than 50% of the adolescents expressed symptoms such as pain in chest that feels like pressure, physical weakness, emotional tiredness, nausea and vomiting and noises from the stomach through mouth (akin to burp) after eating certain foods. In this study allergy was documented predominantly to eggs, prawns, fish and milk. Majority of the adolescents 56% had no depression according to the Patient Health Questionnaire (PHQ-9) scale.

The negative physiological response to proteins in nutrition is evaluated to influence 20 percent of the total world's populace [17]. Most youngsters invest a lot of their energy amid the week in school, recognition and awareness of unfavourable reaction to food and rapid early management in the hands of teachers and school attendants

Predominant symptom was nausea and vomiting observed in nearly 63% of the students. This was followed by physical weakness or emotional tiredness, pain in the chest, and noises produced from the stomach such as burping, followed by migraine headaches or pain in the back of head. Symptoms such as nausea and vomiting and headache can be observed and may be functional or with an organic cause, such as due to rhino sinusitis [18]. In this study by Ilhan et al majority, 65% of the students were going to school; this may support some of the symptoms present in our study. However, in our cohort of the sample we did not confirm for other causes e.g. parental smoking, allergy tests and examination of the throat for adenoids etc.

However, watery stool being discharged frequently, nasal passages getting blocked was similar as in study of IIhan et al [18], Numbness and loss of sensation on face, arms or legs, difficulty in breathing, tingling, prickly sensation or itching in the mouth, redness or itching on the skin, swelling of the lips, face, tongue and throat or other parts of the body after eating certain foods was more likely to be due to specific food allergies and more of an organic rather than functional cause. Other data [19] also supports such symptoms to specific food allergies.

In our study we did not include other causes of the symptoms present in the children e.g. cardiac disease, malnutrition, vitamin D deficiency, hepatitis etc. however, majority of the children in this study were healthy active school going adolescent without any chronic illness or recurrent hospital admissions.

Allergy was documented from foods like eggs 566(28.3%), prawns 523(26.2%), fish 469(23.5%), milk 398(19.9%), soya bean 290(14.8%), peanuts 196(9.8%), wheat/cereals 188(9.4%), walnuts 171(8.6%), cashews 125(6.3%), beef meat 113(5.65%), pistachios 110(5.5%), almonds 82(4.1%).Hence food allergies in children present with a wide spectrum of clinical manifestations, which includes anaphylaxis, urticarial, angioedema, atopic dermatitis and gastro intestinal symptoms such as nausea vomiting, diarrhea and FTT (failure to thrive). About 90% of IgE-mediated food allergies in childhood are caused by eight foods: cow's milk, hen's egg, soy, peanuts, tree nuts (and seeds), wheat, fish and shellfish. None of the children in our study reported a severe anaphylaxis reaction, requiring hospitalization, however majority of the children in our study mentioned an allergy to eggs, prawns, fish, milk, soya bean, peanuts wheat/cereals, walnuts, cashews, beef meat, pistachios and almonds. Most of these food items were similar to study of Allen KJ et al [20], but we were unable to confirm these food allergies by skin prick test (SPT) or any other tests. Also, we did not specifically ask whether the child was allergic to cow's milk, or any other milk or the presence of more than one type of allergy. Majority of the individuals in Pakistan consume bovine, cow and goat milk as shown by an analysis of various milk samples available in Pakistan [21].

In our study it was seen that only approximately 10 % of the children were allergic to peanuts. In the western population allergy to peanuts is rising [22] and allergy to other foods has also been documented. However, hardly any studies have related the findings of allergy to specific foods to depression.

Retrospective chart review of 24 years done in a local private hospital of Karachi, showed anaphylaxis due to various causes to be 129 of which only 22 were due to food allergy and included, dry fruits such as peanut etc to be 1.6%, sea food 7%, egg 0.8%, beef/chicken 3.1% while others were 3.9% [6] This study was not community based, hence comparison of our data with a hospital based study is not possible.

Our attempt was to document the allergy in school going adolescent children and to determine the degree of depression in these children, which can have adverse effects in the long run. Also our data shows a higher frequency of the allergies to egg, beef/chicken,

sea food and dry fruit such as peanuts, as the study was community based and had a larger population size. An adolescent with allergy to more than one food was not documented. There is a possibility that the adolescent did not give an accurate answer and also allergen tests were not confirmed in each child, as this was a study based only on history of symptoms in the child.

Few studies have analyzed connections between food hypersensitivities and symptoms of depression, disruptive, and eating disorders in adolescents from the community. A study has assessed whether children and adolescents with food allergy are at increased risk for psycho pathology [23] this study differs from ours that one parent and the child was interviewed using Child and Adolescent Psychiatric Assessment with paired interviews. However similar to our study food allergies were not associated with a higher likelihood of meeting diagnostic criteria for a psychiatric disorder. Supportive with our study, very few children had severe depressive symptoms related to various food allergies, as shown in a Meta-analysis [24] where depression was absent in children and young people with food hypersensitivity.

An important aspect not done in this study was exclusion of Irritable Bowel Syndrome (IBS), as studies have indicated that children with Irritable Bowel Syndrome (IBS) have a high prevalence of self-perceived food intolerances. The number of these intolerances was weakly associated with measure of Irritable Bowel Syndrome (IBS) severity (Self-perceived food intolerances are common and associated with clinical severity in childhood irritable bowel syndrome [25].

Primary parental figures normally make a protected nourishment condition at home, and a high intake of a different variety of food may cause hypersensitive responses if child happens to be far from home [26]. Subsequently, detachments from guardians may flag expanded risk for accidental allergen ingestion and furthermore the nonattendance of an equipped responder on call (i.e., the parent) in case of a genuine food instigates an unfavourably susceptible response [27]. There is a decrease in separation anxiety in pre-adulthood, [28] but adolescent with food hypersensitivity had increased symptoms. The latter finding is supported by a clinical-based study [29].

In the Canadian Community health Study with individuals 15 years and older it was observed that self–revealed food hypersensitivities were related with conditions such as major depression, panic disorder/agoraphobia, bipolar disorder [30]. About, 20% of children and young people had emotional wellness challenges, including real depressive issue. Sorrow has been positioned as the second suicide [31], most regular reason for death in young people. Mental well-being issues frequently begin in adolescents or immaturity, they are firmly connected with other formative and wellbeing conditions influencing personal satisfaction, social, academic performance, personality disorders and substance abuse in grown-up life [32]. By and large, adolescents with food hypersensitivities have one or more manifestation of psychopathology crossing side effects of emotion, disruptive, and eating disorders than those without food hypersensitivity; the depression and generalized anxiety increase with time. Hence, as shown in this study, though only 1.7% had severe depression, but the issue of food hypersensitivity should be addressed at the earliest.

Food allergy can influence the school participation of the child. In the United States of America (USA) about 33% of respondents said that a huge effect occurred on their child's school participation. While 10% of the study population self-taught their children at home due to their food allergy and avoided sending them to school [33]. While in another study in Netherland a higher non-appearance from school was accounted for in those with food hypersensitivity compared with healthy controls, due to significant illness caused by food hypersensitivity [34]. This aspect of absence from school was not looked at in this study and can be addressed in future surveys involving multi-centre studies of different cities of Pakistan.

Adolescents and individuals, 18-21 years, still in education and living with food hypersensitivity, felt that more extensive choices of safe feast, allergen safe cafeteria zones, and expert individuals from staff to talk about suppers with, would ease their experience of living with food hypersensitivity; 68% expressed that Education of different students would enhance and facilitate their capacity to live with food hypersensitivity [35]. Such an effort should be undertaken at our local schools respectively whether private or government.

Patten and Williams [31] researched the relationship between food hypersensitivity and anxiety and depression. The study revealed higher rates of significant depression, bipolar disorder, panic disorder and social phobia than those with no food hypersensitivity. Despite the fact that this is the main article to report hoisted levels of mental issue utilizing analytic meetings, it is cross-sectional in nature and depends on self-report of food hypersensitivity thus results ought to be treated with caution. In an investigation of 18-to 22-year-olds, Herbert and Dahlquist [36] found that just the individuals who revealed a background marked by anaphylaxis detailed more stress over their food hypersensitivity. There were no noteworthy contrasts in anxiety or depression in those with food hypersensitivity and those without. This can be further looked at

in future studies.

It is evident that food allergy has a profound psychosocial impact on adolescents. In particular the constant vigilance needed to avoid allergens and the daily management of food allergy impacts on daily family activities and social events. Food allergy also appears to have a considerable detrimental effect on certain aspects of quality of life such physical functioning, mental health and quality of school life.

7. Limitations

This study was based only on the recall history by the adolescent students and not confirmed by parents or a precise medical history, laboratory tests or food challenge test to detect food specific IgE. Also it would have helped if we had also looked into how many of the children included in the study had been breast fed in their infancy and whether any hydrolyzed formula was suggested if the baby could not be given human milk. This study was from only Four middle-income schools of Karachi and a wider and more detailed survey of food allergy (with specific tests for the food allergen), self-perceived food intolerance in Irritable bowel Syndrome and its relation with depression from Karachi, Pakistan of school going children with information from parents also needs to be done.

8. Conclusion

Majority of students had by history allergy from eggs (28.3%), prawns (26.2%) and fish (23.5%) There were many students who screened positive for mild and moderate depression. However, majority of them (56.05%) had no depression. Very few of the adolescents had severe depression and no significant co-relation was seen when the type of food allergy was related to mild, moderate or severe depression.

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