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Impact of food intolerance on quality of life among university students

Abstract

Background: Food intolerance is prevalent in the modern world. Based on the methods of data collection and definitions it influences up to 15-20 percent of the population.

Objective: To find out impact of food intolerance on quality of life among universitystudents.

Methodology: A cross-sectional study was conducted among 250 students, selected from The University of Lahore through non-probability convenience sampling. Data were collected about their socio-demographics using self-reported questionnaire and quality of life using QOL-BREF questionnaire. Analysis of association between different variables was done using chi square test.

Results: 81 (32%) subjects were male while 169 (68%) subjects were female. 225 (90%) students were undergraduate and 25 (10%) were postgraduate. 209 (83.6%) students were food intolerant while 41 (16.4%) students were having no food intolerance issue. The mean score of subjects in physical, psychological, social and environmental domain of QOL-BREF was 59.80±14.984, 57.92±16.791, 32.47±14.047 and 59.94±15.465 respectively.No significant association was found between intolerance to food and quality of life of subjects.

Conclusion: Food intolerance had no impact on quality of life of the subjects. There was no impact of food intolerance on quality of life among university students. Social domain had the minimum score and environmental domain had maximum score among all domains of QOL-BREF.

Keywords: quality of life, qol-bref, food intolerance

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Introduction

Hippocrates was the first one to report adverse reactions in food more than two thousand years ago by observing the role of ingested cow's milk in urticaria and gastric upset.[1] Historically, the term "Food intolerance" has been used vaguely in literature of medicine. Food allergy was termed as "IgE-mediated food intolerance" for the very first time in the 1980s.[2] Food intolerance is now used to attribute reactions that are exclusively non-immune mediated thus having pharmacological, enzymatic or unknown origins.[3] Food intolerance can be defined as recurring and uncomfortable condition or response to a particular food or ingredient.[4] Food intolerance should not be mixed up with the term food hypersensitivity which is an umbrella phrase used to define both food intolerance and food allergy. Food intolerance is prevalent in the modern worldup to 15-20 percent of the population.[5] Food intolerance comprises of conditions such as lactase deficiency or lactose intolerance, dietary protein induced enterocolitis syndromes and eosinophilic gastrointestinal disease.[6] Cheese, onions, milk, wheat, chocolate and butter were considered common foods causing intolerance.[7] Food intolerance can be corrected by pursuing the challenge of eliminating suspect food. Any known biological markers cannot prove food intolerance. The elimination challenge is not an antidote but relatively a way to provide relief from symptoms.[8] Pinpointing the trigger foods is much more challenging in food intolerance. When a trigger food is ingested in an amount above the threshold, symptoms occur.[9] Factors experienced by patients such as stress, anxiety and gastrointestinal disease were also related with food intolerance. Having multiple food intolerances have the potential to negatively affect a person's quality of life.[10]

In 2018, Khan S conducted a study in children having diarrhea due to malnutrition in Peshawar Teaching hospital of Pakistan. One hundred and fifty children were selected for study. Study showed 27.3% had lactose intolerance diarrhea.[11] In 2010 study was conducted in Children Hospital Lahore, Pakistan to know the factors, symptoms and management of lactose intolerance (LI) in children up to 5 years old. Out of 25 selected patient's majority were suffering from grade 3 (7 patient) and grade 4 (8 patients) diarrhea.[12] Ontiveros Nconducted a study among adults of Mexican in 2015 to determine the prevalence of symptoms occurring due to gluten intake. It showed that recurrent-symptomatic severe reactions like bloating, constipation, and tiredness to gluten were common.[13] Fructan is found in wheat and onions. Fourteen healthy volunteers of America were selected to study capacity of fructan absorption in human beings. Breath test showed that all subjects developed mild flatulence, burping, feeling of fullness and bloating.[14] According to a study conducted in China, headache was most prevalent issue due to Monosodium glutamate.[15] In 2017, a study was conducted by Acker[16] in Boston to determine prevalence of food intolerance and food allergy in males and females. Prevalence was determined by using allergy data from health care organization and females were found to be more food intolerant as compared to males.[16]

Quality of life can be measured using different scales which include parameters like emotions, anxiety, depression, physical health, social functioning, restlessness, tiredness and toxicity.[17] A study was conducted on children having gastrointestinal disorders to determine gastrointestinal symptoms due to food intake and effect of symptoms on quality of life of children. Results showed that school activities,

extra-curricular performance and social functioning of children was disturbed due to symptoms.[18] A study was conducted by Ostblom in 2008 on Sweden children.

There were 212 children with food hypersensitivity and other 221 children with allergic disease. Children with food hypersensitivity showed lower scores on the subscales of physical functioning, social limitation.[19] A study was conducted to understand the association between health-related quality of life among children who were diagnosed with food hypersensitivity vs. those with a reported food hypersensitivity.Consequently, no differentiation was examined between both groups of children.[20]

Self-perceived food intolerance has been linked with decreased health-related QoL-scores (quality of life). It was observed in a study conducted by Casellas[21] in 2016, that this score was significantly low among individuals having poor absorption processes when compared with individuals having well absorption rate.[21]

A study conducted by Chumpitazi, showed the presence of self-perceived food intolerancesand relationship of these intolerances with psychological and social suffering and quality of life in IBS children. Children of 7-18 years were selected for this research and severity of IBS was assessed using pro-forma which determined quality of life, functional and mental disorder, depression and anxiety. However, weak association was found between food intolerance and quality of life.[22]

Aim

In ncurrent study, the aim of the researcher is to determine the impact of food intolerance on quality of life among university students so that risk factors could be identified and awareness could be created through extensive health education. If not detected and treated well in time, the quality of life among students suffering from food intolerance could be affected. In current study, only healthy individuals without any diagnosis of IBS, adjustment disorder or chronic amoebiasis were included in the study.

Methodology

The study design was cross-sectional. A sample of 250 university students was determined by Non probability convenient sampling technique. Self-reported pre tested questionnaire was used for demographic data collection. Information about food intolerance was collected using self-administered questionnaire. Questions were asked about how often (never, rarely, occasionally, frequently or always) subjects feel certain symptoms (including difficulty in swallowing, asthma, fever, stomach pain, abdominal cramps, bloating, diarrhea, constipation or uncomfortable feeling) after intake of foods (from all food groups and junk foods including pizza, burgers, fizzy drinks etc.).WHO QOL-BREF questionnaire was used to assess quality of life among university students. It took almost 10-15 minutes to fill the questionnaire. Data were collected from undergraduate and post-graduate students of different departments of The University of Lahore from March-19 to June-19. Informed consent was taken from the subjects of study. Institutional Review Board (IRB) and ethical board of The University of Lahore approved the study. Descriptive statistics including frequencies, mean, standard deviation and range was determined using SPSS 21. Chi-square test was done to find out association between variables. p-value less than 0.005 was considered to be significant.

Results

Mean age of the subjects was 21.36±2.034 years. All subjects were having basic level of education (under graduation) and were belonging to middle socioeconomic class. Among 250 subjects 144 (57.6%) individuals were day scholar and 106 (42.4%) were hostelite. Frequencies and percentages of demographic variables including gender, education and socioeconomic status of subjects were determined as shown in Table.1. 138 (55%) students were having normal BMI, didn't have any health issue and preferred home-prepared food. Food intolerance was determined by the frequency of occurrence of certain symptoms among subjects after intake of specific foods.Occurrence of food intolerance among students was illustrated in pie chart (Figure 1). Mean scores of physical and environmental domains were almost similar i.e.59.80±14.984 and 59.94±15.465 respectively while social domain had least mean score i.e. 32.47±14.047 (Table 2). Association between quality of life and food intolerance was found through Chi-square test but p-value was not significant as shown in Table 3.

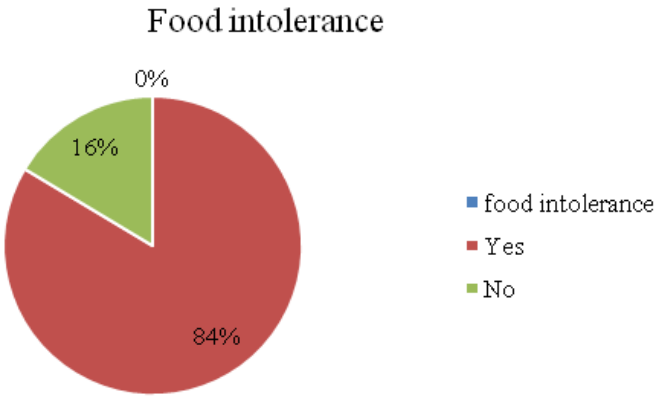

Figure 1 Distribution of subjects according to food intolerance.

Table 1 Distribution of subjects according to demographic variables

Demographic variables		Frequency	Percentage
Gender	Male	81	32
	Female	169	68
Education	Undergraduate	225	90
	Postgraduate	25	10
Socioeconomic status	High	27	11
	Middle	219	88
	Low	4	1

Table 2 Distribution of subjects according to the domains of quality of life

Domains	Mean ±S. D	Range
Physical	59.80 ±14.984	19-88
Psychological	57.92 ±16.791	13-94
Social	32.47 ±14.047	0-75
Environmental	59.94 ±15.465	13-100

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Table 3 Association of quality of life with food intolerance

Domains	Food intolerance		p-value
Physical	**Yes (%)**	**No (%)**	
Poor	3	2	0.407
Average	18	6	
Good	18	3	
Psychological			
Poor	2	2	0.369
Average	24	6	
Good	13	3	
Social			
Poor	18	7	0.306
Average	21	4	
Good	0	0	
Environment			
Poor	1	1	0.5
Average	27	6	
Good	11	4	

There was no significant association between domainsof quality of life and food intolerance (Table.3)

Among 250 subjects 169 (68%) were females while 81 (32%) were males. According to education mostly students i-e. 225 (90%) were undergraduates. However, 219 (87.6%) subjects were belonging to middle socioeconomic class i-e. 219 (Table 1).

209 (84%) students were food intolerant while 41 (16%) students didn't have food intolerance symptoms as seen in Figure 1.

The mean score of subjects in physical domain of QOL-BREF was 59.80 ±14.984 while the maximum score was 88 and minimum score was 19. The mean score of subjects in psychological domain was 57.92±16.791 while the maximum score was 94 and minimum score was 13. The mean score of subjects in social domain was 32.47±14.047 while the maximum score was 75 and minimum score was 0. Similarly, the mean score of subjects in environmental domain was 59.94±15.465 while the maximum score was 100 and the minimum score was 13 (Table 2). There was no significant association between quality of life and gender (Table 4).

There was significant association between cereals intake and food intolerance as p-value of wheat, oats, rice, corn, maize, barley and millet is 0.002, 0.003, 0.001, 0.002, 0.001, 0.001 and 0.008 respectively. There was significant association between processed food intake and food intolerance as p-value was 0.001, 0.008, 0.031 and 0.040 forpizza, burger, frozen desserts and coke/Pepsi respectively.

Discussion

140(56%) females and 69 (28%) males were found to be food intolerant. 124 (49.6%) day-scholars and 85 (34%) hostelites were food intolerant. 48 (19.2%) subjects who always ate home-prepared food and 5 (2%) subjects who never had home-prepared food were food intolerant while 117 (46.8%) subjects had also food intolerance who took 3-4 times home-prepared meal. The current study reported no association between gender, type of student, eating home prepared food and food intolerance. In 2017, a study was conducted by Acker[16] in Boston to determine prevalence of food intolerance and food allergy in males and females. Prevalence was determined by using allergy data from health care organization and females were found to be more food intolerant as compared to males.[16] A study was conducted in 2007 by Marklund B,[23]demonstrates that more food hypersensitivity was reported in adolescent females as compared to adolescent males. Moreover, physical, psychological and social quality of life was severely disturbed among female subjects as compared to males.[23] However, in the current study there was no significant association was found between quality of life and gender (Table 4).

Table 4 Association of quality of life with gender

Domains	Gender		p-value
Physical	**Male**	**Female**	
Poor	5	14	0.821
Average	43	90	
Good	33	65	
Psychological			
Poor	9	16	0.489
Average	39	95	
Good	33	58	
Social			
Poor	51	83	0.104
Average	30	85	
Good	0	1	
Environment			
Poor	6	9	0.722
Average	47	95	
Good	28	65	

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Table 5 Association of cereals intake with food intolerance

Cereals	Food intolerant	Symptoms caused by food intake					p-value
		rarely	sometimes	Often	always	never	
Wheat	Yes	34	20	11	27	117	0.002
	No	1	0	0	4	36	
Oats	Yes	43	25	10	5	126	0.003
	No	1	2	0	3	35	
Rice	Yes	36	39	24	16	94	0.001
	No	0	3	1	4	33	
Corn	Yes	52	31	8	2	116	0.002
	No	2	2	0	1	36	
Maize	Yes	54	29	8	3	115	0.001
	No	0	3	0	2	36	
Barley	Yes	50	23	6	1	129	0.001
	No	1	1	0	1	38	
Millet	Yes	52	21	3	2	131	0.008
	No	2	1	0	1	37	

Table 6 Association of processed food intake with food intolerance

Processed food	Food intolerant	Symptoms caused by food intake					p-value
		rarely	sometimes	Often	always	never	
Pizza	Yes	41	37	20	23	88	0.001
	No	3	3	0	3	32	
Burger	Yes	37	40	20	18	94	0.008
	No	3	3	1	3	31	
Frozen desserts	Yes	36	36	11	18	108	0.031
	No	4	2	2	1	32	
Coke/Pepsi	Yes	30	39	25	23	92	0.040
	No	2	5	1	6	27	

Results showed that there was no association found between food intolerance and four domains of QOL-BREF i.e. physical, psychological, social and environment of quality of life. Previous studies have shown association between the two. A study conducted by Zheng X et al.,[10] in 2015 reported that having multiple food intolerances have the potential to negatively impact a person's quality of life.[10]

Current study didn't find any significant association between food intolerance and psycho-social suffering because very few studies have been conducted to find out association between food intolerance and quality of life and they mostly took children as subjects and none of them was done on university students. In 2016, a study was conducted by Chumpitazi,[22] showed the presence of self-perceived food intolerances and relationship of these intolerances with psychological and social suffering and quality of life in IBS children. Children of 7-18 years were selected for this research and severity of IBS was -day pro-forma which assessed quality of life, functional and mental disorder, depression and anxiety. However, weak association was found between food intolerance and quality of life.[22] In 2005, another study was conducted by Lind R,[23] to find association between health issues and emotional disturbances and patients having food hypersensitivity. 46 subjects who had food hypersensitivity were selected. All subjects were free from IgE-mediated food allergy. Questionnaires were filled up by all subjects. Anxiety, depression, sadness, increased heartbeat and other symptoms were mentioned in heath complaints as subscales. It was seen that patients having food hypersensitivity had increased symptoms as compared to controls.[23]

This study indicated that food intolerance didn't affect physical and social domains of quality of life and physio-social functioning of the subjects remain unaffected. According to a study conducted by Östblom in 2008, children with food hypersensitivity were having reduced physical functioning and they were also socially limited in their society. There were 212 children with food hypersensitivity and other 221 children with allergic disease.[19]

In 2004, Arslan[24] G conducted a study to find out impact of food hypersensitivity on quality of life. Three questionnaires were developed. Number of patients was 52 while 120 subjects were considered in control group. Results showed that food hypersensitive

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subjects had reduced quality of life. They were not only disturbed physically but they also had social stress which hindered their ability to work and compel them to quit their job. Avoiding a food item because of intolerance also made them frustrated and caused psychological disturbance.[25]

Current research reported that there was an association between food intolerance and certain food items including dairy products except yogurt, cereals and processed foods. In 2016, similar findings were reported in a study conducted by Puente-Fernández C et al.,[25] in which various food groups including dairy products, fruits and vegetables caused gastrointestinal symptoms related to food intolerance, thus proving the association of certain food items with the occurrence of food intolerance.[26]

In current study, there was significant association between processed food intake and food intolerance as p-value was 0.001, 0.008, 0.031 and 0.040 for pizza, burger, frozen desserts and coke/pepsi respectively. A study conducted by Skypala IJ et al.[15] in 2015, reported the association between processed foods and food intolerance. Monosodium glutamate is a food additive that is widely used in different recipes of processed foods to enhance flavor. According to a study conducted in China, headache was most prevalent issue due to Monosodium glutamate. Sixty-one volunteers were sensitive to MSG and exhibited symptoms such as headache which is related to food intolerance as well.[27]

Conclusion

Females were more food intolerant than males. There was no significant association found between demographic values and food intolerance. Study concluded that food intolerance had no impact on quality of life among university students.

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Conflicts of interest

The authors have no conflicts of interest to declare.

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