

Digestive Discomforts and Effect of Ingested Food in People Performing Hajj

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Abstract: A variety of health issues have been investigated in the Hajj pilgrims (HPs) in KSA. However, it is still obscure to decide which meals contribute to health related issues specifically gastrointestinal disorders and allergies. Hence present study was planned to compare the effect of using different meals on GIT disorders and allergies.

The data was categorized into two groups. Group 1 of age matched HPs comprised a Functional Digestive System Questionnaire (FDSQ) to study digestive disorders. Group 2 HPs were compared for those received Toafa Corporation Meals (TCM) and those did not received Toafa Corporation Meals (NTCM).

The FDSQ showed some of the gastrointestinal symptoms in male and female Hajj pilgrims differing significantly ($p < 0.05$). The efficacy of the treatment was evaluated by subject recovery scoring (SRS). The 61.7% HPs taking TCM revealed various discomforts and food allergy and the 50.6% HPs using NTCM did not suffer from any disorders. However, the pilgrims taking the meals provided by the Toafa corporation but not showing allergy were more significant in number ($p = 0.0002$).

The existing study presents a new method (construction of a FDSQ) for comparing gastrointestinal and other disorders. The present study recommends that Toafa Corporation should provide suitable meals for the pilgrims to meet their actual needs during Hajj and health situation.

Keywords: Hajj pilgrims, Toafa Corporation Meals, gastrointestinal disorders, allergy.

INTRODUCTION

Hajj is a great gathering in which Muslims from all over the world come to perform the rituals. The pilgrims come across diverse circumstances during their rituals including climate, accommodation, food, drink and health problems. It requires unique processing, management, and provision of all possible facilities. Thereafter results of the study will make the performance of Hajj easier for the pilgrims. There is a controversy about the incidence of various diseases and health problems during the occasion of Hajj, however gastrointestinal complaints were found to be one of the commonest disorders during Hajj [1]. The rate of the incidence for gastrointestinal diseases in a report was quite similar as for several other diseases, though the respiratory diseases were found to be most prevalent in HPs [2]. The GIT disorders were noted to be 6.3% [3]. The pattern of diseases and their management for HPs has been described recently [4, 5], more information is available on the Hajj websites [6, 7].

It was investigated that a small number of pilgrims reported the diarrheal symptoms compared to quite a

large number of those having upper respiratory tract symptoms [4], the incidence of diarrheal diseases or trauma was not found statistically significant related to age or nationality. However, educational level showed statistical significant difference for the diarrheal disorders [4].

The occurrence of food borne diseases comprising food poisoning in Saudi Arabia is commonly recognized just after or certain period after taking the meal [8-14]. There is variety of reasons of such incidences. In the Hajj period, a large number of people with varied cultures, customs and habits from all over the world gather and that influence the hygiene standards [15, 16]. The outbreak of food poisoning directly or indirectly relates to food handlers [17-19].

Diarrheal diseases in HPs might occur due to inappropriate standards of food hygiene, poor storage of large amount of foods, presence of asymptomatic carriers of pathogenic bacteria and shortage of water. The traveler's diarrhea during the Hajj is rarely studied. However, it was the third most common cause of hospitalization [3]. Another study shows the outbreak of diarrheal disease in soldiers at Hajj [20]. A total of 50 Saudi Male Soldiers were interviewed, out of which 16 (39%) developed gastroenteritis, manifested by diarrhea (100%) and abdominal colic (87.5%) [20]. The

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data for constipation and other related disorders is scarce that necessitated to carry out the present study.

The epidemiological pattern of the diseases and the risk factors in HPs attending Mina hospitals was studied¹ which showed that cough, dyspnea and fever were the commonest discomforts; and the most diagnosed diseases were acute respiratory infections and gastrointestinal illnesses. It was found that about 25% HPs were not vaccinated against meningococcal meningitis; about 88% did not use the protective masks; and about 43% had their hair shaved or cut by used scissors and re-used razors [1]. It was noted that those HPs following organized camps and receiving proper health education in their mother countries or KSA had significantly lower risk factors.

The other important diseases commonly found in HPs were cardiovascular disorders. However, no significant difference was obtained for gastrointestinal, gynecological, psychological and other important disorders.

A total of 160 patients from 4 hospitals at two different locations in Al-Mashaer, KSA (76 from Arafat hospitals and 84 from mina hospitals; 62% males and 38 % females) showed respiratory disorders as the most common (57 %), cardiovascular disorders as 19.4 % and gastrointestinal tract diseases as 6.3 % [3]. Three patients had heat stroke and one patient suffered from meningitis. Patients having other diseases include pneumonia, asthma, chronic obstructive pulmonary disease, hypertension and diabetes.

Various studies revealed several health problems including heat stroke and exhaustion [22-24], medical [25], surgical [26], renal [27] and epidemic disorders [28-30] during Hajj period.

The important safety measure to avoid food borne infections and the digestive disorders is that HPs should not be allowed to bring fresh foods to Saudi Arabia and they should only be permitted to bring properly sealed and packed foods by the inspection personnel.

The HPs need to know various risks during the period of Hajj e.g. physical and emotional stress and risk of transmission of infections during their stay in Makkah due to heavy gathering of people from all over the world; hence they should be advice to have proper vaccination, care for older subjects and those having chronic disease [21].

The HPs must take healthy foods to accomplish their health state. This could be only achieved by considering some issues like food must comprise of balanced diet and should have good supply of energy. The pilgrim should also follow some nutritional advices such as personal hygiene, intake of fresh fruits and vegetables and fluid intake like water and juices to compensate fluid losses.

Despite all studies, there was an immense need to conduct well-controlled and comprehensive survey studies related to gastrointestinal diseases and general health status that are mainly influenced by ingested food in HPs. Hence present study was designed to investigate these in HPs.

SUBJECTS AND METHODS

The data of two groups of HPs was recorded, evaluated and compared. Group-1 comprises of 1651 subjects; 803 females and 848 males. The average age of men was 45.23 years and average age of women was 42.29 years. This group was given a Functional Digestive System Questionnaire (FDSQ) for recording and evaluating the gastrointestinal symptoms showing hypoacidity/hyperacidity, Hypo/hyperactivity of small intestine and large intestine and activity of pancreas, liver, gall bladder and other digestive organs in all Hajj pilgrims. The data of the pilgrims was converted into percentages for comparative purposes.

A small sub-group of the subjects having diarrhea and constipation in group 1 was studied before treatment (BT) and after treatment (AT). The medicines in appropriate doses were prescribed and subjects recovered from disease were categorized in different groups according to subjects recovery score (SRS).

The SRS1 represent group in which no disease was present and 100% recovery occurred, SRS2 group in which recovery was 75%, SRS3 group revealed 50% recovery, SRS4 showed 25% recovery and in SRS5 group there was no recovery at all.

The group-2 HPs were studied with the help of a questionnaire and their personal interviews. The comparative effect of the food was determined by recording the type of food received by HPs i.e. those taking Toafa Corporation meals (TCM) and those not taking Toafa Corporation meals (NTCM).

The HPs having any illness and food allergy was also recorded and compared for both types of meals. In addition smoking habits of the HPs were also noted.

The HPs were advice to develop habit of walking and a regular exercise long before coming for Umrah and Hajj since performance of Hajj needs to have good health and fitness.

Pilgrims belonging to the category of Allahlia Toafa Corporations for Arab States were also studied from thirteen Arab countries as shown in Table 1. 1200 questionnaires were collected; however, the actual study includes analysis of only 988 samples as the rest were excluded due to their mismatching.

Table 1: Hajj Pilgrims of the Countries Included in the Study

Algeria	Egypt	Emirates	Iraq
Lebanon	Kuwait	KSA	Jordan
Syria	Sudan	Morocco	Libya
Yemen			

Statistical analysis is based on using SPSS version16 of 2008. Statistical method includes descriptive analysis of the sample, the analysis of the mean and the standard deviation of the level of t-test

and testing error rate (0.05). For comparing the percent values, two tailed t-tests (two sample or one sample t-tests) were employed.

RESULTS

The results of the group 1 and group 2 were analyzed for gastrointestinal and general health status, digestive disorders and effect of ingested food in HPs. A functional digestive system questionnaire (FDSQ) designed showed gastrointestinal symptoms in male and female HPs not very much different from each other except significant difference (p<0.05) for diarrhea and intolerance of greasy foods (Table 2).

The male subjects with abdominal pain and diarrhea were maximum in number i.e. 10.46% (n: 84) and 9.46% (n: 76) respectively. Whereas the female subjects having abdominal pain and intolerance to oily foods were 10.97% (n: 93), and 6.60% (n: 56) (Table 2). This shows that common predominant problem present in both males and females was abdominal pain. The second most prevalent disorder in female subjects was intolerance to oily food and third common

Table 2: Functional Digestive System Questionnaire (FDSQ) Regarding Gastrointestinal Symptoms in Hajj Pilgrims

Gastrointestinal symptoms /features	Hajj pilgrims (n: 1651)				Value of p*
	Male (n:803)		Female (n:848)		
	Number	%	Number	%	
Abdominal distension	26	3.24	21	2.48	0.3538
Abdominal pain	84	10.46	93	10.97	0.7379
Abdominal pain or discomfort relieved by defecation	16	1.99	13	1.53	0.4768
Altered bowel frequency	43	5.35	46	5.42	0.9498
Constipation	56	6.97	52	6.13	0.4903
Diarrhea	76	9.46	42	4.95	0.0004
Early satiety	23	2.86	21	2.48	0.6319
Fatigue after eating	03	0.37	02	0.24	0.6312
Fatigue and sleepiness after eating	23	2.86	27	3.18	0.7044
Food allergies	23	2.86	26	3.07	0.8016
Frequent or recurrent cold	45	5.60	43	5.07	0.6319
Headache after eating	25	3.11	27	3.18	0.9351
Intolerance to oily foods	25	3.11	56	6.60	0.0011
Light colored stool	31	3.86	29	3.42	0.6331
Nausea/vomiting	34	4.23	38	4.48	0.8037
Pain relieved by food or antacid	25	3.11	29	3.42	0.7234
Poor appetite	47	5.85	43	5.07	0.4854
Relief of stomach pain by milk	13	1.62	09	1.06	0.3215
Shiny stool	14	1.74	16	1.89	0.8196
Sore throat	34	4.23	32	3.77	0.6334

*Two-samples two tailed t-test was employed for comparing percent values.

problem in females was found to be constipation 6.13% (n: 52). Subjects having fatigue after eating were found minimum both in males i.e. 0.37% (n: 03) and females 0.24 % (n: 02).

Some of the pilgrims from group 1 having diarrhea or constipation were selected and prescribed medications to evaluate their effect in these disorders (Table 3a). The 27 subjects (58.70%) having diarrhea and 19 (41.30%) having constipation were given similar medication with almost same dosages because of the similar complaints in selected subjects.

55.56% subjects having diarrhea showed full recovery (SRS1); 25.93% showed 75% recovery (SRS2); 11.11% subjects showed 50% recovery (SRS3); 3.70% showed 25% recovery (SRS4) and no recovery was found in 3.70% subjects (SRS5).

Those having constipation i.e.73.68% showed full recovery (SRS1); 15.79 % showed 75 % recovery (SRS2); 5.26 % subjects showed 50 % recovery (SRS3) and no recovery was found in 5.26 % subjects (SRS5).

Table 3b shows statistical analysis of SRS for the management of HPs with diarrhea and constipation.

The SRS1 vs SRS3, SRS4 and SRS5; and SRS2 vs SRS4 for both diarrhea and constipation; SRS2 vs SRS5 only for diarrhea; SRS1 vs SRS2; SRS3 vs SRS4; and SRS4 vs SRS5 showed significant difference for SRS comparisons (Table 3b).

Table 4 show that about 61.7% of the pilgrims received the meal provided by Toafa Corporation suffered from various diseases and allergy to food ($p=0.0000$) compared to the pilgrims did not received meal provided by the Toafa Corporation.

50.6% of the pilgrims did not received meal provided by the Toafa corporation revealed no notable disorder ($p=0.0000$) as compared to pilgrims received meal provided by the Toafa corporation (9.2%). However, the number of pilgrims who received Toafa meal and had no allergy was significant (29.1%) than as compared to pilgrims who did not received the meal provided by the Toafa corporation and had no allergy (15.8%) Table 4.

Table 5 shows the sensitivity of pilgrims to various food items and beans, milk or banana were found to be the most common types of foods showing allergy in both groups of pilgrims who used the meal provided by

Table 3a: Management of Hajj Pilgrims with Diarrhea and Constipation

Digestive disorders	HP Subjects (BT)		SRS (n; %) (AT)				
	n	%	1	2	3	4	5
Diarrhea	27	58.70	15; 55.56	07; 25.93	03; 11.11	01; 3.70	01; 3.70
Constipation	19	41.30 [*]	14; 73.68	03; 15.79	01; 5.26	0; 0.00	01; 5.26

Subject recovery score (1= full recovery; 2= 75 % recovery; 3=50% recovery; 4=25% recovery; 5= no recovery); ^{*} $p=0.2370$ using one sample two tailed t-test for percents.

Table 3b: Statistical Analysis of Subject Recovery Score (SRS) for Diarrhea and Constipation in Hajj Pilgrims

SRS comparisons	Statistical analysis of the Digestive disorders in HPs (p -values*)	
	Diarrhea	Constipation
SRS1 vs SRS2	0.0826	0.0034
SRS1 vs SRS3	0.0023	0.0001
SRS1 vs SRS4	0.0001	0.0001
SRS1 vs SRS5	0.0001	0.0001
SRS2 vs SRS3	0.2035	0.3176
SRS2 vs SRS4	0.0282	0.0000
SRS2 vs SRS5	0.0282	0.3176
SRS3 vs SRS4	0.3173	0.0000
SRS3 vs SRS5	0.3173	1.0000
SRS4 vs SRS5	1.0000	0.0000

*One-sample two tailed t-test employed for comparing percent values.

Table 4: Health Status of Hajj Pilgrims

Health Status	Pilgrims Received TCM		Pilgrims Received NTCM	
	%	Number	%	Number
Pilgrims having illness or food allergy ¹	61.7	222	34.6	85
Pilgrims having no illness ²	9.2	33	50.6	122
Pilgrims having no Allergy ³	29.1	105	15.8	39
Total	100	360	100	246

The p values for ¹, ² and ³ were 0.0000, 0.0000 and 0.0002 respectively for Hajj pilgrims received TCM vs NTCM.

Table 5: Type of Food Allergy in Hajj Pilgrims

Type of Allergy	Pilgrims Received TCM		Pilgrims Received NTCM	
	%	Number	%	Number
Beans ¹	22.6	14	30.4	7
Milk ²	20.9	13	26.2	6
Banana ³	37.2	23	21.7	5
Other allergies ⁴	19.3	12	21.7	5
Total	100	62	100	23

The p values ¹, ², ³ and ⁴ were 0.4610, 0.6036, 0.1807 and 0.8063 respectively for Hajj pilgrims received TCM vs NTCM.

the Toafa Corporation or did not used the Toafa meals. No significant change were noted between both groups ($p > 0.05$).

Table 6 shows comparison between smokers and non smokers pilgrims received or did not received the meal provided by the Toafa Corporation ($p > 0.05$).

DISCUSSION

Results of the current report shows that significant number of HPs received meals provided by the Toafa Corporation revealed various illnesses and allergy, hence there is need to re-check the composition and quality of the food provided by the Toafa Corporation. There might be deficiency of certain essential components in the food or the food might not be suitable for HPs. This was also evident from other part of the data wherein 9.2% pilgrims received TCM

showed no illness on the contrary to 50.6% subjects with no illness who received NTCM.

This emphasizes to investigate the contents of meals provided by Toafa Corporation to ascertain health of the pilgrims and hygiene in the holy city of Makkah. However significant number of pilgrims received TCM (105) and had no allergy.

Hence one advantage seems to be obvious in the subjects received TCM that large number of subjects 105 (29.1%) had no allergy than as compared to pilgrims received NTCM only 39 subjects (15.8%) reported to have no allergy which is quite positive and interesting.

This shows that the TCM contain certain substances or additives that have antiallergic properties. However, this needs further investigation about the components of TCM which exhibited such

Table 6: The Smoking Habit in Hajj Pilgrims

Smoking	Pilgrims Received TCM		Pilgrims Received NTCM	
	%	Number	%	Number
Non smokers ¹	53.4	401	53.7	101
Smokers ²	46.6	350	46.3	87
Total	100	751	100	188

The p value was 0.9412 for both ¹ and ² Hajj pilgrims received TCM vs NTCM.

effects. Hence revealing such clues might help establishing the quality of meals for HPs and general public as well.

The occurrence of diarrhea during Hajj in present study resembles with other studies where diarrhea was found as symptom [4] due to food poisoning [8-14]. It is evident from another report³ where diarrhea was found third most common cause of hospitalization during Hajj. Another study explains the outbreak of diarrheal disease in soldiers on Hajj duty [20], which might be due to unhygienic handling of food [17-19].

The cough, dyspnea and fever during Hajj were once found as most common disorders in literature [1]. However results of the present study are different where abdominal pain, diarrhea and intolerance to oily foods were found to be predominant issues related to health. This might had been partly owing to the reason that the data mentioned in previous report [1] was limited whereas present study is comparatively on large number of HPs both male and female. The present study additionally provides the evaluation of the effect of generally prescribed medication for diarrhea and constipation.

61.7% HPs in the present study received TCM revealed various disorders and food allergy in comparison to only 34.6% of those received NTCM, while the highest percentage of HPs i.e. 50.6% received NTCM did not have any illness.

Several aspects of the present study are similar to the reports explaining that the diarrheal diseases in HPs might be due to inappropriate standards of food hygiene, poor storage of large amount of foods, presence of asymptomatic carriers of pathogenic bacteria and shortage of water. The traveler's diarrhea during the Hajj is rarely studied. However, it was the third most common cause of hospitalization [3] that further explains the patients studied in present report.

CONCLUSION

It has been noted that irrespective to the type of meals taken by HPs; both groups may have certain health issues and severe deficiency in calories, fluids, minerals and vitamins. Hence, it is recommended that all pilgrims should be advised to take a standard hygienic balanced diet and fresh fruits to fulfill the dietary need and prevent from allergies and GIT disorders. Moreover pilgrims should also be directed to increase fluid intake preferably natural juices and water

during Hajj. However fluids like soft drinks, tea and coffee should be avoided as much as possible to avoid discomfort.

It is further recommended that all pilgrims should take advice from their family physicians and their health fitness should be assessed before proceeding to Hajj especially for those above 40 years of age since Hajj is an obligation only for those who can afford financially as well as from health point of view.

Moreover while preparing for Hajj; pilgrims should perform some physical fitness exercises and overweight individuals should decrease their body weight before proceeding to Hajj.

Conclusively, the current study presents a new method (construction of a FDSQ according to prevailing discomforts in HPs) for comparing gastrointestinal and other medical disorders.

Furthermore, it was investigated in the present study that male and female subjects with diarrhea and intolerance to oily foods differ significantly. This necessitates managing for such gender differences.

The other part of the investigation in the current study predicts that the food *via* TCM has advantages as well as disadvantages concerning the health of pilgrims and suggests the authorities to assess nutritional value for TCM. It is essential to know which contents of meals are responsible for clinical disorders and how to manage it.

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