Avens Publishing Group
J Epidemiol Health Care
September 2018 Vol.:1, Issue:1

Open Access Research article

Journal of
Epidemiology & Health Care

Knowledge and Practice after Health Education Program among Hajj 1438 H (2017) Pilgrims, in Saudi Arabia

Fahad A. Alamri[1], Samar A. Amer[2*] and Najla J. Alhraiwil[3]

[1]*Family Medicine Department, Faculty of Medicine, Ministry of Health, Saudi Arabia*
[2]*Public Health and Community Medicine Department, Faculty of Medicine, Ministry of Health, Saudi Arabia*
[3]*Public Health Specialist, Faculty of Community Health, Ministry of Health, Saudi Arabia*

Address for Correspondence

Samar A. Amer, Public Health and Community Medicine Department, Faculty of Medicine, Ministry of Health, Saudi Arabia, E-mail: Dr_samar11@yahoo.com

Submission: July 12, 2018
Accepted: September 19, 2018
Published: September 26, 2018

Keywords: Health education; Hajj; Pilgrims; Saudi Arabia

Abstract

Background: Hajj pilgrimage is the biggest and longest mass gathering across the globe drawing pilgrims from more than 185 countries. The rituals of Hajj are physically very demanding. These increase the risk of communicable and no communicable. Health education is one of the principal services provided for pilgrims from their arrival. The effectiveness of the applied health education program to control as much as possible the arising health problems and to updates health requirements for the 2018 Hajj, with the result that pilgrims now enjoy modern facilities and perform various rites at ease.

Aim of study: Improve the pilgrims overall health status in KSA; Through applying health education program, to increase the level health knowledge to improve some practice, at the same time determining the source of health information, among hajj 2017 pilgrims.

Methods: This is an intervention study; 5173 hajj pilgrims were randomly selected from 54 campaigns after Health Education Program. Data were collected using a questionnaire that was divided into three main parts. Part one addressed the general characteristics and hajj history. The second part addressed aspects related to knowledge, and its sources and practices. The third part briefly addresses some services and availability of some tools.

Results: Level of knowledge was very low in 8.9%, low in 23.7%, average in 40.9%, good in 17.9% and very good in 8.6% of respondents. The mean and standard deviation of practice score was 6.7±2.1 out of 8 (ranged between two and 8). Although the middle-aged pilgrims had the highest knowledge and practice scores. The old and low educated pilgrims had a little knowledge of health tips, they had a good health practice. Almost all respondents stated that they benefited from the health education program and that the health educator was successful in delivering the messages. Only 317(25.6%) reported that they had already received relevant health education messages prior to their arrival in Saudi Arabia.

Conclusion: Health educational strategy to pilgrims is effective in improving knowledge and practice andto decreases the prevalence of health disorders among hajipilgrims.

Abbreviations

WHO: World Health Organization; KSA: Kingdom Saudi Arabia; HE: Health Education; ARI: Acute Respiratory Infection

Introduction

Hajj pilgrimage is the biggest and longest mass gathering across the globe drawing pilgrims from more than 185 countries [1]. Due to Muslim (lunar-based) calendar, Hajj shifts forward by approximately 10 days each successive year, leading to its coincidence with different seasons every few years. Men, women, and children of all ages attend Hajj [2].

The rituals of Hajj are physically very demanding. Extreme physical stressors, such as extreme heat, sun exposure, prolonged stays at Hajj sites, dryness, of environment, overcrowding, and traffic congestions, air pollution and rough and uneven ground [3].These increase the risk of communicable and no communicable diseases [4].

The World Health Organization (WHO) defines health education as;"any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes" and providing opportunities required to make health decisions or change health behaviors such as, hydrating, hygiene, healthy diet and sleep [5-7].

Health education is one of the principal services provided for pilgrims from their arrival. It has various modes, e.g. lectures, discussions, symposia, posters …etc. Each mode has its own merits, drawbacks and scope of effectiveness. Messages have to overcome communication barriers (e.g. physiological, psychological, environmental and cultural) [8]. The effectiveness of health education modes varies according to the setting in which it is delivered to a specific group [9-11].

The Hajj living circumstances and activities may create an environment, thus, health issues such as infections, accidents, complication of chronic diseases and climate complications may arise and affect the health & Hajj of those pilgrims [12]. The prepared nests plans made before the Hajj season ensures the optimum provision of health services for pilgrims, and to minimize disease transmission both during their stay home in the country and upon their return home [13].

Making necessary arrangements each year for the growing annual

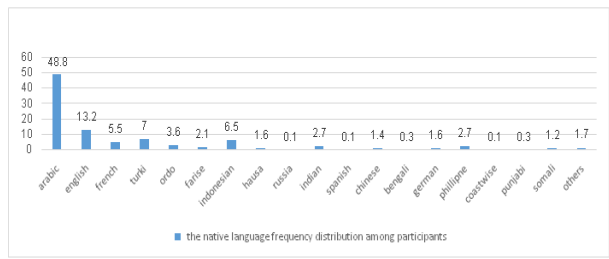

Figure 1: The native language frequency distribution among participants.

number of pilgrims that may reach up to 2,000, 000 poses a logistic challenge for the government of Saudi Arabia (as hosting country) [14], which has, since the 1950s, spent more than $100 billion to increase pilgrimage facilities [15].

Here, we conducted a study to evaluate the effectiveness of the applied health education program to control as much as possible the arising health problems and to updates health requirements for the 2018 Hajj, with the result that pilgrims now enjoy modern facilities and perform various rites at ease [16].

Objectives

To determine the source of health information, to apply health education program, to increase the level of health knowledge to improve some practice, and asses the Hajj 2017 pilgrims general health status (after haji).

Methodology

Through a post intervention study design, a stratified random sample of 5180 haji whom fulfill the selection criteria (aged >18 yrs without any mental or psychological disorders, from companies of countries that had >4000 haji pilgrims) after applying the health education programs in the targeted 54 campaigns of different countries, this study conducted in the three main cities (Mecca-Jeddah-Madinah) from August 18 to September 5, 2017 (11th -17th of Dhu'l-Hijjah), in the following places;

The calculated sample sizes were 2599 participants, calculated using Open Epi web. Targeted Population of 1,980,756 pilgrims , with 95% confidence interval, 80% power of the study, and less than 5% of errors and using the median percent of increase of knowledge after health education 15% among haji pilgrims. Then 2590 participants will be doubled to be 5190 (to compensate deviation from simple random sample), then proportionally divided into 46 different strata (nation), weighted according to the total number of pilgrims from each countries (according to the Saudi general authority of statistics (2016).

Application of the health education programs

By training 1626 medical staff (163 doctors and 1463 technicians); who were the medical teams of 54 campaigns of 45 countries (that had >4000 hajj plagiarisms). Then they educate 1,620,989 pilgrims.

Country	No	%	Country	No	%	Country	No	%
Senegal	10	0.2	Ethiopia	276	5.3	Algeria	442	8.5
Sudan	535	10.3	Jordan	143	2.8	Malaysia	52	1
Syria	72	1.4	Afghanistan	49	0.9	Egypt	735	14.1
Somalia	86	1.7	Germany	10	0.19	Morocco, West, sunset	217	4.2
China	76	1.5	United Arab Emirates	82	1.6	United kingdom	51	1
Tangstan	60	1.2	Indonesia	330	6.4	Niger	14	0.3
Iraq	316	6.1	Uzbekistan	84	1.6	Nigeria	29	0.6
Amman	16	0.3	Pakistan	112	2.2	India	252	4.9
France	50	1	Bangladesh	55	1.1	Holland	3	0.04
Philippines	115	2.2	Burkina Faso	27	0.5	United State	9	0.2
Palestine	107	2.1	Thailand	4	0.1	To whom	7	0.1
Kuwait	80	1.5	Turkey	254	4.9	Others (sum of many)	89	1.8
Kenya	3	0.05	Chad	7	0.1	Lebanon	62	1.2
Saudi Arabia	23	0.4	Tunisia	195	3.8	Libya	62	1.2

Site	Medical team	Institutions	Hospitals	Health center
Mecca	52	5	7	27
Mina			4	26
Muzdalifah				4
Arafa			4	47
Booking Centers				Centers (6)
Hotels				(365) hotels
Wild Ports				(6) Outlets
Jeddah				King Abdul Aziz Airport-Islamic Port- the city of pilgrims in Jeddah
Madinah sites				

No. of hajj campaigns	No. of pilgrims	No. of doctors	No. of public health doctors	%Public health doctors to no. of doctors	Doctors per pilgrims	No. of Technicians	Technicians per pilgrims
54	1,620,989	163	190	12%	(16/10,000)	1,463	15/10000

Borshur for the following topics	Posters	Plates and borders	Roll Up
500,000 folded map of Hajj health in Arabic number	Poster silent porter holds health (20,000) messages	150 Fixed (4 healthy messages)	2100 For many healthy topics
200,000 folded for your health in Arabic, Urdu and English languages about Hajj energy/Hajj bag/Personal hygiene/ sun strikes	food Safety Booster (500) Pasteur		
200,000 folded for food poisoning/shaving/avoiding risk/ use of napkins	Booster for your health (Arabic, Urdu and English): 1. 1500 for: energy Haj/Bag Hajj/personal cleanliness/sun strikes 2. 1500 for: food poisoning/shaving/avoidance of risk	3 Unipol plates were installed and maintained	
800,000 folded for together for Hajj in eleven languages			

Table 1: Shows the general characteristics of the participant haji pilgrim.

Variable	F(%)
Sex	
Male	3473(67.3)
Female	1700(32.7)
Age group (yrs)	
<30	269(5.2)
30-50	2251(43.5)
>50	2653(51.2)
Level of education	
Illiterate	571(11.03)
Read- write-primary	1285(34.1)
Secondary -tertiary	1906(36.8)
University-higher	1401(27.12)
History of chronic disease	3794(66.4)
Hajj times	
1st	3723(71.9)
2nd or more	1450(28.1)
Examined before hajj	4695(91.8)
Vaccination against	
Meningitis	2466(47.6)
Influenza	91(1.8)
Yellow fever	81(1.6)
Poliomyelitis	58(1.1)
Don't know	198(3.8)
Don't vaccinated	1154(22.3)
Multiple vaccinations	1125(21.7)
Duration of stay in Madina	
0-3 days	639(7.1)
3-5 days	4534(92.8)
Duration of stay in Macca	
0-3 days	202(3.9)
3-5 days	1198(23.1)
>5days	3773(73.0)

Through the use and distribute the following tools;

Data collection instrument

The questionnaire was designed in Arabic, and translated into 10 languages. The structured questionnaire divided into three parts. Part one addressed the general characteristics and hajj history. The second part addressed aspects related to knowledge, and its sources and practices. The third part briefly addresses availability of some tools

Table 2: Shows the sites and sources of health knowledge among participants.

	F(%)
Interesting in receiving health education	**4925(95.1)**
Site or time of receiving H.E	
At native country	317(25.6)
*During trip	0(0.00)
At residence site	1505(29.1)
Multiple	3341(64.6)
Having cell phone	4856 (93.8)
Source of information	
Television	890(17.2)
Booklets-boosters	2005(38.8)
Lectures	1758(33.9)
Electronic webs	1393(26.9)
Social media	1371(26.5)
Sms messages	250(4.8)
No	315(6.1)
Social media	
Twitter	282(20.6)
Facebook	270(19.7)
Snap	29(2.11)
Instagram	31(2.3)
Whats App	333(24.3)
Others	395(28.9)
Multiple	31(2.3)
Electronic webs	
Site of the Saudi Ministry of Hajj	440(31.6)
MOH web page	287(20.6)
Others	342(24.6)
Multiple	324(23.2)

Table 3: Shows the sources and availability of some tools.

	F(%)
Interesting in receiving health education	**4925(95.1)**
Site or time of receiving H.E	
At native country	317(25.6)
*During trip	0(0.00)
At residence site	1505(29.1)
Multiple	3341(64.6)
Having cell phone	4856 (93.8)
Source of information	
Television	890(17.2)
Booklets-boosters	2005(38.8)
Lectures	1758(33.9)
Electronic webs	1393(26.9)
Social media	1371(26.5)
Sms messages	250(4.8)
No	315(6.1)
Social media	
Twitter	282(20.6)
Facebook	270(19.7)
Snap	29(2.11)
Instagram	31(2.3)
Whats App	333(24.3)
Others	395(28.9)
Multiple	31(2.3)
Electronic webs	
Site of the Saudi Ministry of Hajj	440(31.6)
MOH web page	287(20.6)
Others	342(24.6)
Multiple	324(23.2)

and the health status after haji.

Trained data collectors did the interviewing, and some volunteers were recruited and trained for two days on how to undertake the interview. Along with constant monitoring of data to exclude incomplete responses.

Quantitative data summarized as Median and interquartile range. While Kruskall Wallis test and Mann-Whitney U test were used for their analysis while frequency and percentages for qualitative data summarization, and chi-square testing for related differences. Moreover, the level of significance $p < 0.05$.

Results

Finally, 5173 pilgrims participated in this study selected randomly from 47countries, Arabic was the native language in about 49% of them, then English 13.2 …etc (Figure 1). As17 questionnaires (0.03%) were, exclude due to their defects.

67.3% of the participant were males,51% were above 50 yrs old, only about 11% were illiterate, about 66.7% had chronic diseases (74.4% of them had multiple diseases, 13.5% were diabetic, and 8.9% had cardio vascular disorders, and about 10.4% were handicapped), it was the 1st haji in 71.9%, about 91.8% of them examined before haji (89.4% as a campaign routine, and only 10.4% by themselves for self-assurance), about 22.3% didn't vaccinated, while 21.4% received multiple vaccinations, 47.6% immunized for meningitis. The mean duration for haji in KSA was (9.3±2.9) range (4-21 days) (Table 1).

About 95.1% of the participants were interesting in receiving Health Education (HE). 25.6% of them received the HE at their native countries, while 29% received after arrival at their residence sites, and about 64.6% of them received HE at multiple sites. Only 316(6.8%) of the participant had not cell phone, while the remaining 4856(93.2%) having cell phone only about 2578(49.8%) had a smart phone with internet. Their personal knowledge obtained through the following routes boosters 38.8%, lectures (33.9%), social media and electronic webs nearly equal about (26.5%), and only 6.1% did not receive any education, as illustrated in details at Table 2.

The frequency distribution of the resources of some pilgrim's tools showed that the solar umbrella is the only tool that provided as a gift on arrival or hajj had on personal acquisition). The campaigns were the main source of tools, while nearly about 12% of plagiarisms didn't have the necessary studied tools.

Around 91.7% of the haji were had their own tools (Table 3).The knowledge level was very low in 8.9%, low in 23.7%, average in 40.9%, good in 17.9% and very good in 8.6 % of respondents. Only 51.1% know the call No. of emergency, 78.4% reported that the medical team was available in their companies (11.7% don't know, and only 9.6% say the medical teams was unavailable) (Table 4). The Mean and standard deviation of practice score was 6.7±2.1 out of 8 (ranged 2-8). Practice score in general was good. Except for the Following healthy ways to save food and using the solar umbrella constantly, only about

Table 4: Shows the frequency distribution of some knowledge among studied haji pilgrims.

Knowledge about medical services	F(%)
Knowing call number of emergency service	2643(51.1)
Availability of medical staff at company	4076(78.4)
Knowing the symptoms of heat disorders	3110(60.1)
Knowing the symptoms of food poisoning	1780(34.4)

Table 5: Shows the frequency distribution of some practice among haji subjects.

Hajj practice	F (%)
Not buying food from street vendors	3711(71.7)
Following healthy ways to save food	2808(54.3)
Using the solar umbrella constantly	2864(55.4)
Using mask in the crowded places	5166(99.9)
Using napkin or arm when sneezing	3596(69.5)
Drinking fluids in sufficient quantities	3838(74.2)
Making sure to use your personal tools and not share them with others	4066(78.6)
Taking adequate sleep	4177(80.7)

Table 6: The relationship between the sex and the total knowledge and practice scores.

	Male No=3473	Female No=1700	p
Total knowledge score			
Median	2	2	0.34
Interquartile range	0-4	0-4	
Total practice score			
Median	6	5	0.45
Interquartile range	2-8	2-8	

Table 7: The relationship between the age groups and the total knowledge and practice scores.

	Group 1(<30 yrs) No=269	Group 2(30-<50 yrs) No=2251	Group 3(>50 yrs) No=2653	p
Total knowledge score				
Median	1	4	2	0.03*
Interquartile range	0-3	2-4	1-3	
Total practice score				
Median	3	7	5	0.00*
Interquartile range	2-6	4-8	2-8	

*p less than 0.05 (there was a significant difference).

55% of answers were true, other item scores were good (Table 5). There was no difference between men and women regarding knowledge and practice scores (p >0.05) (Table 6). While the pilgrims aged 30- <50 yrs significantly had the highest knowledge and practice scores (p <0.05) (Table 7). Although, the old and low educated pilgrims had a little knowledge of health tips, they had a good health practice.

Almost all pilgrims (99.6%) agreed the HE programme was beneficial, with 98.9% evaluating that program as successful in delivering the health education messages. So that (55.8%) of the pilgrims enjoy healthy hajj, only 44.25 was the morbidity rate among the studied participants from them (respiratory diseases 44.7%, heat disorders 3.7%, 2.1% inflammations, 0.88% food poisoning, 0.9% injuries, 0.94% skin disorders,1.48 complication of chronic disease, 0.73% hospitalized, and 15.3% were had multiple disorders) among studied subjects.

Discussion

In this study, we assessed the knowledge, and practices after health education program among hajj 1438H pilgrims, the majority of the represented haji sample were male (67.3%), and aged >50 yrs (51.2%), nearly more than 60% of them were educated, and 66.4% had chronic diseases, nearly similar results reported in studies [17-19]. The mean duration of stay in (Macca and Madinah) was 10 days (d) range (4-30) days, so environmental conditions, and health facilities during Umrah and haji are factors that influence our result [20].That was lower that study conducted on Singaporean pilgrims who 33.3% were short-trip packages with duration of stay ranging from 13 to 22 days. 60% were intermediate-trip packages with duration of stay between 24 to 31 days. Only 6.7% were long-trip packages with duration of stay ranging from 32 to 35 days [21].

The MOH in the KSA has addressed requirements and recommendations for visitors for the purposes of Hajj, through Health authorities in countries of origin to consider the physical ability and health conditions of individuals applying for Hajj [22]. So 91.8% were examined before travelling ,and only about 25% of studied haji didn't vaccinated at all, 47.6% vaccinated against meningitis, and only 1.9% vaccinated against influenza. Although haji seasonal influenza vaccine is recommended by MOH [23], but vaccination coverage has been low before departure to Saudi Arabia [24]. That was lower than haji tips that reported that pneumococcal vaccination is indicated for about one-third regardless of the Hajj status; only 7% of pilgrims in whom pneumococcal vaccine was indicated were advised the same by general practitioners [25].

The enjoyment of health is one of the human rights, that all depends on the hygiene the most important goals in health promotion are empowerment of individuals through public awareness and knowledge about people's health [26]. However, these studies overlook the relation between knowledge, and practice. Other studies are consistent with our findings [27,28].

The low rate for receiving pre-departure health education messages among those affluent enough to afford to travel by air, indicated a notable lapse in pre-travel preparation in the haji population, and a need for home country educational interventions that also reported by Turkestani et al. as in table 2 [29].

In this study, public awareness through media and public issues was good, and more health information was acquired by many uneducated (45.4%) and old age pilgrims participate, and most health problems during the trip occurred mainly in these groups, planning for their health education should be a priority as reported by Aminreza et al. [20]. The total knowledge and practice were good, although the pilgrims of old age and low level of education had little knowledge about health subjects, they had a good health attitude and practice, and the middle aged (30- <50 yrs) had the highest total knowledge and scores. Few studies have been down in the field of health knowledge during the Hajj. Aminreza et al. founded that, the Level of knowledge were very low in 12.1%, low in 25.2%, average in 38.1%, good in 20.4% and very good in 4.2% of respondents. The Mean and standard deviation of practice score was 8.19±1.32 out of 10 (ranged between 3 and 10). Although the old and low educated pilgrims had little knowledge of health tips, they had a good health attitude and practice, that consistent with this study [20].

There was no significant relationship between the sex and the total scores of knowledge and practice, different results reported by Philippe Gautret who assessed the knowledge of Hajj pilgrims about ARI (Acute Respiratory infection). Scores were also higher for female pilgrims. No other demographic or health factor had significant influence [30].

Although 99.9% of participants used mask in crowded places, the incidence of influenza was 44.7%, that explained by a systematic review on its use to prevent transmission of influenza concluded that there was no convincing evidence of protection against influenza infection and uncertainty about the mode of influenza transmission has influenced debate about when and whether to use it for pandemic influenza. Similar Observational studies have failed to demonstrate any clear benefit of its use among Hajj pilgrims [31].

The overall prevalence of health disorders among studied subjects e.g. (respiratory diseases influenza 27.4%, heat disorders 2.2%, 1.3% inflammations, 0.54% food poisoning, 0.57% injuries, 0.6% skin disorders, 0.91 complication of chronic disease, 0.32% hospitalized, and 9.4% were had multiple disorders, were significantly reduced than previous studies [32-35].

Only 27.4% of participant had respiratory disorders (influenza), that was lower than what Hosseini et al. reported that annually, about 50% of hajj pilgrims get involved in severe devastating coughs. That continue, so when turn back home transmit them to family members and other people [1]. That was significantly reduced ($p < 0.05\%$) in who use sterile jells and follow healthy practice when sneeze that agreed with, a cochrane review supports simple and low-cost interventions, particularly hand hygiene, reducing the transmission of respiratory viruses [36]. This study consists with another studies that showed that using the educational intervention (who depends on volunteers from various medical faculties and health institutes) improved knowledge and practice. Ourfindings showed significant improvement in the short-term knowledge level among intervention recipients. This effect has been established in previous studies in similar settings, including India and Saudi Arabia [8, 37, 38]; the authors recommended that health education-focused programmes should be conducted in small groups, preferably via specific topic lectures.

Our study had the following limitations; the limited time and resources available to conduct the current health education intervention presented a significant limitation. This population was not representative of all pilgrims. In addition, it was not possible to obtain a pretest and then directly paired responses from each of the pilgrims, some hajj may reluctant to tell the interviewers they had wrong practice because some was required e.g. vaccinated, examined pre departure, pilgrims' self-reported behaviors may have resulted in over-reporting of correct health practices. In addition, this study design makes determining causality impossible. Anyway, educational strategy to improve knowledge re-grading health-related problems and to develop health practices among pilgrims is needed.

Conclusion

Health educational strategy to pilgrims is effective in increasing the level of knowledge to improve the practice to decreases the prevalence of health disorders among haji pilgrims across years.

Recommendations

Considerable effort on the part of governmental and private health organizations requires continuous training to face both current and future challenges, tailoring health education programs (messages ,tools) to overcome the gaps and facing the challenges to manage hajj health hazards.

References

1. Rahimian M, Hosseini BM (2017) Serological study of *Bordetella pertussis*, *Mycoplasma pneumonia* and *Chlamydia pneumonia* in Iranian hajj pilgrims with prolonged cough illnesses: a follow-up study. Respir Med 132: 122-131.
2. http://www.hajcommittee.gov.in 2015/[Last accessed on 2015 Aug 10]. Available from:
3. Ahmed QA, Arabi YM, Memish ZA (2006) Health risks at the Hajj. Lancet 367: 1008-1015.
4. Shafi S, Booy R, Haworth E, Rashid H, Memish ZA (2008) Hajj: health lessons for mass gatherings. J Infect Public Health 1: 27-32.
5. World Health Organization (2016) Health education.
6. Gold RS, Miner KR, 2000 Joint Committee on Health Education and Promotion Terminology (2002) Report of the 2000 joint committee on health education and promotion terminology. J Sch Health 72: 3-7.
7. WHO EMRO (2017) Health promotion and disease prevention through population-based interventions, including action to address social determinants and health inequity. pp. 1-3.
8. Turkestani A, Balahmar M, Ibrahem A, Moqbel E, Memish ZA (2013) Using health educators to improve knowledge of healthy behaviour among Hajj 1432 (2011) pilgrims. East Mediterr Health J 19(Suppl 2): S9-S12.
9. Nishtar S, Zoka N, Nishtar SS, Khan SY, Jehan S, et al. (2004) Posters as tool for disseminating earth related information in a developing country: a pilot experience. J Pak Med Assoc 54: 456-460.
10. Werner RT Sr, Wilson JM (1981) Are health education conferences effective? An evaluation of knowledge regaining at three day institute. Health Edu 12: 22-24.
11. Abolfotouh MA (1995) The impact of a lecture on AIDS on knowledge, attitudes and beliefs of male school-age adolescents in the Asir Region of southwestern Saudi Arabia. J Community Health 20: 271-281.
12. Campo JE (2009) Encyclopedia of Islam. Facts on File Inc., An imprint of Infobase Publishing. New York, USA, pp. 283.
13. World Health Organization (2015) Communicable disease alert and response for mass gatherings: key considerations. World Health Organization, Geneva: 2008.
14. Memish ZA (2010) The hajj: communicable and non-communicable health hazards and current guidance for pilgrims. Euro Surveill 15: 19671.
15. Al-Tawfiq JA, Gautret P, Memish ZA (2017) Expected immunizations and health protection for Hajj and Umrah 2018-an overview. Travel Med Infect Dis 19: 2-7.
16. (2017) The General Authority for Statistics in Kingdome Saudi Arabia.
17. Rashid H, Shafi S, Booy R, Bashir H El, Ali K, et al. (2008) Influenza and respiratory syncytial virus infections in British Hajj pilgrims. Emerg Health Threats J 1: e2.
18. Deris ZZ, Hasan H, Sulaiman SA, Wahab MS, Naing NN, et al. (2009) Preference of treatment facilities among Malaysian Hajj pilgrims for acute respiratory symptoms. Saudi Med J 30: 1103-1104.
19. (2016) Haji statistics 1437 H. General Authority for Statistics, Kingdom of Saudi Arabia. pp. 42.
20. Tabatabaei A, Mortazavi SM, Shamspour N, Shushtarizadeh N (2015) Health knowledge, attitude and practice among Iranian pilgrims. Iran Red Crescent Med J 17: e12863.
21. (2018) Media release on authorised travel agents and approved Haj packages for Haj 2018 (1439H). Islamic Religious Council of Singapore. pp. 14.
22. (2018) Health requirements and recommendations for travelers to Saudi Arabia for Hajj and Umrah - 2018/1439H.
23. Ahmed QA, Arabi YM, Memish ZA (2006) Health risks at the Hajj. Lancet 367: 1008-1015.
24. Shafi S, Rashid H, Ali K, El Bashir H, Haworth E, et al. (2006) Influenza vaccine uptake among British Muslims attending Hajj, 2005 and 2006. BMJ 333: 1220.
25. http://www.hajtips.com/expenses.htm
26. Lopez-Quintero C, Freeman P, Neumark Y (2009) Hand washing among school children in Bogota, Colombia. Am J Public Health 99: 94-101.

27. Grodin MA, Annas GJ, Glantz LH (1993) Medicine and human rights. A proposal for international action. Hastings Cent Rep 23: 8-12.

28. Nutbeam D (1998) Health Promotion Glossary. Health promotion international: Oxford University Press, UK, 13: 349-364.

29. Turkestani A, Balahmar M, Ibrahem A, Moqbel E, Memis ZA (2013) Using health educators to improve knowledge of healthy behavior among Hajj 1432 (2011) pilgrims. East Mediterr Health J 19(Suppl 2): S9-S12.

30. Gautret P, Soula G, Parola P, Brouqui P (2009) Hajj pilgrims' knowledge about acute respiratory infections. Emerg Infect Dis 15: 1861-1862.

31. Bin-Reza F, Chavarrias VL, Nicoll A, Chamberland ME (2012) The use of masks and respirators to prevent transmission of influenza: a systematic review of the scientific evidence. Need further studies. Influenza Other Respir Viruses 6: 257-267.

32. Meysamie A, Ardakani HZ, Razavi SM, Doroodi T (2005) Comparison of mortality and morbidity rates among Iranian pilgrims in Hajj 2004 and 2005. Saudi Med J 27: 1049-1053.

33. Memish ZA, Zumla A, Alhakeem RF, Assiri A, Turkestani A, et al. (2014) Hajj: infectious disease surveillance and control. Lancet 383: 2073-2082.

34. Gautret P, Soula G, Delmont J, Parola P, Brouqui P (2009) Common health hazards in French pilgrims during the Hajj of 2007: a prospective cohort study. J Travel Med 16: 377-381.

35. Michael JA, Barbera JA (1997) Mass gathering medical care: a twenty-five year review. Prehosp Disaster Med 12: 305-312.

36. Jefferson T, Del Mar CB, Dooley L, Ferroni E, Al-Ansary LA, et al. (2011) Physical interventions to interrupt or reduce the spread of respiratory viruses. Cochrane Database Syst Rev 6: CD006207.

37. Saha A, Poddar E, Mankad M (2005) Health Effectiveness of assessment in a scientific conference. BMC Public Health 5: 88.

38. Nishtar S, Zoka N, Nishtar SS, Khan SY, Jehan S, et al. (2004) Posters as a tool for disseminating health re-lated information in a developing country: a pilot experience. J Pak Med Assoc 54: 456-460.

Acknowledgement

Acknowledgement of Financial Support: Supported by General Directorate of Clinical Education, Assistant Agency of Public Health, and Ministry of Health. In collaboration with Ministry of Haji, in Saudi Arabia (in applying the health education program)

We would also like to acknowledge the contributions of members of the group who participated in the meeting and discussions at the preparation of the questionnaire and the application of the health education program; Mohamed S. Alsuwaidan (GP, resident(MBBS), (Eissa Aldahmashi (B.A. Nursing), Hana A.Alhumud (B.A.Epidemiology), and the all team of the by General Directorate of Clinical Education. In addition, special thanks to Dr. Mounira Al Ahmar who supervised the data collectors. To all haji plagiarisms who participate and cooperation in this study.