

Knowledge, Perceptions and Practices of Malaysian Hajj Pilgrims for Prevention of Influenza-like illness (ILI) in 2013 Hajj Season

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ABSTRACT

Introduction: Influenza-like illnesses (ILI) were defined as a triad of cough, sore throat and fever. The aim of this study is to determine the changes in knowledge, perceptions and practices towards preventive measures of succumbing to ILI before and after hajj among Malaysian hajj pilgrims. **Methodology:** An open-labeled randomized control trial study performed on five hundred Malaysian hajj pilgrims in the year 2013. After validated pre-hajj questionnaires completed, 250 subjects were given health education, benzalkonium-based handrub and demonstration of the handrub usage together with pamphlets and labelled as an intervention group. Another 250 subjects from another flight batch were given the same questionnaires without health education with unmedicated hand lotion as a control group. The knowledge, perception, practices and compliances to the handrub practice in both groups were compared with the pre-hajj results. **Results:** No significant difference between pre and post hajj knowledge and practice among hajj pilgrims in intervention group. Pre hajj perception score [M (IQR) = 30 (5.00), Z = -2.441, p < 0.05] is much higher compared to post hajj perception [M (IQR) = 29 (6.00), Z = -2.441, p < 0.05]. No significant difference between pre and post hajj knowledge, perception and practices among hajj pilgrims in control group. Hand hygiene compliance was not improved with provision of health education and free handrub supply. **Conclusion:** No significant changes in knowledge, perceptions and practices of Malaysian hajj pilgrims pre and post-hajj in both groups. Provision of handrub did not improved hajj pilgrims compliance.

KEYWORDS: Knowledge, Perception, Practice, influenza-like illness

INTRODUCTION

The Kingdom of Saudi Arabia hosts more than 3 million hajj pilgrims to the two Holy Mosques in Mecca and Madinah every year. Most of the pilgrims were brought by the Pilgrims Fund Board of Malaysia¹ which allowed them to stay in Mecca and Madinah from fourteen to forty days in Mecca and Madinah. Malaysian pilgrims are at risk of having

communicable diseases such as respiratory infections due to prolonged stay, physical exhaustion during `saie` (walking from Safa to Marwah and back to Safa seven times which is around 5.88km), prolonged exposure to crowds, especially in the Holy Mosque and the compulsory gathering at Mina and the Valley of Arafat. These risks are higher in those with comorbidities such as diabetes mellitus, chronic lung disease, renal disease, and heart disease.²

Respiratory illness was the major cause of hospital admission during pilgrimage.³ In 2007 Hajj season, about 40.1% of Malaysian hajj pilgrims experienced ILI.¹ The prevalence was lower than French hajj

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pilgrims⁴ 2013 which was 47.3% and Indian hajj pilgrims in the 2014 hajj season which was 63.3%.⁵

A systematic review about the community's knowledge and perception of the 2009 H1N1 influenza pandemic found a high percentage of moderate knowledge and awareness of the pandemic. The most common reported factors that influenced participants to adopt certain recommended precautions were due to an increase in risk perceptions.⁶

A study conducted in India demonstrated that higher educational level, employment, males and older respondents had a significantly higher degree of knowledge surrounding this topic.⁷ Strong intentions to comply with preventive measures of influenza in the future were associated with older age, a high perceived severity and anxiety, and a high perceived efficacy of the preventive measures.⁸

Perceived risk of precautionary behavioural tendencies and infection can be differed by demographic characteristics of the study participants and also geographical locations.⁹ Studies investigating the modifiable risk factors for ILI such as knowledge and perception are extremely vital, so that these factors can be modified in order to prevent ILI amongst Malaysian hajj pilgrims in the future.

Based on guideline by WHO in 2009, adherence to hand hygiene procedures is variable with with very low compliance rates.¹⁰ Besides, improved adherence to hand hygiene practices reduced the occurrence of infection.¹⁰

Several studies have shown that multi-modal interventions needed to sustain success to comply to hand hygiene practices.^{11,12} Provision of handrub had associated with increased compliance.¹³

Thus, the aim of this study is to determine the responses for the knowledge, perception and practices regarding preventive measures of influenza-like illnesses in Malaysian hajj pilgrims before and during hajj after given health education and free supply of benzalkonium-based handrub and the compliance to the handrub usage.

METHODOLOGY

An open-label randomized control trials study was conducted among Malaysian hajj pilgrims in 2013 during the hajj season. The calculated sample size was 225 using two-proportion formula after including 10% dropouts. The rational of calculating the sample size is to achieve the strength of the study at 80% with a precision of 0.05. Simple randomization was applied for the sample selection. However, due to large dropouts encountered during the previous hajj season, 500 questionnaires were distributed in Malaysia before their departure to Mecca.¹

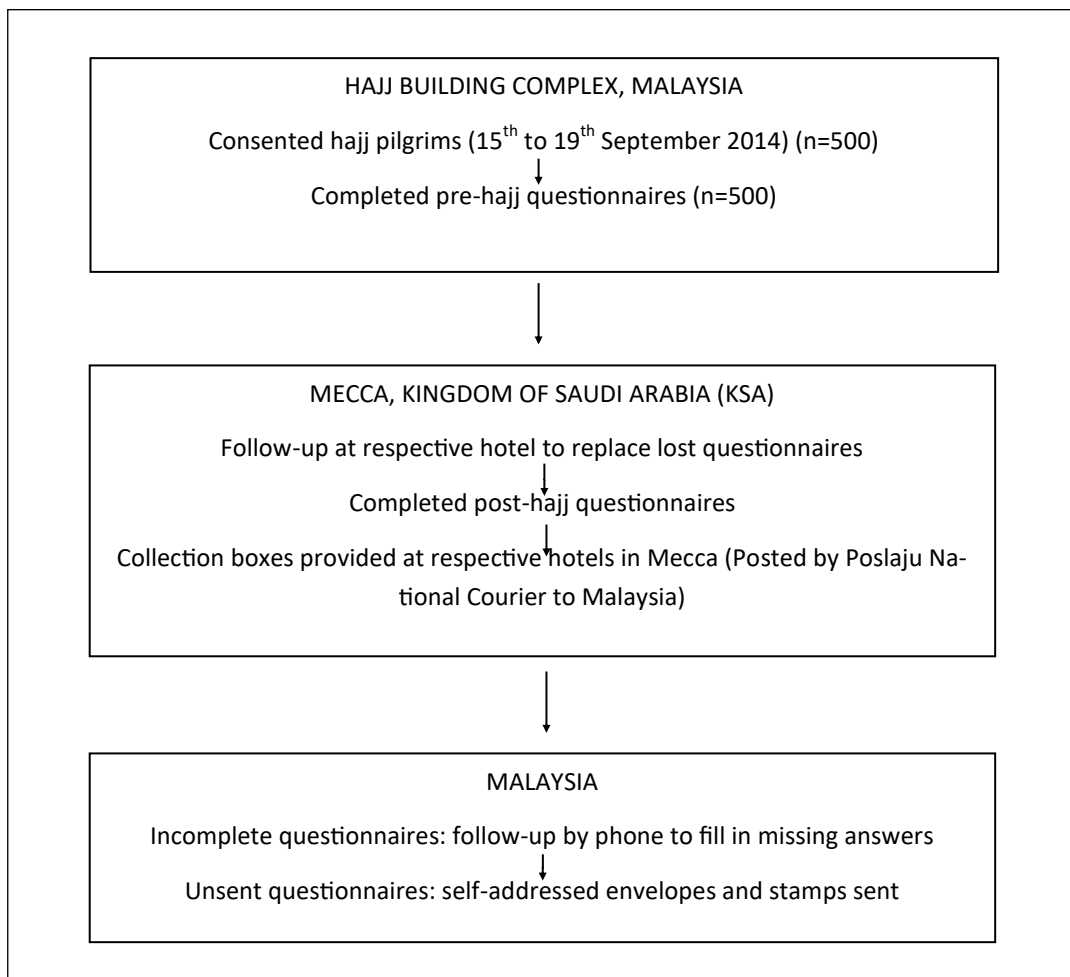
Five hundreds pilgrims from different flight batch completed the validated pre-hajj questionnaires. Two hundred fifty subjects were given health education, benzalkonium-based handrub and demonstration of the handrub usage together with pamphlets and labelled as an intervention group. Another two hundred fifty subjects from another flight batch were given the same questionnaires without health education with unmedicated hand lotion as a control group. The knowledge, perception and compliances to the handrub practice while doing hajj with or without intervention were compared with the pre-hajj results. A change is expected after the health education session as documented in several studies.^{14,15}

Influenza-like illness (ILI) was defined as having a temperature of $\geq 37.8^{\circ}\text{C}$ and either a cough or sore throat in the absence of a known cause of other illnesses rather than influenza.¹⁶⁻¹⁸

The study flow chart is illustrated below. Hajj Building Complex is a transit place where hajj pilgrims from all over Malaysia gather before being transferred to the Kuala Lumpur International Airport (KLIA). The respondents were followed up during the whole visit, a total of 42 days.

Sample population

The inclusion criteria included hajj pilgrims aged more than 18 years, and those who were successfully able to answer the questionnaire independently. A close relative or friends were allowed to read and assist in filling up the



Flow chart illustrating methods of distribution and collection of pre- and post-hajj questionnaires among consented Malaysian hajj pilgrims 2013.

questionnaire, but they should not interfere with the chosen answer.

The exclusion criteria were very ill pilgrims or having no assistance to read or fill in the questionnaires. For quality control purposes, appointed researchers at Mecca will review the questionnaires sent at their respective hotels and those who sent incomplete questionnaires will be contacted by phone after returning from hajj.

Written informed consent was obtained from all participants prior to their enrolment in this study.

Tools used

A validated self-administered questionnaire in the Malay language was used to obtain the required information regarding knowledge and perception of the hajj pilgrims.

This knowledge, perception and practice of Respiratory Infection Preventive Measure

Questionnaire (KPP-PMQ) consisted of three main domains and ten items. The questionnaires also assessed the presence of ILI during hajj. Knowledge domain mainly consists of risk factors and mode of transmission of ILI with a maximum score of 24. Perception domain consists of precaution methods for the prevention of ILI with a maximum score of 35. Practice domain consists of dietary habits, physical activities and hand hygiene practices for the prevention of ILI with a maximum score of 70. Three-Likert scale was used for knowledge domain. Each true answer was given 3 marks, followed by 2 marks for unsure answer and 1 mark for false answer. Five-Likert scale was used for perception domain. 5 marks were given for strongly agree (the highest mark) to 1 mark for strongly disagree (the lowest mark). Five-Likert scale was used for practice domain. 5 marks were given for the most appropriate answer (the highest mark) to 1 mark for the least appropriate answer (the lowest mark).

Intervention kit is comprised of four bottles of handrub for each hajj pilgrim, (100mls/bottle) from

Hana Medic company, SAFERCARE Plus-Non-Rinse Moisturizing Hand Sanitizer which is alcohol and perfume free were given to the intervention arm of this study.

The ingredients for the handrub are Benzalkonium chloride, Sorbilene L and Glycerine, Sticker was put on each handrub stated for usage 5 times a day or after using the toilet. Health education was given to each hajj pilgrims that agreed to participate in this study particularly the intervention group. These includes one-to-one demonstration on how to use handrub provided as well as pamphlets on handrub usage, precautionary measures such as dietary habits, the correct way to use facemask and handrub.

Sampling method

Subjects were selected at random based on a voluntary convenient sampling and fulfilling the inclusion criteria of the study.

Outcome measured

The outcome measured were responses for the knowledge, perception and practices about preventive measures of ILI pre and post hajj.

Statistical analysis

Socio-demographic characteristics of hajj pilgrims were expressed in terms of the number and percentage. The paired t-test was used in this study to compare the two population means which were before-and-after given the handrub. Below is the formula used for this study. P-value of less than 0.05 was considered as significant.

$$t = \frac{\sum d}{\sqrt{\frac{n(\sum d^2) - (\sum d)^2}{n-1}}}$$

Besides, Hosmer Lemeshow test was used in this study to see the association between socio-demographic factors with knowledge, perception and practices among hajj pilgrims. Below is the formula used for this study. P-value of less than 0.05 was considered as significant.

$$H = \sum_{g=1}^G \left(\frac{(O_{1g} - E_{1g})^2}{E_{1g}} + \frac{(O_{0g} - E_{0g})^2}{E_{0g}} \right)$$

$$= \sum_{g=1}^G \left(\frac{(O_{1g} - E_{1g})^2}{N_g \pi_g} + \frac{(N_g - O_{1g} - (N_g - E_{1g}))^2}{N_g(1 - \pi_g)} \right)$$

$$= \sum_{g=1}^G \frac{(O_{1g} - E_{1g})^2}{N_g \pi_g (1 - \pi_g)}$$

Ethical approval

Ethical approval was obtained from the USM Research and Ethics Committee prior to the commencement of this study (Reference number: USMKK/PPP/JEPeM [266.3.(3)]).

RESULTS

Five hundred questionnaires were distributed to the hajj pilgrims. A total of 172 (34.4%) respondents successfully completed and returned the post-hajj questionnaires. Post-hajj questionnaire was completed and return by 94/250 (37.6%) participants from intervention arm and 78/250 (31.2%) participants from control arm. Poor response rate was expected from this study due to long period of hajj as well as the difficulties to gather and collect the questionnaires after completion of hajj. Out of this, 77/172 (44.8%) were male and 95/172 (55.2%) were female. The mean age was 51.2 ± 9.3 years old with 19.8% aged 60 and older. Most of the hajj pilgrims received tertiary education either in university, college or polytechnic, while the majority of them, 92 (53.5%) received secondary, primary or no schooling whatsoever.

Most of them, 111 (64.5%) were employed either as government servants, in private sectors or owning their own businesses. Only 61 (35.5%) were unemployed. About 155 (90.1%) and 113 (65.7%) of the respondents had no experience of doing hajj and umrah before. Only 28 (16.3%) pilgrims used private agencies for the hajj. Of the 172 respondents, 101 (58.7%) met the criteria for self-reported influenza-like illness (ILI) as reported from studies by Rashid et al ²⁰ and Biggerstaff et al. ²¹

There is no significant difference between pre and post hajj knowledge and practice among hajj pilgrims in intervention group. There is a significant difference between pre and post hajj perception among hajj pilgrims in intervention group. At the $\alpha = 0.05$ level of significance, pre hajj perception score [M (IQR) = 30 (5.00), Z = -2.441, $p < 0.05$] is much higher compared to post hajj perception [M (IQR) = 29 (6.00), Z = -2.441, $p < 0.05$]. These findings are stated in Table I.

Knowledge particularly the risk factors, mode of transmission and protective measures of ILI in the questionnaires were included as this basic knowledge was one type of preventive awareness during a major influenza epidemic in Japan.²⁵

Preventive measures for influenza were selected based on the provision of face masks provided by the government via the Pilgrims Fund Board of Malaysia.

Table I The Comparison of Knowledge, Perception and Practices Scores of a paired sample (n=94) in Intervention group

Variables	Median (IQR)	Z statistics ^a	p-value*
Knowledge ζ			
Pre hajj	22 (2.00)	-0.139	0.889
Post hajj	22 (2.00)		
Perception ζ			
Pre hajj	30 (5.00)	-2.441	0.013
Post hajj	29 (6.00)		
Variables	Mean (SD)	Mean difference (95% CI)	p-value*
		t-statistic ^b (df)	
Practice ζ			
Pre hajj	50.79 (6.81)	0.117 (-1.281,1.515)	0.868
Post hajj	50.67 (5.54)	0.166 (93)	

*Significant at 0.05

^a Wilcoxon Paired Signed-Rank Test applied

^b Paired t- Test applied

ζ Maximum knowledge score was 24

ζ Maximum perception score was 35

ζ Maximum practice score was 70

There is no significant difference between pre and post hajj knowledge, perception and practices among hajj pilgrims in control group as stated in Table II.

Table III showed that supplying handrub did not increase compliant toward its usage.

DISCUSSION

The prevalence of ILI in this study was higher (58.7%) than the previous study in 2007 hajj season among Malaysian hajj pilgrims which was 40.1%¹. The definition of self-reported ILI was based on the studies conducted by Rashid et al²⁰ and Biggerstaff et al²¹. However, the prevalence was lower than Indian hajj pilgrims during the 2014 hajj season which was 63.3%⁵ possibly due to longer duration of exposure compared to pilgrims from other countries. Self-reported ILI was used like previous hajj studies^{22, 23} as it shows close congruence with clinician documentation.²⁴

Previous studies have displayed that misconceptions have led to inappropriate actions such as refusal to comply with precautionary measures, including wearing a facemask, accepting vaccination and avoidance of visiting health-care facilities due to fear of it becoming a venue for acquiring such infection.²⁶⁻²⁸ Therefore, understanding their perception would assist the Ministry of Health Malaysia and Pilgrims Fund Board of Malaysia to pinpoint the knowledge gaps which may be utilized in developing educational programs in order to increase the awareness of the hajj pilgrims towards the prevention of ILI thus reducing the occurrence of ILI among future hajj pilgrims.

There was no significant difference in median knowledge and mean practice pre and post hajj in intervention group. The median (IQR) of pre hajj perception was higher than post hajj and it was statistically significant. However, there was no study comparing why pre-hajj perception was better than post hajj in intervention group. The postulated reason was probably due to more hajj

pilgrims experienced ILI compared to previous studies and changed their beliefs toward preventive measures of ILI. There was no significant difference in median knowledge and perception as well as the mean practice as expected in control group.

Regarding compliant to handrub usage during hajj, there is still no study done to evaluate the compliances of hajj pilgrims using the handrub

(between the 15th to 19th of September 2013) as well as inadequate members of staff to handle and follow-up all study participants in Mecca in an attempt to replace some of the lost questionnaires. Besides that, some hajj pilgrims failed to return the post-hajj questionnaires and were uncontactable after they arrived in Malaysia. This study was performed within a short period of time involving 500 hajj pilgrims, may not reflect the true hajj

Table II The Comparison of Knowledge, Perception and Practices Scores of a paired sample (n=78) in Control group

Variables	Median (IQR)	Z statistics ^a	p-value*
Knowledge ζ			
Pre hajj	20 (3.00)	-1.351	0.177
Post hajj	20 (3.00)		
Perception ζ			
Pre hajj	29 (5.00)	-0.753	0.451
Post hajj	29 (5.00)		
Variable	Mean (SD)	Mean difference (95% CI)	p-value*
		t-statistic ^b (df)	
Practice ζ			
Pre hajj	52.17 (6.27)	0.256 (-1.118,1.631)	0.711
Post hajj	51.91 (6.32)	0.371 (77)	

*Significant at 0.05

^a Wilcoxon Paired Signed-Rank Test applied

^b Paired t- Test applied

ζ Maximum knowledge score was 24

ζ Maximum perception score was 35

ζ Maximum practice score was 70

supplied. This study is quite difficult to be done as we have to supply at least four bottles of handrub to cater for at least 42 days at Holy Land. In our study, most of hajj pilgrims didn't comply to handrub supplied. However, one study showed that supplying handrub will increase compliance toward its usage in hospital setting.²⁹ Further studies need to be done later to evaluate the reason of non-compliant to the handrub supplied among hajj pilgrims. One study showed that the most common reason for non-compliance to handrub supplied were perception as a priority things to be done, followed by forgetfulness and irritation caused by the handrub supplied.³⁰ Therefore, a pilot study can be conducted among umrah pilgrims to know the possible reason for non-compliance even though we have supplied alcohol-free and perfume free handrub as hajj event is only once a year.

Our study has some limitations, including inadequate sample size and poor response rates that was also documented in other studies as well.^{1,31} This was mainly due to limited time available to recruit the study participants, which was only one week

epidemiology of Malaysian hajj pilgrims. In this study, influenza vaccination was not included as one of the variables as a preventative measure of ILI because the influenza vaccination was not mandatory for Malaysian hajj pilgrims.

Emerging respiratory illnesses such as MERS-CoV and Ebola may mimic ILI. A study among French hajj pilgrims in 2013 also showed a lack of MERS-CoV but a high prevalence of the influenza virus.⁴ Furthermore, there is no evidence of MERS-CoV nasal carriage detected among French hajj pilgrims³³ returning from the hajj in 2012 as well as among 5235 hajj pilgrims in the Kingdom of Saudi Arabia in the 2013 hajj season.³⁴ There was a high prevalence of common respiratory viruses such as human rhinovirus (HRV), respiratory syncytial virus (RSV) and influenza A, however no evidence of MERS-CoV was found in Ghana hajj pilgrims during the 2013 hajj season.³⁵ Ebola was not taken into consideration in 2013 in view of no outbreaks detected at that time. Furthermore, the Kingdom of Saudi Arabia has suspended Hajj visas for hajj pilgrims from affected countries such as Sudan and

Table III The association between handrub compliant during hajj with handrub supply

Grouping of hajj pilgrims	*Comply to handrub usage n (%)	±Not comply to handrub usage n (%)	p-value†
Control	12 (15.4)	66 (84.6)	0.369
Intervention	10 (10.6)	84 (89.4)	

*Comply to handrub usage : daily use

†Significant level was set at 0.05

Pearson Chi-Square applied

Sierra Leone since the 2014 outbreak.³⁶ We believed that health education among hajj pilgrims must be tailored differently according to age group and level of education. A simplified educational book mainly with pictures and diagrams will attract the attention of hajj pilgrims compared to wordy pamphlets. Besides, instead of provision of handrub in Malaysia, we can collaborate with researchers from Arab Saudi to get the handrub from their place to ensure continuous supply of handrub throughout their stay in Holy Land.

CONCLUSION

There was no significant changes in knowledge, perceptions and practices of Malaysian hajj pilgrims pre and post-hajj in intervention and control groups concerning the spread and preventative measures of influenza-like illnesses. Giving handrub did not resulted in compliances to its usage. Emphasis on health education with regards to the prevention of respiratory infections during pilgrimage was imperative. Hajj pilgrimage provides an opportunity to conduct large trials in order to evaluate the role and effectiveness of these protective measures in mitigating the respiratory illness and to determine which factors predict protective measures.

ACKNOWLEDGEMENTS

This study was funded by the Ministry of Higher Education, Malaysia through the Long-term Research Grant Scheme (LRGS) (203.PTS.6728003) and University Sains Malaysia through the Research University Grant, (1001/PPSP/870026). We would like to acknowledge the Pilgrims Fund Board of Malaysia for their continuous support as well as Ms Nur Sulwana Mohd Hanapi for helping and assisting in the statistical analysis of this study.

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