



# ***INFLUENZA LIKE ILLNESS(ILI): PREVALENCE AND PREVENTIVE PRACTICES AMONG INDIAN HAJ PILGRIMS OF KARNATAKA.***

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**Abstract—** Haj pilgrimage, gathers annually 3 million Muslims from, 186 countries into one confined geographical area. 60% of them develop influenza like illness, during haj or transit; particularly in geriatric, immunocompromised pilgrims. Secondary infections in home countries are source of global spread. Saudi Arabia recommends influenza vaccination of all pilgrims, however it is not widely implemented in India. Hence WHO recommended preventive practices are recommended. **Objectives:** To determine prevalence of ILIs-Influenza like illness among Indian haj pilgrims, the effect of WHO/CDC recommended preventive practices and assess awareness of pilgrims on Influenza vaccination, MERS, Ebola infection. **Material methods:** A cross sectional study was done among pilgrims departing from Bangalore, Karnataka for Haj 2014. 270 pilgrims were selected by simple random sampling, interviewed telephonically post Haj. **Results:** Overall prevalence of ILIs was 66.3%, 7.8% developed ILIs post haj, 4.4% among these required hospitalization. Geriatric age and comorbidities taken together were significantly associated with ILIs prevalence ( $p < 0.001$ ). All the 5 preventive practices were significantly associated with lower prevalence of ILIs ( $p < 0.05$ ). Less than 50% of pilgrims had awareness regarding MERS CoV, Ebola infection, influenza vaccination. **Conclusion:** High prevalence of ILIs especially with comorbidities, low levels knowledge and practice of recommended preventive practices was observed.

**Recommendation:** Seasonal influenza vaccine be made mandatory for Indian Haj pilgrims. There is need for health education regarding preventive practices and free distribution of face masks, hand sanitizers, face tissues by International authorities concerned with Haj.

**Key words:** Haj pilgrimage, Influenza like illness, Preventive practices.

## ***L. INTRODUCTION:***

Haj, the pilgrimage to Makkah, is obligatory on every adult, physically and financially competent muslim, once in their lifetime. The largest annual event in world, gathers about 3 million muslims, with diverse medical and social backgrounds, from 186 countries, through 16 ports of entry-air, land, sea, into one confined geographical area, especially in the 5-day haj period; 50-100 people to share a tent in Mina. The pilgrims move from Mecca to Arafat, Muzdalifah, Mina and back to Makkah to complete the haj ritual (Fig 1).

Physical overexertion accompanied by environmental stressors such as extreme heat, dryness, overcrowding, traffic congestions, minimum toilet facilities, increase the risk of droplet transmission of respiratory pathogens especially influenza virus<sup>1</sup>. It is estimated that at least 6,00,000 out of three million pilgrims develop Influenza like illness (ILI) and 36,000 develop Influenza<sup>2</sup>. Secondary infections, reported as 27.3%<sup>3</sup>, from contact with Haj pilgrims returning home,



potentially initiate waves of outbreaks worldwide and burden health-care systems.

Old age and co-morbid condition of the Haj pilgrims further add to risk profile for ILIs, and related hospital and ICU admission during Haj season<sup>1</sup>. Most of the Indian pilgrims, ambitious to perform Haj, are of geriatric age (> 60 years) with co-morbidities. About 5000 haj pilgrims have departed from Karnataka, for year 2014, (Islamic year 1435H), of which 60% are of geriatric age<sup>4</sup>.

Ministry of Health, Saudi Arabia recommends vaccination of all pilgrims with seasonal influenza vaccine, especially high risk pilgrims i.e those with chronic diseases, immunocompromised, > 65 years age, pregnant, children <5 years age<sup>5</sup>. However influenza vaccination by Hajj committee of India is restricted to only few of the high risk pilgrims. In this scenario, WHO/CDC recommended preventive practices for influenza are simple, low-cost effective physical measures to prevent transmission of respiratory infections among haj pilgrims<sup>6</sup>.

#### **NEED FOR STUDY:**

Karnataka State Haj pilgrims are given health education on prevention of Influenza and related outbreaks like Middle East Respiratory Syndrome (MERS) and Ebola, during Vaccination and Health Camps before departing for Haj. However, there is lack of published literature from Indian subcontinent, regarding burden of influenza, associated risk factors, awareness and compliance of haj pilgrims with preventive practices for influenza.

Hence this study was conducted to establish burden of ILIs in Indian Haj pilgrims and assess the effectiveness of the recommended preventive practices in reducing ILIs.

#### **II.OBJECTIVES:**

1. To determine prevalence of ILIs-Influenza like illness, among Indian haj pilgrims
2. To determine the effect of WHO/CDC recommended preventive practices on reducing ILIs.
3. To assess awareness of pilgrims on Influenza vaccination, and recent influenza related outbreaks- MERS, Ebola virus infection

#### **III.METHODOLOGY:**

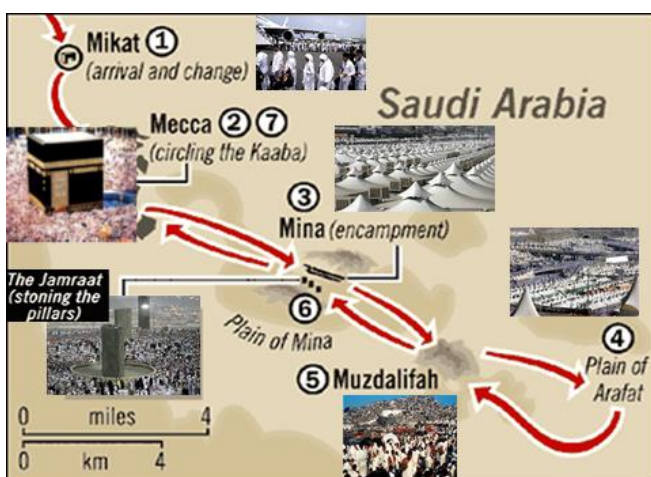
This cross sectional study was done among Haj pilgrims departing from Karnataka during September 2014, at Bangalore embarkation point. List of Haj pilgrims with contact details was obtained from Haj camp established by Karnataka State Haj Committee, at Bangalore. Based on international prevalence of influenza among Haj pilgrims as 60%<sup>7,8</sup>, with 15 % allowable error and 95% CI, sample size is calculated as 270 pilgrims. The subjects were selected by simple random sampling and interviewed telephonically after returning from Haj. Voluntary participation and anonymity was assured. Institutional ethical clearance was obtained. Pilgrims less than 20 years age and those who did not give consent to participate were excluded.

The questionnaire comprised of information regarding,

1. Influenza like illness-ILI suffered during Haj and within two weeks of returning to India, and related hospitalization history. ILI was defined as triad of cough, sore throat and subjective fever<sup>9</sup>.
2. Compliance with the five CDC/ WHO recommended influenza prevention practices: hand hygiene, wearing a face mask, cough etiquette, social distancing, and contact avoidance.
3. Associated co morbidities (COPD-Chronic obstructive pulmonary disease, Allergic rhinitis, Diabetes, Hypertension, Cardiovascular disease, chronic kidney disease, Immunodeficiency disorders).
4. Awareness on influenza vaccination and on recent outbreaks: MERS, Ebola virus infection.

**Data analysis:** Data was entered in Microsoft excel and analyzed using SPSS-16.0. Results were expressed as frequency and percentages. Chi square test of significance, Fisher's exact test were employed as appropriate. p-value of <0.05 was considered statistically significant.

**FIGURE 1: THE PLACES AND STAGES OF HAJ**





#### IV.RESULTS

##### Descriptive statistics

Out of 270 pilgrims studied, majority (54.8%) of the pilgrims were males. Pilgrims were aged between 32 and 76 years old with a mean age of 47.25 years; majority (53.3%) of the them belonged to the age group 50-59 yrs. 8.8% had visited Saudi Arabia earlier to the Haj pilgrimage. Average duration of pilgrimage was 42 days.

##### Prevalence of ILIs among haj pilgrims.

While the overall prevalence of ILIs was 66.3%, 28.1% had ILIs at the time of departure for Haj pilgrimage, 30.4% pilgrims suffered from ILIs during Haj pilgrimage and 4.4 % among these required hospitalization during the pilgrimage. 7.8% developed ILIs within two weeks of arrival to India.

##### Age, Gender and Co morbidities' association with ILIs.

Geriatric age i.e > 60 years. (p<0.001) was significantly associated with ILIs. While male pilgrims had higher prevalence of ILIs, it was not statistically significant. 62.96% pilgrims had underlying co morbidities such as COPD, Allergic rhinitis, Diabetes, Hypertension, Cardiovascular disease, Chronic kidney disease, Immunodeficiency; Hypertension and all comorbidities taken together were significantly associated with ILIs prevalence (p<0.001), while other comorbidities were not individually significant. (Table 1)

##### Influenza preventive practices: knowledge, practice and ILIs. (Table 2)

The compliance of pilgrims to WHO/CDC recommended five preventive practices was higher for hand hygiene (63.7 %) and cough etiquette (57.4%), while lowest for wearing face mask (13.7%). All five preventive practices were significantly associated with lower prevalence of ILIs (p<0.05). Figure 2 describes the knowledge and practice of pilgrims regarding the preventive practices.

**Table 1: Influence of age, gender and co-morbidities on prevalence of ILIs in Haj pilgrims.**

	ILIs <sup>a</sup>		Total N=270	P value	OR(95% CI)
	Suffered(n=179)	Not suffered(n=91)			
<b>Gender</b>					
Males	87(58.7)	61(41.2)	148(54.82)	0.062 <sup>b</sup>	1.57(0.97-2.55)
Females	58(47.5)	64(52.4)	122(45.18)		
<b>Age</b>					
Age ≤ 60 yr	103(55.3)	83(44.6)	186(68.89)	<0.001 <sup>b</sup>	0.13(0.06-0.29)
Age >60 yr	76(90.5)	8(9.5)	84(31.11)		
<b>Comorbidities</b>					
Comorbidities present	152(89.4)	18(10.6)	170(62.96)	<0.001 <sup>b</sup>	22.83(11.81-44.11)
Comorbidities absent	27(27.0)	73(73.0)	100(37.04)		
<b>Distribution of Co morbidities<sup>d</sup> (n=170)</b>					
COPD	27(79.41)	7(20.58)	34(20.0)	0.081 <sup>b</sup>	2.13(0.89-5.10)
Allergic rhinitis	7(63.63)	4(36.37)	11(6.4)	0.844 <sup>b</sup>	0.88(0.25-3.11)
Diabetes	63(70.78)	26(29.21)	89(52.4)	0.276 <sup>b</sup>	1.36(0.78-2.35)
Hypertension	57(49.13)	59(50.86)	116(68.2)	<0.001 <sup>b</sup>	0.25(0.15-0.43)
Cardiovascular disease	13(59.09)	9(40.91)	22(12.9)	0.451 <sup>b</sup>	0.71(0.29-1.74)
Chronic kidney disease	4(44.44)	5(55.56)	9(5.2)	0.169 <sup>c</sup>	0.39(0.10-1.50)
Immunodeficiency	4(66.66)	2(33.34)	6(3.5)	0.100 <sup>c</sup>	1.01(0.18-5.66)

<sup>a</sup>ILIs-Triad of cough sore throat and subjective fever

<sup>c</sup>Fischer's exact test

<sup>b</sup>Pearsons chi -square test.

<sup>d</sup>multiple responses

(numbers in parentheses indicate percentages)



**Table 2: WHO/CDC Recommended preventive practices for influenza during Haj and its association with ILIs.**

Preventive practices for Influenza				ILIs <sup>a</sup> in Haj		P value	OR (95% CI)
				Suffered n=179	Not Suffered n=91		
1	Hand hygiene	Not practiced	97(35.9)	95(97.9)	2(2.00)	<0.001 <sup>c</sup>	50.33 (12.02-210.68)
		Practiced	173(64.1)	84(48.55)	89(51.45)		
2	Wearing a face mask	Not practiced	254(94.1)	176(69.30)	78(30.70)	0.015 <sup>c</sup>	9.77(2.70-35.29)
		Practiced	16(5.9)	3(18.75)	13(81.25)		
3	Cough etiquette	Not practised	139(51.4)	40(28.77)	6(4.34)	<0.001 <sup>b</sup>	40.96(16.77-100.06)
		Practiced	131(48.6)	46(35.11)	85(64.88)		
4	Social distancing	Not practised	213(41.9)	150(70.42)	63(29.58)	0.005 <sup>b</sup>	2.29(1.26-4.17)
		Practiced	57(21.1)	29(50.88)	28(49.12)		
5	Contact avoidance	Not practiced	219(81.1)	159(72.61)	60(27.39)	<0.001 <sup>b</sup>	4.10(2.17-7.76)
		Practiced	51(18.9)	20(39.22)	31(60.78)		

<sup>a</sup>ILIs-Triad of cough sore throat and subjective fever

<sup>c</sup>Fischer's exact test

<sup>b</sup>Pearsons chi -square test.

(numbers in parentheses indicate percentages)

Awareness regarding influenza related recent outbreaks and influenza vaccination.

21.1% of pilgrims were aware of MERS-CoV and 31.1% were aware of Ebola virus infection. Only 5.9% pilgrims were aware of Influenza vaccination and 1.1% were vaccinated with the seasonal influenza vaccine.

**V.DISCUSSION**

Overall ILIs prevalence in our study was 66.3%, as compared to varied observations in previous studies:9.5% in Iranian pilgrims<sup>10</sup>,18% in British pilgrims<sup>11</sup>,40% in Iranian study<sup>12</sup>,40.1% in Malaysian pilgrims<sup>13</sup>,49.6% in French pilgrims<sup>14</sup>.

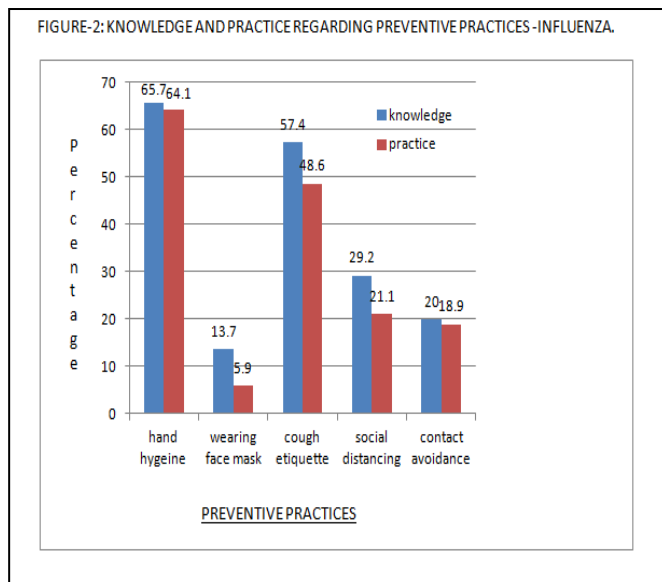
Influenza vaccination and its awareness was very low among pilgrims in our study. Effectiveness of influenza vaccination depends on matching the circulating strain and vaccine strain, hence efficacy of the vaccine has been reported to be doubtful. Seventy-two percent of hajj pilgrims received influenza vaccination before departure and 72.9% wore facemasks in a study by Deris et al<sup>15</sup>.

As observed in our study, the recommended preventive practices for influenza like illnesses have established evidence of protection through various studies<sup>16,17</sup>.

Comorbidities and geriatric age are significantly associated with prevalence of ILIs in pilgrims. In a study by Madani et al<sup>18,19</sup>,Bronchial asthma accounted for 9.2% of hospital admission and directly caused 8.6% of intensive care admission during Hajj .

**VI.CONCLUSION**

The prevalence of ILIs was high among Indian haj pilgrims and the current level of seasonal influenza vaccination, and the preventive practices of ILIs seem inadequate to reduce it. Pilgrims with underlying comorbidities such as diabetes mellitus, allergic rhinitis, COPD had higher prevalence of ILLs. Awareness regarding MERS CoV, Ebola infection and







influenza vaccine was observed among less than 50% of pilgrims.

### RECOMMENDATIONS

Based on these findings, it is recommended that seasonal influenza vaccine be made mandatory for Indian Haj pilgrims, especially geriatric pilgrims and those with co morbidities, as already mandated in many countries<sup>1</sup>. Free distribution of preventive tools-face masks, hand sanitizers, face tissues accompanied by strong advice on compliance with the preventive measures, seeking early medical attention for respiratory symptoms may be strongly incorporated in pre haj health education.

Future research should be aimed at prevention and mitigation of ILIs by conducting case control, longitudinal cohort studies with larger sample size, for which the Haj pilgrimage provide fertile ground

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### REFERENCES

1. Memish Z A, Zumla A, Alhakeem R F, Assiri A, Turkestani A, Al Harby K D et al.Hajj: infectious disease surveillance and control.the lancet. 2014;383:2073-2082.
2. Yang Y, Sugimoto J D, Halloran M E ,Basta N E, Chao D L, Matrajt et al.The Transmissibility and Control of Pandemic Influenza A (H1N1) Virus. Science. 2009;326: 729–733.
3. Balkhy H H, Memish Z A , Bafaqeer S, Almuneef M A. Influenza a Common Viral Infection among Hajj Pilgrims: Time for Routine Surveillance and Vaccination. Journal of Travel Medicine. 2004;11: 82–86.
4. HAJ 2014 – INFORMATION.available at [http://www.karhaj.in/right\\_to\\_information.html](http://www.karhaj.in/right_to_information.html). Accessed on 15th October,2014.
5. 18 circular:health requirements for pilgrims of haj 2014.available on [http://www.karhaj.in/circulars\\_haj-2014/18-circular-Health-Requirement-for-Pilgrims-of-Hajj-2014.pdf](http://www.karhaj.in/circulars_haj-2014/18-circular-Health-Requirement-for-Pilgrims-of-Hajj-2014.pdf).Accessed on 19<sup>th</sup> November,2014.
6. World Health Organization. Health conditions for travellers to Saudi Arabia for the pilgrimage to Mecca (Hajj). Wkly Epidemiol Rec. 2013;88:343–7.
7. Deris ZZ, Hasan H, Sulaiman SA, Wahab MS, Naing NN, Othman NH. The prevalence of acute respiratory symptoms and role of protective measures among Malaysian hajj pilgrims. J Travel Med 2010; 17:82–8. 2.
8. Gautret P, Vu Hai V, Sani S, Douchi M, Parola P, Brouqui P. Protective measures against acute respiratory symptoms in French pilgrims participating in the Hajj of 2009. J Travel Med2011; 18:53–5.
9. Rashid, H., Shafi, S., Bashir, H.E., Haworth, E.,Memish, Z.A., Ali, K.A. & Booy, R. Influenza and the Hajj: defining influenza like illness clinically. International Journal of Infectious Diseases .2008;12:102–103.
10. Emamian MH, Hassani AM,Fateh M. Respiratory tract infections and its preventive measures among hajj pilgrims, 2010: A nested case control study. Int J Prev Med 2013;4:1030-35.
11. Rashid H, Shafi S,Booy R, El Bashir H, Ali K, Zambon MC etal.Influenza and respiratory syncytial virus infections in British Hajj pilgrims. Emerging Health Threats Journal 2008, 1:e2.
12. Razavi SM, Ziaee H, Mokhtari-Azad T, Hamkar R, Doroodi T, Mirsalehian A, et al. Surveying respiratory infections among Iranian Hajj pilgrims. Iranian J Clin Infect Dis 2007;2:67-70
13. Deris, Z.Z., Hasan, H., Sulaiman, S.A.,Wahab, M.S., Naing, N.N. & Othman, N.H. The Prevalence of Acute Respiratory Symptoms and Role of Protective Measures among Malaysian Hajj Pilgrims. J Travel Med. 2010;17(2):82-8
14. Gautret P, Charrel R, Benkouiten S, Belhouchat K, Nougairède A, Drali T et al. Lack of MERS Coronavirus butPrevalence of Influenza Virus in French Pilgrims after 2013 Hajj. Emerging Infectious Diseases.2014; 20(4):728-729.
15. Deris Z Z, Hasan H, Sulaiman S A, Suhaimi Ab M. Wahab, Naing N N. The Prevalence of Acute Respiratory Symptoms and Role of Protective Measures Among Malaysian Hajj Pilgrims. Journal of Travel Medicine.2010;17 (2):82–88.
16. Haworth E, Barasheed O, Memish ZA, Rashid H, Booy R.Prevention of influenza at Hajj: applications for mass gatherings.J R Soc Med. 2013 Jun;106(6):215-23



17. Abdulaziz H. Alzeer. Respiratory tract infection during Hajj *Annals of Thoracic Medicine* 2009; 4(2):50-53.
18. Madani T A, Ghabrah T M, Al-Hedaithy M A, Alhazmi M A, Alazraqi T A, Albarrak A M. Causes of hospitalization of pilgrims in the Hajj season of the Islamic year 1423 (2003). *Annals of Saudi Medicine*. 2006;26: 346–351.
19. Madani T A, Ghabrah T M, Albarrak A M, Alhazmi M A, Alazraqi T A, Althaqafi A O. Causes of admission to intensive care units in the Hajj period of the Islamic year 1424 (2004). *Annals of Saudi Medicine*. 2007;27:101–105.