# Seropositivity in Clinical Influenza Cases Among Pilgrims During Hajj, 1421 H.

Influenza is a major health problem, whether measured by its morbidity, mortality or economic impact. Detection of influenza infection in Hajj can be difficult since the clinical presentation is atypical, and other pathogens also cause influenza-like illnesses. The use of laboratory tests for detection of influenza in conjunction with acceptable case definitions leads to recognition of seropositive cases aiming to reduce transmission and initiation of infection control measures.

This study was conducted using a cross-sectional method. An Influenza case was defined as any person aged over 15 years old with fever, and at least two of the following; headache, myalgia, cough, sore throat or coryza. The study population was Hajjis affected with flu attending the outpatient clinics of hospitals in Makkah and Mina during the period from 5/12/1421 to 12/12/1421. Sample size was calculated assuming that the occurrence of flu among pilgrims was 12% (+4%). The number of patients required for the study was estimated at 254 patients at the 95% confidence level. To recruit the study sample the 3 major General Hospitals in Makkah; namely King Abdul Aziz Hospital, King Faisal Hospital, and Ajiad Hospital, and the 2 General Hospitals in Mina; namely Mina General Hospital and Mina Bridge Hospital, were included in the study. A systematic random sample 1 to 5 was selected among flu patients attending the outpatient clinics of the selected hospitals. Data was collected from 5th to 12th/12/1421 H.

A questionnaire was completed by interviewing selected patients, inquiring about personal information, clinical manifestations, past medical history, habits and environmental factors. After obtaining consent, 10ml of venous blood was collected from each patient for testing. Each specimen was divided into 2 portions; the first was tested for the presence of the influenza virus, and the second for the type of virus in positive specimens. Serotyping of the virus was done using ELISA Test.

The total number of patients meeting our clinical case definition from whom samples were obtained were 305 pilgrims; 45 of them were seropositive (14.8%). Among seropositive cases, 60% were influenza type B, 27% were type A, and the rest were positive for both types A and B. Males constituted 90% of the sample, 15.3% were seropositive compared to 9.6% of females. Hajjee characteristics and sero-prevalence of Flu Virus are demonstrated in Table 1.

Seropositivity appeared to fall with increasing age. American, European and Australian pilgrims had the highest positive rate, followed by South East Asians with statistical significance. There was no difference in seropositivity on the basis of clinical presentation, but was not statistically significant. Smokers were twice as likely to be seropositive. A room density of 6-10 persons per room had the highest prevalence, but the association was not statistically significant. Regarding history of contact with other flu cases, the association between contact and seropositivity was not statistically significant. The risk of seropositivity was 53% lower among those vaccinated, however, vaccination status was not statistically significant.

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**Editorial notes:** Influenza is an infection of the respiratory tract caused by the influenza virus, and, compared with other viral respiratory infections, often causes a more severe illness.[1] The Center of Disease Control & Prevention (CDC), Atlanta, U.S.A. defines flu as illness characterized by a rise in temperature of at least 37.8°C, in combination with either cough or sore throat.[1] Two important features give Influenza special

significance: its high rate of pulmonary complications and deaths, and the epidemic nature of the disease. As a result, many countries have developed influenza surveillance systems to make it possible for early detection of epidemics, and to provide estimates of the disease burden.[2]

Influenza viruses are of three antigenic subtypes A, B and C.[1,3] Type A has been associated with widespread epidemics and pandemics, while Type B has been infrequently associated with epidemics. Type C usually causes either a very mild respiratory illness or no symptoms at all, it does not cause epidemics and does not have the severe public health impact that influenza types A and B do. Efforts to control the impact of influenza are aimed at types A and B.[1,3]

Humans are the primary reservoirs of influenza. The virus spreads from person to person primarily through coughing and sneezing of infected persons. Transmission may also occur by direct contact. Airborne spread predominates among crowded populations. Its incubation period is 1-4 days with an average of 2 days. Persons can be infectious from the day before symptoms begin through approximately 5 days after onset of illness.[4]

Influenza and its complications are responsible for 150,000 excess hospitalizations and 10,000 to 40,000 deaths annually in the USA, with 80-90% of these deaths occurring among individuals 65 years and older.[5] During major epidemics, which typically occur during winter months, severe illness and death occur, primarily among high risk groups.[2,4,5] Clinical attack rates during epidemics range from 10-20% in the general community, to over 50% in closed populations such as boarding schools or nursing homes. High mortality is associated with pandemics, which occur at variable intervals of 10 or more years.[2]

Each year over 2,000,000 muslim pilgrims assemble in Makkah, Saudia Arabia, to complete the Hajj, one of the five pillars of Islam. The close contact among pilgrims and high

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population density aggravates spread of infection. An influenza outbreak in such conditions could have significant consequences. The prevalence of Influenza reported in this study corresponds with a previous study that contributed 56% of influenza infection to type A and 44% to type B.[6]

Based on the results of this study, Influenza vaccination may not be mandatory for pilgrims at this stage until further studies are conducted to identify serotypes and the role of vaccination in decreasing its prevalence and severity of infection among pilgrims. High risk pilgrims, such as those of older age groups or heart disease, should be vaccinated in their home countries before arrival to Saudi Arabia to perform either Hajj or Umra.

## References:

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**Table 1: Hajjee characteristics and Sero-prevalence of Flu Virus, 1421 H.**

| | Total | Positive Serology | | |
|---|---|---|---|---|
| | | No. | % | |
| **Age Group** | | | | |
| 15 – 19 | 4 | 0 | 0.0 | $X^2 = 7.73$ |
| 20 – 39 | 167 | 33 | 19.8 | $P = 0.052$ |
| 40 – 59 | 105 | 10 | 9.5 | |
| 60 + | 29 | 2 | 6.9 | |
| **Gender** | | | | |
| Male | 274 | 42 | 15.3 | OR =1.69 |
| Female | 31 | 3 | 9.6 | 95% CI=0.49-9.06 |
| **Nationality** | | | | |
| GCC | 19 | 3 | 15.3 | $X^2 = 14.99$ |
| Other Arab States | 134 | 18 | 13.4 | $P = 0.02$ |
| South East Asia | 6 | 2 | 33.3 | |
| Indian Subcontinent | 106 | 15 | 14.1 | |
| America, Europe, Australia | 11 | 5 | 45.4 | |
| Iran | 22 | 0 | 0.0 | |
| Sub-Saharan Africa | 7 | 2 | 28.6 | |
| **Education** | | | | |
| Illiterate | 106 | 9 | 8.5 | $X^2 = 6.29$ |
| Primary | 74 | 12 | 16.2 | $P = 0.09$ |
| Secondary | 58 | 13 | 22.4 | |
| University and Above | 67 | 11 | 16.4 | |
| **Smoking** | | | | |
| Yes | 55 | 13 | 23.6 | OR = 2.64 |
| No | 250 | 32 | 12.8 | 95% CI=1.20-5.73 |
| **Use others utensils** | | | | |
| Yes | 43 | 8 | 18.6 | OR = 1.39 |
| No | 262 | 37 | 14.1 | 95% CI=0.55-3.43 |
| **Method of Arrival** | | | | |
| Air | 153 | 23 | 15.0 | $X^2 = 0.06$ |
| Sea | 30 | 4 | 13.3 | $P = 0.97$ |
| Land | 122 | 18 | 14.8 | |
| **Residence** | | | | |
| Street | 117 | 14 | 12.0 | OR = 0.69 |
| Housing | 188 | 31 | 16.4 | 95% CI=0.33-1.42 |
| **Room Density (person/room)** | | | | |
| ≤5 | 69 | 7 | 10.1 | $X^2 = 5.63$ |
| 6-10 | 85 | 20 | 23.5 | $P = 0.06$ |
| >10 | 34 | 4 | 12.0 | |
| **Contact Status** | | | | |
| No Contact History | 113 | 18 | 16.0 | $X^2 = 1.86$ |
| Contact in Saudi | 165 | 21 | 12.7 | $P = 0.39$ |
| Contact outside Saudi | 27 | 6 | 22.2 | |
| **Vaccination Status** | | | | |
| Vaccinated | 13 | 1 | 7.7 | OR = 0.47 |
| Not Vaccinated | 292 | 44 | 15.1 | 95% CI=0.01–3.33 |