

The Frequency Distribution of Cases Affected by Influenza A (H1N1) Based on Demographic Characteristics During 2008 – 2009 in Yazd Province (Iran)

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Background: Human influenza is an acute and self-limited disease that is caused by viruses including types A, B, C. These viruses are related to RNA viruses and belonging to the family of *Orthomyxoviridae*. They are divided into other sub-species based on surface antigens, including hemagglutinin (H) and neuraminidase (N). The new virus of the group that was isolated from swine was called as influenza A (H1N1) virus.

Objectives: The purpose of this study is an investigation on the frequency distribution of cases affected by influenza A (H1N1) based on demographic characteristics during 2008–2009 in Yazd Province.

Patients and Methods: This is a descriptive cross-sectional study that was done with the information related to patients that were available at the Health Center of Yazd Province. Of 1442 patients suspected to influenza, during 2008 – 2009 years, 253 throat samples were positive with RT-PCR (reverse transcriptase-polymerase chain reaction) method and were confirmed for viruses.

Results: 111 female and 142 male were available from a total of 253 confirmed H1N1 cases. The minimum and maximum ages were 15 and 90 years, respectively. The most common symptoms were fever and cough. 144 cases had record of hospitalization, 100 cases were undergone outpatient treatment and nine cases have not recorded the treatment status. The most frequent underlying manifestation was hypertension.

Conclusions: According to this study, due to higher hypertension frequency in patients, hypertension should be considered in other diseases in Iran for preventing influenza.

Keywords: Influenza A; H1N1; Underlying Disease

1. Background

The pandemic of H1N1/2009 influenza in Mexico in April 2009 was the first influenza pandemic of the 21st century (1-6). Then cases of influenza outbreaks occurred in the United States and many other countries (7). Human influenza is an acute and self-limited disease caused by influenza viruses including types A, B and C. The virus is an RNA virus and belongs to the *Orthomyxoviridae* family and are divided into more sub-species based on surface antigens, including hemagglutinin (H) and neuraminidase (N). The new virus was isolated from swine, was named influenza virus A (H1N1) (8).

Epidemiological patterns of disease may not be similar in each country and even different regions within a country (9). The most amount of morbidity and mortality were reported in developing countries (10). The most common clinical manifestations at the launch of the influenza

pandemic of 2009 were included coughing (86%), fever (85%), dyspnea (74%), morbidity (48%), myalgia (27%) and headache (25%). Although nausea, vomiting, and diarrhea may occur in patients infected with this type of influenza have high prevalence. So that vomiting and diarrhea have been occurred in 50% of mild to moderate cases that were not hospitalization (11).

Factors such as age, gender, infections and the effect on women or men in dealing with different pathogens are leading to differences between men and women in the occurrence, duration and severity of infections and diseases, particularly influenza (12). Risk factors that may cause women more sensitive to influenza are including heart disease, diabetes and HIV infections (13-17). Useful diagnosis laboratory methods are RAT (Rapid Antigen Test) and RT-PCR (reverse transcription polymerase chain reaction) that the optional test is RT-PCR which has 98%

Implication for health policy/practice/research/medical education:

Collecting and classification of patients based on their clinical manifestations and other demographic characteristics is essential to deal with disease pandemics and identification of patients for serving and immediate treatment in these pandemics.

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sensitivity (18).

In a study in America Atlanta related to a period from early to mid-July of 2009, 272 patients were admitted to the hospital for at least 24 hours and their infection with influenza A (H1N1) confirmed by PCR. These patients were investigated for demographic characteristics. Of the 272 patients that were studied, 25% were admitted to an intensive care unit. 5% were 65 years old or older (3). In another study in Quebec in Canada two pandemic periods related to influenza A (H1N1) in 2009 were compared. During the first period from May to June 2009 hospitalized patients allocated 94 percent of all patients. In the second period this rate reduced by 94 percent to 51 percent (19).

In a study that was performed in Melbourne in Australia, 112 patients hospitalized due to influenza A (H1N1) from May to July 2009, were studied for demographic characteristics. In this study most underlying syndrome in the patients was asthma (20). In another study that was performed in California in America, 553 confirmed cases of influenza A (H1N1) were examined for underlying diseases, the pulmonary diseases with 37 percent had the highest frequency (21).

2. Objectives

In accord to the above findings, the present study was performed for investigating the frequency distribution of cases affected by influenza A (H1N1) based on demographic characteristics during 2008 - 2009 in Yazd Province.

3. Patients and Methods

In this cross-sectional study, census of all influenza patients was carried out. Information related to about 1442 patients suspected to influenza A (H1N1) infection, in 2008 - 2009 in Yazd province, was available at the Health Center of province. These samples were taken from patients admitted or outpatient visit either the hospital or emergency centers in the province cities. Then samples were sent to the Kerman reference laboratory. RT-PCR was performed and results were submitted to the Health Center of Yazd province. We used results of our research.

Personal information related to patients as linear list was including: Name/Address/Gender/Age/Occupation/Nationality/Residence/Traveling history during the past ten days to a foreign or inside the country/last dose of influenza and pneumococcal vaccination/history of contact with influenza patients or animals during last 10 days/Date of symptoms emerging/Date of checking and sending samples/condition of the patient (admitted or outpatient)/Most obvious sign/Report date and phone. Finally 253 cases of confirmed influenza were identified.

For completing records related to some cases that underlying disease was not mentioned, we called them and if they were notable to speak because of very low age or

being older, information was gotten from a closes and most knowledgeable relative of the patient.

4. Results

We referred to the health center of Yazd to collect information of 253 patients with confirmed influenza A (H1N1) in 2008 - 2009 that were available in the Health Center. This information was collected and recorded by Excel software. In this study, the results were as follows:

4.1. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on Gender

From total 253 cases of confirmed with influenza infection in Yazd province in 2008 - 2009, 111 cases were women (43.7%) and 142 men (56.3%), respectively (Table 1).

Table 1. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on Gender

Gender	Percent	Frequency
Female	43.7%	111
Male	56.3%	142
Total	100%	253

4.2. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on Age

In certain cases in 2008 - 2009, mean age was 33.83 years with standard deviation was 24.09. The minimum age was 1.5 and the maximum was 90 years. Five age groups were including 0 -4, 5-14, 15-29, 30-59 and 60 years older (Table 2).

Table 2. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on Age

Percent, %	Frequency, No.	Age Group, y
4.7	12	0-4
22.9	58	5-14
26.1	66	15-29
26.9	68	30-59
19.4	49	60<
100	253	Total

4.3. Frequency Distribution of Clinical Symptoms in Influenza A (H1N1) Confirmed Cases

Prominent symptoms that the patient had at the time of visiting were as following: 224 (88.5%) of patients had fever, 184 cases had body aches and 218 cases coughed. Therefore fever was the most common clinical manifestation of disease in confirmed cases (Table 3).

4.4. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on the Type of Treatment (Outpatient/Inpatient)

Out of 253 confirmed cases, 144 cases had a hospitalization history during infection that due to incomplete records and lack of correct responses of patients were not entered in to our study. 100 cases were treated as outpatient. Also in nine cases the type of the treatment was not recorded (Table 4).

4.5. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on Underlying Diseases

One thing that was important in the study on patients was collecting the information about the underlying diseases for easing identification of the next position of patients in the pandemic influenza. 40.5% of confirmed cases had at least an underlying disease. It is noteworthy that in this study the pregnancy is as a risk factor and an underlying disease. In this research, 14 cases were excluded due to our failure in making connection with them. The most underlying disease in patients was hypertension by 11.9% (Table 5).

Table 3. Frequency Distribution of Clinical Symptoms in Influenza A (H1N1) Confirmed Cases

Clinical Symptoms	Frequency, No. (%)
Body aches	184 (72.7)
Cough	218 (86.2)
Fever	224 (88.5)

Table 4. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on the Type of Treatment (Outpatient/Inpatient)

Type of Treatment	Frequency, No. (%)
Outpatient	100 (39.5)
Inpatient	144 (56.9)
Total	244 (96.4)

Out of 13 cases of chronic kidney disease, 12 cases had chronic renal failure and were under dialysis treatment and 1 case had nephritic syndrome that was under medication treatment. For malignancies, one case was a woman 30 years old who had the lung cancer and was undergoing chemotherapy. Other cases were including a man 66 years old with lymphoma and a man 57 years old with prostate cancer and a student 13 years old with Hodgkin's lymphoma. Four cases of other malignancies were reported as cases of influenza mortality.

Out of six cases of blood disorders, a six years old girl and a 13 years old boy had the sickle cell anemia and a 39

Table 5. Frequency Distribution of Influenza A (H1N1) Confirmed Cases Based on Underlying Diseases

Underlying Diseases	Frequency, No. (%)
Hypertension	30 (11.9)
Diabete	28 (11.1)
Chronic lung disease	20 (7.9)
Heart disease	20 (7.9)
Asthma	13 (5.1)
Kidney disease	13 (5.1)
Malignancies	8 (3.2)
Blood diseases	6 (4.6)
Pregnancy	6 (2.4)
Immunodeficiency diseases	4 (1.6)
Cerebral stroke	2 (0.8)
Mentally retarded	1 (0.4)

years old woman had ITP (Idiopathic Thrombocytopenic Purpura). Also two cases of hemophilia were reported in men 18 and 38 years old. A case of major thalassemia had been reported in a 31 years old woman that was related to cases of influenza mortality. About immunodeficiency diseases, one case of lupus disease and one case of nephrotic syndrome and one case who had undergone kidney transplantation was undergoing treatment with drugs are noteworthy. A 55 years old man also was related to this part that from several years ago had the sarcoidosis disease and was under Corton treatment and was also reported as a case of influenza mortality.

5. Discussion

Human influenza is an acute and self-limited disease that is caused by influenza viruses including types A, B and C that is an RNA virus and belongs to the *Orthomyxoviridae* family. Global pandemics of influenza A (H1N1) is an event that may happen suddenly. This subject will cause a very large population of patients to refer to health centers. Therefore, in this study the frequency distribution of certain cases affected by influenza A (H1N1) based on demographic characteristics during 2008 - 2009 in Yazd Province was investigated.

During a study that was conducted from early to mid-July 2009 in Atlanta, demographic characteristics of 272 patients that were hospitalized for at least 24 hours were confirmed for influenza A (H1N1) using PCR, were examined. 25% of these patients were hospitalized in the intensive care unit (ICU). 45% of patients were those who had aged under 18 years and only five percent of patients were 65 years or older. In this study 73% of patients had underlying diseases (20). This study was very similar to the present study except that in the present study, nearly

30 percent of patients were under 18 years and about 20 percent were older than 65 years. The underlying diseases percentage in our study was 62%.

In another study in 2009 two pandemics related to influenza A (H1N1) in Canada were compared. In the first pandemic, hospitalized patients were 94 percent of all patients. 10% of these patients were hospitalized in ICU. In the second pandemic, hospitalized patients reduced from 94 to 51 percent. The comparison of these two pandemic showed that data collection and appropriate review in primary pandemics could be useful in planning for encountering with next pandemics (19). The difference of these two studies was that in the present study 56.9 percent of all patients were hospitalized.

In another study that was conducted in Australia, 112 patients hospitalized due to influenza A (H1N1), in the period May to July 2009, were examined for their demographic characteristics. In this study, 12 percent of patients were 65 years old. 54% of patients were female. Smoking was proved in 26.9% of patients. The most common underlying disease was asthma by 31% (20). This study was also similar to the present study except that in the present study, the amount of patients over 65 years were 20 percent and women compromised 43.7 percent of total patients. Also in the present study the most common underlying disease was hypertension by 11.9%.

In another study that was conducted in California in America, the absolute number of patients affected by influenza A (H1N1) that were examined in terms of underlying diseases, were 553 cases. Studies showed that lung diseases by 37% had the most frequent underlying diseases. In this study, hypertension by 3% had the minimum frequent underlying diseases (21). In this study the demographic investigation of the underlying diseases of patients was similar to the present study except that in the present study the most common underlying disease was hypertension with 11.9%.

In accord to the above studies, classification of patients based on clinical manifestations and collecting information for easing the identification of patients' next position is essential that in the present study has been noted to it. Since the hypertension is the most common underlying disease among patients affected by influenza A (H1N1), The Health Centers should pay more attention to the prevention of influenza in patients with the mentioned underlying disease. Collecting and classification of patients based on clinical manifestations and other demographic characteristics is essential, in order to deal with disease pandemics and identification of patients for serving and immediate treatment.

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Authors' Contribution

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