



THE CHARACTERISTICS OF PATIENTS WITH CONFIRMED INFLUENZA VIRAL INFECTION IN IRAQ

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ABSTRACT

Introduction: Influenza is an acute viral respiratory infection, very contagious and kills about half million in the world every year. Aim: To know the epidemiological and clinical characteristics of Iraqi patients with influenza. Methods: A cross sectional study done on patients with laboratory- confirmed influenza viral infection who attended Iraqi sentinel sites for influenza surveillance (Nov. 2021- May 2022). Results: The total number of cases was 73. The largest age group (46.6%) was 19-39. 76.7% of cases were registered in Baghdad/ Rusafa, 17.8% in karkh, 4.1% in Erbil, and 1.4% in Basra. 52.1% were females. 82.2% were living in urban areas. 91.8% presented with cough & 98.6% with fever. Only 8.2% got influenza vaccine. 63% did not vaccinated against COVID19. 80.8% were diagnosed as ILL, 19.2% as SARI (needed admission), all were cured, only 1.4% needed oxygen mask. All were diagnosed as type A virus, 97.3% had H3N2, 2.7% had H1N1 pdm09 subtype. Conclusions: Most cases were registered in Baghdad/ Rusafa. The largest age group was 19-39. Most living in urban areas. Most presented with cough and fever. Most were mild. Most cases did not immunize against influenza nor COVID19. All cases with influenza virus had type A, mainly H3N2 strain subtype. Recommendations: Health education about influenza especially for people living in Baghdad/ Rusafa and those aged 19- 39. Establishment of other surveillance sites. Provision of influenza vaccine against H3N2 subtype and encouraging people to take it annually.

KEYWORDS: Influenza, Influenza virus, H3N2.

INTRODUCTION

Influenza is an acute viral respiratory infection, very contagious and kills about half million in the world every year. Types of the virus that could cause disease in human are three; influenza A, B, and C. The most type in charge of causing pandemics because of its genetic makeup is type A. Historically, this type of influenza virus was responsible for four pandemics from 1918 to 2009.^[1-3] It is appraised by the World Health Organization (WHO) that about three to five million severe influenza cases occurred every year. Infection with the disease is principally caused by influenza A and B types, which could affect all age groups.^[4-6] The influenza viral infection is not limited to pulmonary system, there are many systemic symptoms and older adults are more susceptible to influenza-relevant complications. In older adults, influenza rarely comes without additional complications and there is more chance for boosting the disease because of multiple

factors including existing co-morbidities, in addition the healthy aging could be related to impaired lung function and dysregulated immune response. Commonly, opportunistic secondary bacterial infections increase in damaged lungs.^[7] Evidence suggests that influenza has an additional burden due to wider consequences of the disease. Some of these extra- pulmonary complications include cardiovascular incidents, exacerbations of chronic underlying conditions, rising the susceptibility for secondary bacterial infections, functional drop, and poor pregnancy outcomes.^[8] A key component of good readiness for influenza infection is the ability to detect its subtypes (strains), as they emerge in the human population. These subtypes might emerge indirectly from animal reservoirs to humans and must be detected as quickly as possible before sustained human to human transmission occurs.^[3] The Influenza viruses have surface proteins in their structure called hemagglutinin (HA) and neuraminidase (NA). As the influenza viruses

replicate, small changes (or mutations) in the genes of the viruses could occur leading to changes in that surface proteins. These small changes are called antigenic drift, which happen continually over time as the viruses replicate. Antigenic drift is an important reason why people can get influenza viral infection several times during their lives. It is also a primary reason why the composition of influenza vaccines is reviewed annually and updated as needed to keep up with evolving influenza viruses. The sudden unexpected major change in influenza A virus which could result in new surface proteins (new HA and/or new HA and NA) in the viruses that infect humans is called antigenic shift which could result in a new influenza A subtype infecting people for the first time, and it may lead to influenza pandemic. While influenza viruses evolve genetically all the time and often subject an antigenic drift, the antigenic shift takes place infrequently.^[9,10] In the outpatient clinics and health institutions, diagnosis could be made depending on the clinical picture; mainly fever, cough, and fatigue, usually in winter, with an optional diagnostic test for confirmation.^[11,12] Influenza viral infection and its complications could be prevented in most cases by the safe available effective vaccines, which have to be updated regularly.^[4,13,14] This study aims to know the epidemiological and clinical characteristics of Iraqi patients with influenza viral infection.

METHODOLOGY

It is a cross-sectional study carried out in the sites of Iraqi sentinel surveillance for influenza virus which are: (1) Numan Hospital in Baghdad/ Rusafa, (2) Kadhimiya Hospital in Baghdad/ Karkh, (3) Erbil Hospital in Erbil city, and (4) Basra Hospital in Basra city. The study population are Iraqi patients that were confirmed by laboratory tests (which are done at The Central Public

Health Laboratory that belongs to Iraqi Ministry of Health/ Public Health Directorate) to have influenza viral infection, who were registered in the four mentioned sites (from Nov. 2021 till May 2022). Those cases were recorded in the sentinel sites to have either influenza-like illness (ILI) or severe acute respiratory infection (SARI) according to the WHO definition. The ILI cases do not require hospitalization, while the SARI cases require hospital admission. During the study period, there were two sentinel sites in Iraq that are responsible for registration of cases with ILI, which are Numan Hospital and Erbil Hospital, while the others (Kadhimiya Hospital and Basra Hospital) are responsible for registration of cases with SARI. Regarding the study tools, this work involved the epidemiological and clinical characteristics of the participants according to the investigation forms that contain the relevant information and were filled in those hospitals. These characteristics include the following variables: age, sex, type of living area, classification of case (ILI or SARI), clinical presentation, status of vaccination against influenza and COVID-19 in the last six months, patient admission status and severity, final fate, type of virus and its strain after laboratory analysis. The gathered data were coded for each participant and analyzed by PC- SPSS programme, and then they were summarized and presented as tables and charts.

RESULTS

The total number of cases that were registered by the sentinel surveillance hospitals for influenza in Iraq (since their establishment in Nov. 2021 till May 2022) and were assured by the laboratory diagnosis to have influenza viral infection was 73. The statistics of them regarding their age is revealed by table 1.

Table (1): The statistics of cases with influenza viral infection regarding their age, N=73.

Variable	Mean	Standard deviation	Minimum	Maximum
Age of patient (years)	28.8	16	5	85

The distribution of patients with influenza virus regarding their sociodemographic variables is shown by table 2, their distribution regarding the clinical variables

is shown by table 3, while their distribution regarding the immunization status against influenza and COVID-19 is shown by table 4.

Table (2): Frequency distribution and percentage of sociodemographic variables among cases with influenza viral infection, N=73.

Variable	Frequency	Percentage
Site of surveillance:	Baghdad/Rusafa	56 76.7%
	Baghdad/Karkh	13 17.8%
	Erbil	3 4.1%
	Basra	1 1.4%
Age classification:	1-12	7 9.6%
	13-18	14 19.2%
	19-39	34 46.6%
	40-59	15 20.5%
	≥ 60	3 4.1%
Sex:	Male	35 47.9%

	Female	38	52.1%
Type of living area:	Urban	60	82.2%
	Rural	13	17.8%
Total		73	100%

Table (3): Frequency distribution and percentage of clinical variables among cases with influenza viral infection, N=73.

Variable		Frequency	Percentage
Case Classification:	ILI	59	80.8%
	SARI	14	19.2%
Have cough:	Yes	67	91.8%
	No	6	8.2%
Have fever:	Yes	72	98.6%
	No	1	1.4%
Hospital admission:	Yes	14	19.2%
	No	59	80.8%
Required an intubation:	Yes	0	0%
	No	73	100%
Required oxygen mask:	Yes	1	1.4%
	No	72	98.6%
Required a C-PAP:	Yes	0	0%
	No	73	100%
Patient final fate:	Cured	73	100%
	Dead	0	0%
Total		73	100%

Table (4): Frequency distribution and percentage of immunization status among cases with influenza viral infection, N=73.

Variable		Frequency	Percentage
Get Influenza vaccine:	Yes	6	8.2%
	No	67	91.8%
Get COVID-19 vaccine:	No	46	63.0%
	1 dose	10	13.7%
	2 doses	17	23.3%
Total		73	100%

The distribution of patients with influenza viral infection regarding the types and subtypes of the virus is shown by table 5. Among the cases that have influenza A virus,

figure 1 shows the common two kinds of virus strains that were detected in Iraq.

Table (5): Frequency distribution and percentage of types and subtypes of influenza virus among cases with influenza viral infection, N=73.

Variable		Frequency	Percentage
Type of Influenza virus:	Influenza A	73	100%
	Influenza B	0	0%
Type of virus strain:	H1N1pdm09	2	2.7%
	H3N2	71	97.3%
	H5N1	0	0%
	H7N9	0	0%
	Yamagata	0	0%
	Victoria	0	0%
	Total	73	100%

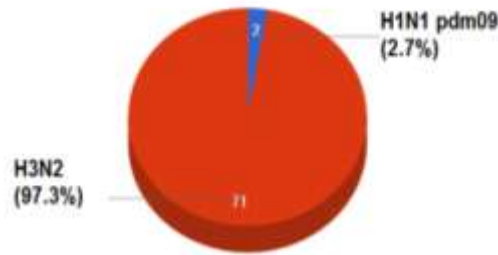


Figure (1): The distribution of cases with influenza- Type A, regarding the strain kind of the virus, N=73.

DISCUSSION

The total number of Iraqi patients with confirmed influenza viral infection that were registered in the sentinel sites responsible for registration of influenza in Iraq "from their establishment in Nov. 2021 till May 2022" was 73. The mean age of patients was 28.8 ± 16 years. Slightly less than half of them (46.6%) aged between 19- 39 years. Another study carried out on a sample of influenza surveillance in Iraq from 2015 to 2017 showed that the mean age was 31.7 ± 22.6 years.^[15] This is on the contrary of findings of another Spanish study which revealed that the most age group was less than five years old.^[16] More than three- quarter (76.7%) of the cases in this study were registered in Baghdad/ Rusafa. This could reflect the high population density in this side of Iraqi capital, and also the higher percent of mild ILI cases of Iraqi patients with influenza viral infection. Slightly more than half of the cases (52.1%) were females. The Iraqi study which was done on a sample of influenza surveillance in Iraq from 2015 to 2017 revealed that the percent of females in that sample was 45%.^[15] Majority of cases in the current study (82.2%) lived in urban areas. This could be related to the places of the four mentioned hospitals which are located in the centers of cities. Concerning the severity of cases in the current work, most of them (80.8%) were classified into ILI cases, whom they did not need any hospitalization, while others (19.2%) were classified into SARI cases whom they were severe and needed an admission to the hospital.^[17] Among those who admitted to the hospitals, no one needed C-PAP or endotracheal intubation, and small percent of them (1.4%) required an oxygen mask while they were hospitalized. All of them cured and discharged well from the hospitals. Those percents could reflect the relatively low severity of influenza viral infection in Iraq. This goes with the fact that most of influenza infections considered as mild illnesses and the serious complications occur in a minority of cases.^[4] This also goes with the fact that the activity of influenza virus declined during COVID-19 pandemic substantially which could be due to the preventive measures taken against COVID-19 that may reduce the severity of other respiratory diseases.^[18] The COVID-19 pandemic and subsequent implementation of nonpharmaceutical interventions (e.g. global travel cutoff, the using of protective masks, physical distancing, and staying at home) reduced transmission of some viral respiratory pathogens.^[17] The vast majority of

patients in the current study presented with cough and fever (91.8% and 98.6% sequentially). This goes with the WHO standard definition of influenza viral infection and its clinical presentation.^[12] Regarding the status of immunization, the vast majority of patients (91.8%) did not vaccinate against influenza virus in the last six months, and greater than half of them (63%) did not get any dose of COVID-19 vaccine, while others get only one dose or they completed the two required doses (13.7% and 23.3% sequentially) against COVID-19. The percentage of patients in the current study who had no immunization against influenza virus is more than that founded by another study carried out in United States which showed that the percent of patients with SARI who did not get influenza vaccine was 38.9%.^[19] After laboratory confirmation for the type of influenza virus among the cases, all of them were of influenza A- type and no one had influenza- B type. From those confirmed influenza A- type, the vast majority (97.3%) appeared as H3N2 influenza subtype, while the others (2.7%) were H1N1 pdm09 subtype. Other influenza- A subtypes (H5N1, H7N9, Yamagata, and Victoria strains) were not found in Iraq. The above-mentioned Iraqi study which was done on influenza surveillance from 2015 to 2017 showed that about 2% of cases who had influenza viral infection were diagnosed as type B influenza virus. The findings from the same study also showed that the detected subtypes of influenza A virus were H1N1 (mainly) followed by H3N2 strains.^[15] Globally, for the period between 2018 to 2019 "based on public health laboratory specimens" the predominant influenza- A subtype was H1N1 pdm09 (56.6% of positive specimens), followed by the H3N2 subtype (43.6%).^[20]

CONCLUSION

(1) The greatest number of cases with influenza viral infection was registered in Baghdad/ Rusafa sentinel site. The largest age group among patients was 19-39 years. Most of them were living in urban areas. (2) Clinically, most patients presented with cough and fever. The percentage of SARI cases (who needed an admission) was less than ILI cases. Among those admitted, all were cured, and no one required intubation nor C- PAP. (3) Among patients with confirmed influenza viral infection, only small percent of them were immunized against influenza virus. In addition, most cases did not immunize against COVID- 19. (4) All of cases infected with

influenza virus had type A, most of them had H3N2 strain subtype.

RECOMMENDATIONS

(1) Enhancement of health education about influenza, via different means, especially for people who are living in Baghdad/ Rusafa side, and for those aged between 19 to 39 years. (2) Establishment of other influenza-surveillance sites in each governorate, in order to cover all Iraqi geographical area and to make a close monitoring of the disease. (3) Provision of influenza vaccine against H3N2 influenza- A subtype, and encouraging people to take that vaccine annually.

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