

What We Learned from the 2019 Influenza Crisis

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Type A influenza virus (hemagglutination virus) has about sixteen serotypes, and six of them have led to the creation of disease in humans (H1, H2, H3, H5, H7, and H9). It is said that one of the three types of H1, H2, and H3 has been incriminated as the etiological cause of the recent influenza epidemic.(1) This virus is transferred from person to person by respiratory secretions. The power of this virus in altering the surface antigens is considered as the most important factor capable of creating new epidemics annually in human communities. Therefore, it is known as the sixth leading cause of mortality among human beings (2). The high virulence of the virus in pathogenesis and transmission is the factor involved in epidemics and occasionally pandemics. Thus, in many cases, governments make decisions like closing schools to diminish virus transmission

or making people vaccinate themselves to enhance immunization, to reduce individuals' affliction, and to decrease disease sequel (3). It has been asserted that the vaccination of the people at risk has resulted in a reduced incidence of epidemics. In this regard, the WHO has established the "Global Agenda on Influenza Surveillance and Control" and conducted some research on improving vaccines and their availability. According to some reports, the most important preventive measure to ward off this disease is observing personal hygiene among the people.

On the other hand, vaccination against the disease is an appropriate and noticeable measure for at-risk individuals with underlying diseases. This vaccination ought to be accomplished in the country (4). Every year, at the onset of the cold season, the Iranian Ministry of Health provides some guidelines and protocols on standard methods of disease prevention for the laypeople, schools, and high-risk groups through audio-visual mass media (5, 6). Nonetheless, the number of people afflicted with various types of viruses is significant, so that nearly 4000 Iranian people were affected with H1N1 influenza in the 1981 epidemic with a mortality rate of 3.8% (7).

Last year, from September to December 2019, 290 people were hospitalized in Shahid Sadoughi Hospital in Yazd, Iran, with the possible diagnosis of influenza (based on symptoms and not necessarily based on diagnostic tests). Thirteen of these patients passed away. Since this hospital is the referral of infectious patients from neighbouring towns, the high mortality rate was justified. The correct use of resources and facilities to resolve the resulted problems and improve hospital revenue is considered as a basic principle (8).

Hospital-based epidemic response refers to a set of interventions performed with the following advantages: continued provision of the principal and necessary services, the coordinated and suitable performing of interventions based on priority at all levels, establishing clear and accurate (non-erroneous) inter- and intra- organizational communication, adjustability/ compatibility suitable for increased demands, effective use of rare or sporadic resources, and creation of a safe environment for the healthcare personnel (9). In 2019, 16% of the influenza patients were admitted to the hospital through the Emergency Department (ED), which was one of the causes of workload in the ED. Overcrowding leads to increased workload of health care providers and result in reduced safety, diminished patients' safety, and decreased quality of patients' care (10). Given the provision of subspecialty care and treatment for patients, many of them were awaiting hospitalization. Indeed, the hospital bed occupancy rate was about 90% in the ED, internal, infectious, and neurological departments from September 2018 to September 2019. This index even increased to 100% at the highest prevalence of influenza, i.e., from September 2019 to November 2019.

Emergency Department (ED) of Shahid Sadoughi Hospital

This ward has been managed round-the-clock by emergency medicine specialists since 2009. The major challenge in this ward is also overcrowding and long ED stay. More than 80% of ED beds are occupied round-the-clock so that each patient stays at the hospital for an average period of 9 hours. Most immunocompromised patients (including hepatic, renal, and diabetic patients, etc.) were dominantly hospitalized in this ward, and the following measures were taken to manage and prevent transmission of influenza to ED patients.

The most primitive measure was the activation of a team called "hospital incident command system," which aimed at determining the severity of the situation, setting the required measures for investigating the patient's status, and determining

hospital requirements. Hence, several meetings were held at Shahid Sadoughi University of Medical Sciences, and Shahid Sadoughi Hospital so that the following decisions have been made:

- 1- Reducing hospitalization of elective patients in other wards to decrease ED and also hospital workload.
- 2- Allocating 20% of the capacity of other wards (that are irrelevant to infectious ward such as orthopedic ward) to non-contagious infectious diseases and non-influenza diseases.
- 3- Hospitalization of patients with similar infectious diseases in the same department and also the room.
- 4- Cooperation of infectious disease specialists for visiting ED and infectious department patients twice a day and early discharge if it is possible to free the capacity of the emergency department.
- 5- Daily monitoring of the treatment course of influenza patients in the ED and other departments by the health representative in the hospital.
- 6- Establishing several training sessions for the staff and medical and paramedical students regarding recognition and prevention of influenza to improve their performance in diagnosis, implementation of the present treatment protocols, and determining patients' status.
- 7- Vaccination of all medical and non-medical hospital staff who have not been vaccinated previously.
- 9- Checking the air conditioners in different parts of the hospital, especially ED and infectious wards and repairing them if required.
10. Allocating more clinical staff for ED.
11. Training in ABCs of infection control in all wards, encouraging all staff to observe these principles and also the provision of suitable antiseptics in this line.
- 12- Isolation of the location of patients suspicious to flu after triage and obtaining a colored print of triage chart for these patients to be identified easily by all personnel.
- 13- Devoting a fully isolated space in ED for inpatients suspicious of the flu.

Experienced nurses in the ED were asked to do the triage of the patients entering the ED. When that patient's medical history indicated symptoms of the flu or the flu-like syndrome, they were given surgical masks and then introduced to the physician present in the fast track. In the case of making a diagnosis by the physician, the patient will be referred to an emergency medicine specialist to get hospitalized. Based on his/her decision, a request for being visited by an internist or infection specialist will be given, and the patient will be hospitalized in the intended ward according to the previous measures. It should be pointed out that the triage sheets of these patients should be printed in color to be easily identified by the staff. The security staff of the hospital were also asked to guide these patients to the special area allocated to infectious patients in the waiting room to attenuate infection transmission. Moreover, a separate unit with 18 beds was set up and equipped in the ED, and all suspicious patients in need of hospitalization were treated only in this unit.

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