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Pregnancy Outcomes Among Hospitalized Patients Infected With 2009 H1N1 Influenza Virus in Qom, Iran, in Oct-Nov. 2009

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ABSTRACT

Background: Pandemic H1N1 influenza A 2009 (H1N1/09) virus has been identified as a leading cause of febrile respiratory diseases worldwide, and pregnant women constitute a high risk group.

Objectives: To determine the clinical characteristics and outcomes of pregnant women with H1N1 influenza A hospitalized in university hospitals of Qom city in Iran.

Patients and Methods: This descriptive retrospective study was conducted using existed data related to October and November 2009. All pregnant women with influenza manifestations were admitted to the hospitals to undergo nasopharyngeal culture. H1N1 virus was confirmed in 11 cases. Data including demographic characteristics, clinical manifestations, laboratory test results, and pregnancy complications was extracted from medical records, and analyzed by descriptive statistics.

Results: The mean age of the women was 28.1 ± 4.7 years with a mean gestational age of 28.7 ± 10.9 weeks. The most common clinical manifestations included coughing (100%), fever (87.5%), and dyspnea (75%). The most common abnormal test was anemia (88%). Pregnancy complications included preterm delivery (36.3%), low birth weight (18%), oligohydramnios (9%), gestational diabetes (9%), and fetal distress (9%). Also one (12.5%) wound dehiscence happened.

Conclusions: vaccination seems to be necessary to prevent this potentially fatal infectious disease. Furthermore, timely prescription of antiviral medications is recommended to decrease the risk of severe complications.

Keywords: Pregnancy; Influenza A Virus, H1N1 Subtype; Iran

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

Vaccination is the best way to prevent influenza as a potentially fatal infectious disease, so the most important duty of healthcare providers is to advise and encourage pregnant women to undergo immunization. Upon seeing a pregnant woman with suspected or confirmed influenza, it is critical to monitor concisely to detect her complications.

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1. Background

In April 2009 an outbreak of H1N1 influenza A 2009 (H1N1/09) spread rapidly and made the World Health Organization (WHO) declare a pandemic on June 11, 2009. Pregnant women were quickly identified as a high-risk group for complications of H1N1 influenza (1), because they had a fourfold increased risk of hospitalization and a disproportionate number of deaths (2). Complications of the H1N1 virus in pregnancy included non-reassuring fetal tests and febrile morbidity. Hyperthermia in the first trimester of pregnancy has been associated with neural tube defects (NTD), and other congenital anomalies. Fever during labor and birth is a risk factor for neonatal seizures, newborn encephalopathy, cerebral palsy, and death (3). An analysis of New York City hospital admissions between May and June 2009 found that pregnant women were 7.2 times more likely to be hospitalized, and 4.3 times more likely to require admission to the intensive care unit (ICU) than non-pregnant women (4). In Brazil, 156 (9.6%) of the 1632 total deaths reported during the 2009 pandemic were among pregnant women (5). In the US, the mortality rate was 8% for a group of pregnant women during the influenza H1N1 epidemic (6). Mothers had to be controlled carefully since they were susceptible to severe outcomes (2, 7, 8).

2. Objectives

The aim of the present study was to describe the demographic, clinical and laboratory characteristics, and outcomes of pregnant women and their newborns with laboratory-confirmed pandemic H1N1 influenza in the city of Qom, Iran.

3. Patients and Methods

This descriptive retrospective study was conducted using existed data from medical records related to October 1, 2009 through November 15, 2009. The study was approved by the ethics committee of the Qom University of Medical Sciences. All pregnant women with laboratory-confirmed pandemic H1N1 influenza virus admitted to the public university hospitals of Kamkar, Izadi, and Alzahra were included in the study. In the first day the samples for the laboratory test has been gathered. It was required to hospitalize severe cases. Severe disease was defined as an oral temperature of 380c or higher, severe cough, dyspnea, hypotension, sore throat and other likely symptoms such as headache, myalgia, arthralgia, diarrhea, nausea and vomiting. After hospitalization, the first step was to obtain nasopharyngeal sample culture for confirming H1N1 influenza virus infection while the second stage was treatment with Oseltamivir had been started before receiving the test results. Women had pregnancies of any gestational ages at study entry and close to the time of infection. Data was collected from two parts of the medical records: (1) at admission time and during hospitalization, (2) after delivery. The variables extracted from the first part included the maternal age, trimester of gestation, gestational age, gravidity, parity and maternal ethnic origin, treatment with antibiotics and Oseltamivir, ICU admission, pneumothorax and need for mechanical ventilation. The variables extracted from the second part included maternal characteristics and complications, fetal and neonatal complications, weight, height, head circumference, Apgar score of neonate, fetal and neonatal deaths. Laboratory data assessed for each patient included complete blood count, erythrocyte sedimentation rate, serum electrolytes, serum creatinine, blood urea nitrogen, C-reactive protein, blood sugar, liver enzymes and urine analysis. Descriptive statistics methods were used to analyze the data.

4. Results

There were 11 confirmed cases of H1N1 infection among pregnant women admitted to the study hospitals. The mean age of the women was 28.1 ± 4.7 years (range, 20–36 years) and the mean gestational age at the time of hospital admission was 28.7 ± 10.9 weeks (range, 10–37 weeks). Two women (18.1%) were in the first, 4 (36.3%) in the second, and 5 (45.4%) in the third trimester of pregnancy. Seven women (63.6%) were primigravida, and 4 (36.3%) were multigravida. The mean duration of hospitalization was 5 days. None of the 11 women had been vaccinated against H1N1. The most common clinical manifestations at the time of admission to the hospital were coughing (100%), rhinorrhea, and fever (87.5%), chills and dyspnea (75%), headache, diarrhea, and vomiting (62.5%), while myalgia (32.2%), and sore throat and vertigo (25%) were reported less frequently. Abnormal results of laboratory tests were anemia (88%), high CRP (44.4%), thrombocytopenia (33.3%), leukopenia, leukocytosis, hyperglycemia, high ESR, and pyuria (22.2%), elevated liver enzymes, high creatinine and blood urea nitrogen, hyperkalemia and proteinuria (11.1%). Seven patients (63.6%) received Oseltamivir within the 2 days of symptoms onset and 4 (36.3%) after 2 days. Ten patients (90.9%) were discharged but 1 (9%), in the third trimester of pregnancy, was admitted to ICU and required mechanical ventilation due to acute respiratory failure, and finally died (age = 31y, G3P2L2, GA = 31w + 4d, WBC = 36900, SGOT = 60, Hb = 9.5, PLT = 86000). The perinatal complications in the current pregnancies included preterm delivery in 4 (36.3%), low birth weight in 2 (18%), oligohydramnios in 1 (9%), gestational diabetes in 1 (9%), fetal distress in 1 (9%), and wound dehiscence in 1 (9%). Eight of the patients (72.7%) gave birth by cesarean delivery, among which 12.5% wound dehiscence was reported (*Table 1*). The mean ± SD of birth weight, height and head circumference of neonates were 2968.89 ± 603.08, 49.12 ± 1.45, and 35.57 ± 1.90, respectively. One-minute Apgar score in 10 (90.9%) of the neonates was 9-10, while the 5-minute Apgar score was higher than eight, and only in 1 (9%) was lower than seven (*Table 1*).

Table 1. Maternal and Neonatal Outcomes Among 11 Pregnant Women Confirmed With H1N1 Influenza in Qom, Iran

Maternal Outcome	No. (%)	Neonatal outcome	No. (%)
Maternal Death		Neonatal Death	1 (9)
Yes	1 (9)		
No	10 (90.9)		
ICU Admission		Low Birth Weight	2 (18)
Yes	1 (9)		
No	10 (90.9)		
Pneumothorax		Poor Feeding	1 (9)
Yes	1 (9)		
No	10 (90.9)		
Type of delivery		Apgar Score at 5 min	
Normal Vaginal Delivery	3 (27.2)	9-10	9 (81.8)
Cesarean Delivery	8 (72.7)	7-8	1 (9)
		< 7	1 (9)
Gender of Neonate		Apgar Score at 1 min	
Girl	6 (54.5)	9-10	10 (90.9)
Boy	5 (45.4)	7-8	-
		< 7	1 (9)
Pregnancy Complications			
No Complication	4 (36.3)		
Preterm Delivery	4 (36.3)		
Oligohydramnios	1 (9)		
Diabetes	1 (9)		
Fetal Distress	1(9)		
Wound Dehiscence	1(9)		

5. Discussion

In the present study, the most common clinical manifestations were similar to other studies (2, 8). The prevalence of anemia was 88% in the present study, compared to 37% in the study by Jain et al., in the US (9), and 15.2% in another study in China (10). In our study, patients were merely pregnant women with H1N1 influenza, but the US study was conducted on the general population. Pregnancy potentially induced anemia; therefore, the rate of anemia in our study was higher than the US rate. Furthermore, in developing countries, anemia is more prevalent in women, especially during pregnancy. In this study, other abnormal results of laboratory tests were thrombocytopenia in 3 (33.3%), and leucopenia in 2 (22.2%). in the USA, 14% had thrombocytopenia, and 20% leukopenia (9). The study conducted in China revealed that the prevalence of thrombocytopenia in women infected with H1N1 was 4.3% (10). Of all pregnant women in the present study, 9% died secondary to the severe H1N1 infection in comparison with other studies which reported maternal deaths ranging from 0% (11) to 25% (9). Our results revealed 1 (9%) neonatal death due to preterm birth, and very low birth weight. A similar study in Brazil showed very similar rates of maternal mortality (9.7%) and neonatal mortality rate (9.7%) (5). The CDC recommends early antiviral treatment of pregnant women with suspected or confirmed H1N1 influenza, preferably within the two days of the onset of symptoms (11). In seven patients (63.6%) antiviral treatment was started within the two days of symptom onset, and 36.3% received Oseltamivir treatment after two days. The rate of ICU admission was 22% in California (10), 18.6% in Australia (7), 14% in Brazil (11), and 9% in the US (2); however, in the present study, only one (9%) woman was admitted to ICU which was similar to that reported in the USA. In our study, 36.3% of infants were born preterm. This can be compared to a baseline rate of preterm birth of 9.6 % worldwide (12). Yates et al., found that the rate of preterm birth was higher in pregnant women with 2009 H1N1 than uninfected pregnant ones (13). In our study, similar to the Brazilian study (5), preterm birth was the most frequent adverse perinatal outcome. Prevalence of low birth weight in the study conducted by Pramanick in India (4) was 15%, but it was 18% in the present study. Higher prevalence of LBW in our study can be due

to the high prevalence of preterm delivery. The mean ± SD of birth weight of neonates was 2968.89 ± 603.08gr. Mendez Figueroa (14) conducted a study on 41 pregnant women with influenza-like illnesses and influenza H1N1 to compare the pregnancy outcomes of the two groups. They found that the mean birth weight of neonates born by mothers with positive results of H1N1 2009 test was 285 grams less than that of neonates born by mothers with influenza-like illnesses. In our subjects, 72.7% cesarean deliveries were reported, while Siston et al., reported 58.0% cesarean deliveries in the United States (15). According to the reviewed literature, no wound dehiscence was reported, but in our study, of all women who underwent cesarean section 12.5% wound dehiscence was reported. In this study, no infants had positive results of H1N1/09 test, while infant morbidities mostly resulted from preterm birth delivery. Vaccination is the best way to prevent influenza as a potentially fatal infectious disease, so the most important duty of healthcare providers is to advise and encourage pregnant women to undergo immunization. Upon seeing a pregnant woman with suspected or confirmed influenza infection, it is critical to monitor her concisely to detect her complications.

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Authors' Contribution

Esmat jafarbegloo was responsible for the study conception and design. Dadkhah, Ahmari and Abedini participated in the process of data collection. Sheikholeslam helped in the process of sampling and made critical revisions on the final draft of the manuscript.

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The authors declare that they have no competing interests.

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