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A retrospective study of critically-ill pregnant women with H1N1 infection in a tertiary care rural medical college of Gujarat

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Abstract

Introduction: H1N1 influenza infection is known to cause severe morbidity and mortality in pregnant women. Perinatal morbidity and mortality is also increased due to neonatal disease, prematurity and stillbirth. World Health Organization has identified pregnant and postpartum women as a high risk group.

Method: A retrospective observational study was carried out to study the clinical profile and maternal – perinatal outcome in pregnant women critically –ill with H1N1 infection at a tertiary care rural medical college of Gujarat.

Results: 13 patients fulfilled the admission criteria. There were 4 maternal deaths in the study group. Delay in reporting to the hospital, associated co-morbidities like anemia, bronchial asthma, gestational hypertension was the common factor in pregnant women succumbing to influenza. None of the pregnant women admitted to Intensive care had received Influenza vaccination.

Conclusion: Delay in diagnosis and management is associated with poor maternal and perinatal outcome. Influenza vaccination awareness among high risk groups can help in reducing morbidity and mortality due to H1N1 infection.

Keywords: H1N1 infection, pregnancy, critically ill, maternal outcome, perinatal outcome

Introduction

Influenza viruses are group of RNA viruses that are further classified into A, B and C subtypes. Influenza A and B viruses are known to cause seasonal flu in human population. The first case of H1N1 influenza infection was reported in Mexico ^[1] in 2009 which was then declared into a pandemic by World Health Organization. In India the first case of H1N1 was reported on 13 May 2009. The mode of transmission of this virus is through droplets and fomites. Pregnant women ^[2, 3, 4] particularly during their third trimester along with postpartum women are at high risk for developing severe illness due to H1N1 infection. Influenza vaccination ^[5, 6, 7, 8] during second or third trimester is associated with reduced risk of prematurity, small for date, still-birth and neonatal deaths. In rural area lack of knowledge ^[9, 10] about the illness and its implications on pregnant women, delayed referral, late initiation of treatment and paucity of awareness about the influenza vaccine is taking its toll. There is an unmet need for creating awareness and formulating preventive programs particularly in rural areas to reduce the morbidity associated with this infection. This study was undertaken to highlight the demographic, obstetric and critical care variables, maternal and perinatal outcome of pregnant women admitted to critical care due to H1N1 infection.

Material & Methods

A retrospective observational study was carried out in a tertiary care rural medical college of Gujarat. Duration 4 years from January 2015 to December 2018. Medical records of patients fulfilling the inclusion criteria were retrieved from Medical records department.

Inclusion Criteria: Pregnant women with confirmed H1N1 infection requiring Critical care for mechanical ventilation or hemodynamic instability.

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Exclusion Criteria: Pregnant women suspected of H1N1 infection. Pregnant women with H1N1 infection admitted to hospital with mild illness. Pregnant women with H1N1 infection on home care. Clinical profile was studied along with maternal and perinatal outcome. A confirmed Case of H1N1 infection was one in whom the RT-PCR was positive in throat or nasal swab or endotracheal secretions. Indications for admission to critical care was shock, respiratory distress needing non-invasive or mechanical ventilation, ARDS and hyperpyrexia. Treatment was initiated as per WHO guidelines in form of oseltamivir 75 mg BD for 5 days, isolation of newborn after delivery or cesarean section, use of specialized masks by treating intensivists, mechanical ventilation, dialysis, fluids and antibiotics for superadded bacterial pneumonia. Demographic parameter was studied in terms of maternal age, Basic Obstetric variables like parity, gestational age at presentation along with presence of co-morbidities, symptoms and duration of flu, vital parameters on admission like temperature blood pressure, pulse rate, respiratory rate, Spo2, lung condition, duration of stay in intensive care unit, need for mechanical ventilation, mode of delivery, maternal recovery, maternal death, late complications like refractory shock, renal failure and bacterial pneumonia. Variables for perinatal outcome was studied in terms of live birth, prematurity, fetal weight, meconium aspiration, fetal distress, still birth and neonatal death. Results 13 patients fulfilled the admission criteria. Table 1 shows the demographic Basic obstetric and clinical parameters of admitted patients. 53.8 % of patients were in the age group of 25-30 years, Mean age was 26.4 years, 76.9% were multigravidas, 53.8 % presented in third trimester of pregnancy, Mean gestational age was 30.2 weeks. Commonest presentation on admission was breathlessness and spiking fever. 76.9 % patients presented to the hospital after 72 hours of onset of symptoms.

Table 2 shows the indication for admission to intensive care and co-morbidities 76.9% patients had associated co-morbidities in form of anemia, pre-eclampsia Obesity, bronchial asthma and cardiac disease. 7 (53.8%) needed mechanical ventilation, 1 patient needed dialysis, 3 (23%) patients had developed superadded bacterial pneumonia.

Table 3 & 4 shows the maternal and perinatal outcome. In the surviving group 3 patients continued pregnancy till term. Mean birth weight was 2.8 kg in these patients. 2 had a successful vaginal delivery and 1 patients underwent planned LSCS. Among the 7 patients who delivered during the period of hospitalization 2 had a vaginal delivery and 5 patients underwent LSCS for indications like fetal distress, previous 2 LSCS severe pre-eclampsia, meconium stained liquor. 15.3 % were preterm, 23% still born. Only 1 newborn needed NICU admission for respiratory distress, others were kept in isolation till mother recovered.

There were 4 (30.7%) maternal deaths during the study period of which 2 patients succumbed within 12 hours of admission, 2 of 4 patients were in the 2nd trimester of pregnancy. 3 patients remain undelivered and 1 patient died after LSCS.

Table 1: Demographic and basic obstetric and clinical parameters of pregnant women.

Age in years	Number
18-24 yrs	5 (38.4%)
25-30 yrs	7 (53.8%)
Above 35 yrs	1 (7.6%)
Gestational age	
0-12 wks	0
13-28 wks	6 (46.1%)
29-36wks	5 (38.4%)
37-40 wk	2 (15.3%)
Order of pregnancy	
Primigravida	3 (23%)
Multigravida	10 (76.9%)
Duration of symptoms	
≤48 hours	0
3-5 days	10 (76.9 %)
≥ 7days	3 (23%)
Symptoms	
Fever and breathlessness	11 (84.6%)
Unresponsive/confused state	2 (15.3%)

Table 2: Indications and complications of pregnant women admitted to intensive care

Criteria for admission	Number
Mechanical Ventilation (invasive)	7 (53.8%)
Bacterial pneumonia	3 (23%)
Refractory shock	2 (20%)
Acute renal failure	1(7.6%)
Pre-existing co-morbidities	N=10/13 (76.9%)
Anemia	5 (50%)
Pre-eclampsia	3 (30%)
Cardiac disease*	1 (10%)
Kochs*	1 (10%)
Bronchial asthma**	1 (10%)
Obesity**	1 (10%)

*,** Combination of co-morbidities were seen in a single patient.

Table 3: Maternal outcome

Continued Pregnancy till term	3 (23.07%)
Maternal death	4 (30.7%)
Delivered during hospitalization	7 (53.8%)
Undelivered	3 (23.07%)
Mode of delivery	
Vaginal	4
LSCS	6
Indication of LSCS	
Robson 5	2 /6
Robson 10	4/6

Table 4: Perinatal outcome

Outcome	Number
Live birth	7 (53.8%)
Term ≥ 37 wks	5 (38.4%)
Pre-term	2 (15.3%)
Still birth	3 (23%)

Table 5: Clinical characteristics of pregnant women who succumbed

S. No	Gestational age	Duration of symptoms	Co-morbidities	Mode of delivery	Interval of admission to Death
1	22 wks	5 days	Anemia	Undelivered	5 days
2	24 wks	≥ 7 days	Anemia	Undelivered	12 hrs
3	34 wks	4 days	Anemia Bronchial asthma	Lscs	9 days
4	36 wks	≥ 7days	Anemia Pre-eclampsia	Undelivered	12 hrs

Discussion

This study highlights the need for increased awareness about the ill-effects of influenza infection in pregnant women not only among the health care providers but in the general public as well. There are many studies [11, 12, 13, 14] on the maternal and perinatal outcome in pregnant women with seasonal influenza however there are very few Indian studies on the maternal and perinatal outcome in pregnant women admitted to intensive care [15, 16] with H1N1 infection particularly in rural area. In the current study more than 50% of patients were in the 25-30 years age group. Pregnant women are at high risk for hospitalization particularly in the third trimester but in our study the number of patients in 2nd and 3rd trimester were same as shown in study by Lim and Mehmood *et al.* [17] which showed that the percentage of hospitalized cases requiring intensive care is same within each gestational band. None of pregnant women was in the first trimester of pregnancy. Majority of patients had presented after 3-5 days after onset of symptoms and hence late initiation of treatment which is one of the factors associated with poor maternal outcome as shown by studies by Louie [18] *et al.* and Rebeiro [19] *et al.* Study by Pramanick [20] *et al.* also reported that mortality among pregnant women with influenza was associated with a significant delay in presentation to hospital. Fever and breathlessness were the main presenting complaints as seen in other studies. More than 50% patients needed mechanical ventilation and these were those who had presented to the hospital after 48 hours. Presence of co-morbid conditions is another risk factor associated with poor maternal and neonatal outcome as shown by many national [21, 22, 23, 24] and international studies [25, 26]. Bronchial asthma [27] is commonest co-morbid condition seen in these patients but in our study anemia complicated the course as it is a tertiary care center in a rural area. Dialysis was needed in 1 patient, bacterial pneumonia and septic shock were other superadded complications. Of 13 patients there were 4 (30.7%) maternal deaths, 3 died undelivered while 1 patient died in the postpartum period. All 4 pregnant women who died had co-morbid conditions in form of anemia (3/4) and pre-eclampsia (1/4), had presented to the hospital after a mean duration of 5 days from the onset of symptoms. Refractory shock and respiratory failure was the cause of death. 9 patients had successful recovery of which 3 continued pregnancy till term and resulted in live births with mean birth weight being 2.8 kg. Indications of LSCS was grouped as per Robson's criteria .38.4 % had poor perinatal outcome due to Pre-maturity and still birth. 3 newborns were kept in isolation and only 1 newborn required intensive care for respiratory distress. Maternal mortality rates in H1N1 ranges from 3.7% to 70% [28, 29, 30] and in our study it was 30.7%. Mathur [31] *et al.* observed a higher maternal mortality rate among women in third trimester (80%) as compared to women presenting in early pregnancy (63%). All of them had presented after 48 hours of onset of symptoms, had associated co-morbidities like anemia and pre-eclampsia and needed invasive mechanical ventilation. None of the pregnant women had received influenza vaccine similar to study result by Agarwal [32] *et al.* To our knowledge this is the only study from rural Gujarat that studies the maternal and perinatal outcome in H1N1 confirmed cases requiring intensive care. Limitation In our study the limitation was that we did not compare the maternal and perinatal outcome with non-critical confirmed cases of H1N1 being managed on Outpatient basis or those managed at home. Knowledge and awareness about the H1N1 infection among the general population also needs to be studied particularly in rural area.

Conclusion

Close supervision of antenatal women during the outbreaks, early identification of warning signs, early referral, early initiation of treatment and universal vaccination of pregnant women during outbreaks might help in reducing the morbidity and mortality with H1N1 infection.

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