A comparative study to assess the epidemiological profile & outcome among pregnant and non-pregnant women infected with Influenza A H1N1 attending a tertiary care hospital of southern Rajasthan region of India

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Abstract

Introduction: Pregnant females are at higher risk for development of respiratory complications women mainly because of their altered immunity and physiological adaptations. Compared to non-pregnant individuals, pregnant women are more likely to develop influenza-associated complications, severe disease, and death. This study is carried out to analyze the epidemiological factors associated with outcome in pregnant women who suffered from H1N1 infection as well as to compare the outcome of HINI infection in pregnant and non-pregnant women.

Materials and Methods: Descriptive and hospital based study of all Swine flu positive pregnant and non-pregnant females reported to OPD & admitted in Isolation and ICU from Jan to Dec 2015 were included in the study. The demographic data was collected for each patient and the following details were noted and analyzed: gestational age at diagnosis, duration of hospitalization, place of admission, mechanical ventilation status and maternal neonatal outcome.

Results: The study revealed that during study period total 2344 women attended swine flu OPD, out of them 686 women tested by RT-PCR. In 282 cases, RT PCR was H1N1 positive. Out of them 147 women were admitted in isolation ward and ICU for further investigation and treatment. Out of 147 admitted confirmed cases, 30 females were pregnant, 67 were admitted in ICU. Total 33 swine positive females were expired, out of them 28 were put on ventilator and 7 were pregnant. Most of the females belong to rural background. Healthcare seeking behaviour was higher in Pregnant female with significantly higher duration of stay in hospital. More pregnant women (69.23%) put on ventilator than non-pregnant (38.89%). Case fatality rate in pregnant females (23.33%) was higher in compare to non-pregnant population (22.22%).

Conclusions: Pregnancy is associated with high CFR, longer duration of hospitalization, more need of ICU admission as well as mechanical ventilation. ICU. It may be due to low awareness and late presentation especially in the women belonged to rural areas.

Keywords: H1N1, Swine flu, Pregnancy, Trimester.

Introduction

Swine flu is an acute respiratory infection caused by Influenza A H1N1, RNA virus of the family orthomyxoviridae.[1] Rapid spreading and difficulty in control of this infection is due to the transmission of this pathogenic virus via air borne mode.[2]

Pregnant women are vulnerable to H1N1 because the growing foetus in a pregnant women pressing upward & compresses the lungs.[3] Compression reduces the ability of the lung to fill and expel the fluid. As a result pregnant women are susceptible to pneumonia for that reason more in later months of pregnancy. Along with this low immunity make the mother more susceptible for getting infection.[4] Pregnant women appear to be approximately 4-5 times more likely to develop severe disease, when compared to non-pregnant individuals in the general population, and this risk is highest in the third trimester.[5] Compared to non-pregnant individuals in the general population, pregnant women are more likely to develop influenza-associated complications, severe disease, and death, especially if they have co-morbidities.[6-10] Influenza in pregnancy is associated with increased risk of adverse pregnancy outcomes such as spontaneous abortion, preterm birth, and foetal distress.[6,7,11]

Aim of this study is to analyze the epidemiological factors associated with outcome in pregnant women who suffered from H1N1 infection as well as to compare the outcome of HINI infection in pregnant and non-pregnant women.

Materials and Methods

This is a descriptive hospital based study conducted in Maharana Bhupal Government Hospital, Udaipur of Southern region of Rajasthan during year 2015 Swine flu outbreak. Study Population included all female patients visited swine flu OPDs, swine flu wards and ICU. H1N1 suspected cases were tested for real time PCR. During the study period total 2344 women attended swine flu OPD, out of them 686 women tested by RT PCR. In 282 cases, RT PCR was positive and the diagnosis of H1N1 influenza virus was confirmed. Out of them 147 women were admitted in isolation ward and ICU for further investigation and treatment. All the confirmed swine flu cases were treated with Oseltamivir 75 mg twice daily for 5 days. Among 147 admitted confirmed cases, 30 females were pregnant. Out of 147 swine positive females, 67 were admitted in ICU and 30 were put on ventilator. Total 33 swine positive females were expired, out of them 28 were put on ventilator and 7 were pregnant. The demographic and clinical data was collected for each patient by using a standardized pre-structured questionnaire. Formal consent from patient or attendant and ethical clearance from ethical

committee has been obtained. Data was analyzed by using excel sheet and statistical software.

Results

Table 1 shows that total 686 samples were tested for rt-PCR from January 2015 to December 2015, out of them. 282 cases were identified as positive for H1N1 and 147 were admitted. Out of them, 30 (19.73%) women were pregnant at the time of admission.

Majority of pregnant females belong to age group of 16-30 years and urban area however there was no significant difference in the age group as well as rural-urban distribution of pregnant and non-pregnant women. (Table 2)

Table 3 shows that the case fatality rate among pregnant females (23.33%) was higher than that of non-pregnant females (22.22%) and this difference was statistically significant ($p<0.005$).

ICU admission rate was higher in pregnant swine positive females but the difference was not significant (Table 4).

Percentage of swine positive pregnant put on ventilator was higher but the difference was not significant (Table 5).

ICU admission rate was higher in pregnant swine positive expired females but the difference was not significant (Table 6).

Percentage of swine positive pregnant expired females put on ventilator was higher but the difference was not significant (Table 7).

Table 8 shows that majority of deceased pregnant females were expired after 3 days of admission while majority of deceased non-pregnant females were expired within 3 days of admission. However this difference was not statistically significant ($p>0.05$).

Table 9 shows that total 29 pregnant female were swine positive at the time of admission. Out of them 7(24.14%) were expired. Highest mortality 5(38.46%) was observed in the female of second trimester. However the difference was not statistically significant ($p>0.05$).

Table 1: Distribution of female population according to H1N1 positivity

Total Screened	Total tested	Total Positive	Admitted	
2344	686	282	147	
			Pregnant	Non-pregnant
			30 (20.41%)	117 (79.59%)

Table 2: Comparison of pregnant and non-pregnant swine positive females according to age & area wise distribution

Age Group (in years)	Pregnant	Non-pregnant	Total female	P value
	No. (%)	No. (%)	No. (%)	Mann Whitney U test, Z-score = -1.88004, p value >0.05
0-15	0 (0.00)	3 (2.56)	03 (2.04)	
16-30	27 (90.00)	27 (23.08)	54 (36.74)	
31-45	3 (10.00)	38 (32.48)	41 (27.89)	
46-60	0 (0.00)	37 (31.62)	37 (25.17)	
>60	0 (0.00)	12 (10.26)	12 (8.16)	
Total	30 (100.00)	117 (100.00)	147 (100.00)	
Area wise distribution				
Rural	9 (30.00)	38 (32.48)	47 (31.97)	Chi square 0.067 p value >0.05
Urban	21 (70.00)	79 (67.52)	100 (68.03)	

Table No. 3 Comparison of case fatality rate in pregnant and non-pregnant swine positive females (confirmed patients, n=147)

S. No.	Parameters	Pregnant	Non-pregnant	Total
1.	Expired	7	26	33
2.	Survived	23	91	114
3.	Total	30	117	147
4.	CFR	23.33%	22.22%	22.45%
Chi square 8.130, df=1, p<0.005				

Table 4: Comparison of pregnant and non-pregnant swine positive females according to admission place (n=147)

S. No.	Admission place	Pregnant	Non-pregnant	Total
1.	ICU	13	54	67
2.	Isolation	17	63	80
3.	Total	30	117	147
4.	ICU admission rate	76.47%	46.15%	45.58%
Chi square 0.077, df=1, p>0.05				

Table 5: Comparison of pregnant and non-pregnant swine positive females according to ventilator status (n=67)

S. No.	Ventilator status	Pregnant	Non-pregnant	Total
1.	Put on ventilator	9	21	30
2.	Not put on ventilator	4	33	37
3.	Total	13	54	67
4.	Ventilator rate	69.23%	38.89%	44.78%
Chi square 2.770, df=1, p>0.05				

Table 6: Comparison of pregnant and non-pregnant expired females according to admission place (n=33)

S. No.	Admission place	Pregnant	Non-pregnant	Total
1.	ICU	7	21	28
2.	Isolation	0	5	5
3.	Total	7	26	33
4.	ICU admission rate	100.00%	80.77%	84.84%
Chi square 0.443, df=1, p>0.05				

Table 7: Comparison of pregnant and non-pregnant expired females according to Ventilator status (n=28)

S. No.	Ventilator status	Pregnant	Non-pregnant	Total
1.	Put on ventilator	7	18	25
2.	Not put on ventilator	0	3	3
3.	Total	7	21	28
4.	Ventilator rate	100.00%	85.71%	89.29%
Chi square 0.124, df=1, p>0.05				

Table 8: Hospital stay in pregnant and non-pregnant females expired (n=33)

S. No.	Duration of Hospitalization	Pregnant	Non- pregnant	Total
1.	≤3 Days	3(42.86%)	19(73.08%)	22
2.	≥4 Days	4(57.14%)	7(26.92%)	11
	Total	7	26	33
Chi square 2.2665 df=2, p>0.05				

Table 9: Association of mortality with pregnancy

S. No.	Pregnancy status	Confirmed patients	Expired	%
1.	First trimester	3	0	0
2.	Second trimester	13	5	38.46
3.	Third trimester	13	2	15.38
	Total	29	7	24.14
Chi square 0.4821 df=2, p>0.05				

Discussion

Among all swine positive females nearly 20.41% were pregnant at the time of admission. Majority of pregnant females belong to age group of 16-30 years and urban area. It shows the health care seeking behaviour and strength of health care in urban population.

Death were more reported in pregnant females so case fatality rate was much higher among them (23.33%). Our study findings were corroborating with the study of CP Sharm et al (2012)[12] which showed that among all swine positive females nearly one fifth (20.6%) were pregnant at the time of death. Death were more reported in pregnant females with higher case fatality rate (27.5%).Our study findings were also similar to a study of Mahendra Singh et al (2012)[13] which reported that death were more in pregnant females so case fatality rate was much higher among them 20.69% (24 out of 116).

More swine positive pregnant females were admitted in ICU (76.47%) and put on ventilator support (69.23%) in compare to non-pregnant. This finding was in contrast to the study of Gunasekaran (2012)[14] which reported less ICU admission (11.1%) than ward (18.5%). Study of Pramanick et al (2011)[15] reported 40% admission in ICU. Study of Chudasama et al (2010[16] reported need of 73.3% admission in ICU.

Maximum mortality in swine positive pregnant females was observed in patients admitted in ICU and put on ventilator.

Majority of pregnant swine positive females were expired after 3 days of admission while majority of pregnant swine positive females were expired within 3 days of admission.

Highest mortality was observed in the female of second trimester (38.46%). It was in contrast to the study of Mathur S et al (2010)[17] which showed highest mortality in third

trimester (80%). It indicated that pregnancy itself is a high risk factor for swine flu.

Limitations

The data was taken only from hospitalized patients. Patients belonging to category A & B, treated on outpatient basis were not included in the study.

Conclusion

Pregnancy is associated with high CFR, longer duration of hospitalization, more need of ICU admission as well as mechanical ventilation. ICU. It may be due to low awareness and late presentation especially of the women belonged to rural areas. However our study included only hospitalized patients and limited to a particular region so more studies are needed to establish the facts.

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