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## Original Research Article

# Maternal and fetal outcomes in pregnant women with hyperemesis gravidarum

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## ABSTRACT

**Background:** Hyperemesis gravidarum (HG) is associated with maternal weight loss, nutritional deficiencies, fluid and electrolyte abnormalities, which may lead to adverse fetal and maternal outcomes. The purpose of this study was to evaluate the relationship of hyperemesis gravidarum to maternal and foetal outcomes.

**Methods:** A hospital-based prospective observational study was carried out. All patients with singleton pregnancy diagnosed as / history of hyperemesis gravidarum the current pregnancy was included in the study. The pregnant women with multiple pregnancy, molar pregnancy, presence of pre-gestational diabetes, pre-gestational hypertension, and other causes of nausea such as appendicitis and pyelonephritis were excluded from the study.

**Results:** 36 pregnant women with prevalence rate of 3.28% have been found to be suffering from HG. Almost half (17, 47.22%) of the pregnant women with HG had age less than 25 years. The significant association (p-value: 0.0099) has been found between parity and smoking with HG. HG was significantly associated with low birth weight (p-value: 0.0133); small for gestational age (SGA) (p-value: 0.0316); APGAR score < 7 after 1 minute (p-value: 0.0060); and APGAR score <7 after 5 minutes (p-value: 0.0006). There is no association found between mode of delivery, gestational diabetes, and pregnancy-induced hypertension with HG.

**Conclusions:** HG can adversely affect fetal as well as maternal, though not significant, pregnancy outcomes.

**Keywords:** Adverse pregnancy outcomes, Fetal outcomes, Hyperemesis gravidarum, Maternal outcomes

## INTRODUCTION

Nausea and vomiting are among the commonest experiences by women during pregnancy. It may affect 70–80% of all pregnant women.<sup>1</sup> Majority of the pregnant women experiences nausea and vomiting mostly during the first trimester. Very limited number of limited women have a prolonged course with symptoms extending until delivery.<sup>2</sup> Most of the pregnant women with nausea and vomiting can self-manage their symptoms by avoiding triggering factors/food and adequate oral hydration.<sup>3</sup> The remaining pregnant women have more severe and protracted symptoms which leads to physical and

psychosocial sequelae.<sup>4</sup> This type of the most severe form of nausea and vomiting in pregnancy (NVP) is referred to as hyperemesis gravidarum (HG).<sup>5</sup>

According to World Health Organization, Hyperemesis gravidarum (HG) is characterised by severe NVP starting before the 22nd week of gestation and can occur with or without metabolic disturbances.<sup>6</sup> HG is the most common cause of hospitalization during the first half of pregnancy and is second only to preterm labor for hospitalizations in overall pregnancy in USA.<sup>7</sup> The prevalence of HG may varies from 0.3% to 3% of pregnancies depending on ethnic variation in study populations.<sup>7</sup> Pregnant women

of Western Europe had the lowest prevalence (0.8%) of HG, whereas those of India and Sri Lanka had the highest prevalence (3.2%) of HG.<sup>8</sup> Despite extensive research in this field, the mechanism of the disease is largely unknown.<sup>7</sup>

There are literatures available, which associate HG with adverse fetal pregnancy outcomes like low birth weight, pre-term birth, and small-for-gestational age (SGA) infants.<sup>9-11</sup>

But one of the same systematic review also not able to identified any association of HG with Apgar scores, congenital anomalies, or perinatal death.<sup>9</sup> HG causes emotional and psychological disturbances and can grossly adversely affect quality of life of pregnant women. HG can also affect behavioural and cognitive function, work capacity, household activities and interaction with children of pregnant women.<sup>12,13</sup> HG is associated with maternal weight loss, nutritional deficiencies, fluid and electrolyte abnormalities, which may lead to adverse fetal and maternal outcomes.<sup>14,15</sup>

The purpose of this study was to evaluate the relationship of hyperemesis gravidarum to maternal and foetal outcomes.

## METHODS

A hospital-based prospective observational study was carried out to analyse the impact of hyperemesis gravidarum on the maternal and fetal outcome. The study was conducted in Department of Obstetrics and Gynaecology, Sri Maharaja Gulab Singh (SMGS) Hospital, Jammu and Gastroenterology section of Department of Medicine, Govt. Medical College, Jammu between July 2010 to June 2012. The study was approved by Institutional Ethics Committee. Written informed consent was obtained from patient before enrolling them into the study.

### Inclusion criteria

- All patients with singleton pregnancy diagnosed as / history of hyperemesis gravidarum.
- The pregnant women with one or more antepartum hospitalizations for emesis, the first hospitalization must had occurred before 24 weeks of gestation considered as hyperemetic pregnancies.

### Exclusion criteria

- The pregnant women with multiple pregnancy, molar pregnancy, presence of pre-gestational diabetes, pre-gestational hypertension, and other causes of nausea such as appendicitis and pyelonephritis.

All the patients with hyperemesis gravidarum were admitted, examined for signs of dehydration, and were treated with intravenous fluids and antiemetics. Patients

were discharged after brief stay of 3-4 days in hospital after symptomatic improvement tolerating oral food intake. These patients were followed up throughout pregnancy and the maternal and fetal outcome were evaluated.

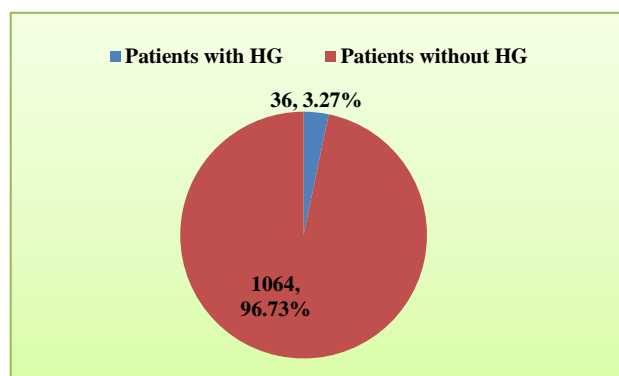
Birth weight; small for gestational age (SGA: the bottom tenth percentile for weight according to week of gestation and gender); pre-term delivery (birth before 37 weeks of gestation); 1 and 5-minute APGAR score were assigned as fetal outcomes. While, mode of delivery (caesarean section, vaginal), gestational diabetes, and pregnancy-induced hypertension were assigned as the maternal outcomes. All the data were recorded in case record form. The data was entered in the excel sheet. The data was analysed using descriptive statistics. The test variables were compared using Chi-square test for qualitative variables and Student's test for quantitative variables. The p-value <0.05 was considered statistically significant for difference and association between variables.

### Statistical analysis

Statistical analysis was performed using SPSS 16.0 software. Unpaired t-test was used to analyze continuous data. Categorical data was compared using Chi-square test. P <0.05 was taken as statistically significant. Relative risk was calculated for abnormal UA PI, UA RI, UA S/D, MCA PI and cerebral-umbilical PI ratio. Multivariate regression was used to analyze effect of multiple variables.

## RESULTS

Total 1100 pregnant women were screened during the study period. Based on the defined criteria for hyperemesis gravidarum (HG) for the present study, 36 pregnant women have been found to be suffering from HG. This give the overall prevalence of 3.28% of HG for the present study (Figure 1).



**Figure 1: Prevalence of hyperemesis gravidarum (HG).**

The most frequently affected (14, 38.89%) age-group with hyperemesis gravidarum was 20-24 years followed by age groups of 25-29 years (10, 27.78%) and 30-34

years (7, 19.44%). The age group of 20-24 years significantly (p-value: 0.0000) associated with development of hyperemesis gravidarum. Majority of pregnant women with hyperemesis gravidarum was of primipara.

The significant association (p-value: 0.0099) has been found between parity and hyperemesis gravidarum. Smoking habit is also significantly (p-value: 0.0132) associated with development of hyperemesis gravidarum (Table 1).

**Table 1: Background characteristics of the study participants.**

Characteristics	All patients (N=1100)		HG (N=36)		Chi-square value	p-value
	N	%	N	%		
<b>Maternal age</b>						
< 20 years	14	1.27	3	8.33	11.7890	0.0006**
20-24 years	122	11.09	14	38.89	25.5600	0.0000**
25-29 years	436	39.64	10	27.78	1.9404	0.1636
30-34 years	395	35.91	7	19.44	3.4442	0.0635
> 35 years	133	12.09	3	0.47	2.0758	0.4944
<b>Parity</b>						
Primipara	524	47.64	25	69.44	6.6389	0.0099*
Multipara	576	52.36	11	30.56		
<b>Smoking habit</b>						
Non-smokers	1048	95.27	31	86.11	6.1393	0.0132*
Smokers	52	4.73	5	13.89		

HG: hyperemesis gravidarum; \* p-value < 0.05: significant difference; \*\* p-value < 0.001: significant difference

**Table 2: Fetal outcomes of pregnancy in study participants.**

Fetal outcomes	All patients		HG		Chi-square value	p-value
	(N=1100)		(N=36)			
	N	%	N	%		
Low birth weight	366	33.27	19	52.78	6.1306	0.0133*
SGA	162	14.73	10	27.78	4.6209	0.0316*
Pre-term	314	28.55	15	41.67	2.9171	0.0876
APGAR score-1 minute < 7	62	5.64	6	16.67	7.5365	0.0060*
APGAR score-5 minute < 7	14	1.27	3	8.33	11.7890	0.0006**

HG: hyperemesis gravidarum; \* p-value < 0.05: significant difference; \*\* p-value < 0.001: significant difference

**Table 3: Maternal outcomes of pregnancy in study participants.**

Maternal outcomes	All patients		HG		Chi-square value	p-value
	(N=1100)		(N=36)			
	N	%	N	%		
Mode of delivery						
Caesarean section	378	34.36	10	27.78	0.6723	0.4123
Vaginal	722	65.64	26	72.22		
Gestational diabetes	62	5.64	3	8.33	0.2959	0.5865
Pregnancy-induced hypertension	48	4.36	3	8.33	0.9757	0.3233

HG: hyperemesis gravidarum

Fetal outcomes of pregnancy were depicted in table 2. According to table 2, development of hyperemesis gravidarum was significantly associated with low birth weight (p-value: 0.0133); small for gestational age (SGA) (p-value: 0.0316); APGAR score < 7 after 1 minute (p-value: 0.0060); and APGAR score < 7 after 5 minutes (p-value: 0.0006).

There is no association found between pre-term delivery and hyperemesis gravidarum. According to table 3 regarding maternal outcomes of pregnancy, no statistically significant association has been detected for gestational diabetes, and pregnancy-induced hypertension with hyperemesis gravidarum. Caesarean delivery rate in

pregnant women with hyperemesis gravidarum were similar to other pregnant women during study period.

## DISCUSSION

This prospective observational hospital-based study presents a comprehensive profile on the maternal and fetal outcome in pregnant women with hyperemesis gravidarum. Out of the total 1100 pregnant women were screened during the study period, 36 pregnant women have been found to be suffering from HG with prevalence of 3.28%. Different large population studies suggest the ethnic variation in the incidence of HG.<sup>7</sup> In a study based on the Medical Birth Registry of the of Norway from 1967-2005, overall prevalence of 0.9% has been found for HG.<sup>16</sup> According to ethnicity, prevalence of HG found in 2.2% of Pakastani women and 1.9% of Turkish women, both more than twice the incidence of 0.9% in Norwegian women.<sup>16</sup> Asian populations tend to have higher prevalence of HG. The prevalence rate of 3.9% and 3.6% has been found out in a Malaysian study and an Eastern Asian population study, respectively.<sup>17,18</sup> Pregnant women of Western Europe had the lowest prevalence (0.8%) of HG, whereas those of India and Sri Lanka had the highest prevalence (3.2%) of HG.<sup>8</sup>

The most frequently affected age-group with hyperemesis gravidarum was of 20-24 years. Almost half (17, 47.22%) of the pregnant women with HG had age less than 25 years in the present study. The age group of 20-24 years significantly associated with development of hyperemesis gravidarum. In the Norwegian study, maternal age of 20-24 years was more likely to develop HG.<sup>8</sup> The prevalence of HG gradually decreases with advancing age.<sup>19</sup> Majority of pregnant women with hyperemesis gravidarum was of primipara. The significant association has been found between parity and HG in the present study. Similar parity preponderance was found in many other studies including the large Norwegian cohort study.<sup>8,20</sup> The multiparous women can cope up the symptoms much easier based on their previous experience of pregnancy/s. Smoking habit is also significantly associated with development of hyperemesis gravidarum. HG is a multifactorial condition and has been associated with various risk factors.<sup>21</sup> Women with HG are more likely to be younger, primiparous, and alcoholics.<sup>22,23</sup> But smoking do not appear to differ significantly between women with HG and those without.<sup>23</sup>

In the present study, development of hyperemesis gravidarum was significantly associated with low birth weight; small for gestational age (SGA); APGAR score < 7 after 1 minute; and APGAR score < 7 after 5 minutes. There is no association found between pre-term delivery and hyperemesis gravidarum. Two large cohort studies reported that pregnant women with HG had low birth weight, and an increased rate of being SGA babies.<sup>10,24</sup> In a 10-year study of Norway, Vikanes et al. observed low birthweight among women with HG.<sup>20</sup> A Web site

registry based study, performed by Fejzo et al., involving 819 women with HG, 8% of the women reported low birth weight infants.<sup>25</sup> HG has been reported to be associated with an increased risk for adverse fetal outcomes, like, low birth weight, preterm birth, and small-for-gestational age infants.<sup>9-11</sup> A recent systematic review failed to identify association with APGAR scores, congenital anomalies, or perinatal death.<sup>9</sup>

Although, higher prevalence of gestational diabetes, and pregnancy-induced hypertension was found out in pregnant women with HG, the present study had found no association between mode of delivery, gestational diabetes, and pregnancy-induced hypertension with HG. Similar complicated pregnancy rates were found in control and HG groups in the study done by Kuru, et al.<sup>26</sup> The rate of pregnancy-induced hypertension in HG was similar to controls in their study as well as in study of Tan et al.<sup>21</sup> HG can be extremely debilitating for pregnant women. It can cause malnutrition, electrolyte imbalances, thrombosis, Wernicke's encephalopathy, depressive illness, and poor pregnancy outcomes.<sup>27-29</sup>

It is important for treating physicians to emphasize on early assessment of nausea and vomiting in pregnancy, which may prevent delay in diagnosis and management of HG. Any new interventions, however, must be shown to be safe from both a maternal and fetal point of view, to be acceptable to mothers, and to be cost-effective for reduction of adverse pregnancy outcomes.

## CONCLUSION

In conclusion, pregnant women with HG are more likely to be younger and primiparous. HG can adversely affect fetal outcomes – low birth weight; small for gestational age (SGA); APGAR score < 7 after 1 minute; and APGAR score < 7 after 5 minutes. Not significant but higher prevalence of gestational diabetes, and pregnancy-induced hypertension was found out in pregnant women with HG.

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