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ORIGINAL ARTICLE

Retrospective Analysis of Hyperemesis Gravidarum and Its Psychological Impact during Hospital Admission

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Abstract

Background The aim of this study was to evaluate hyperemesis gravidarum in pregnant women and its psychological impact.
Methods This retrospective study included 109 pregnant females suffering from hyperemesis gravidarum admitted during 2019–2020 at Maternity Ain shams university hospital.
Results Disease severity and laboratory investigations such as Na and K levels ($P = 0.007$ and < 0.001, respectively) and serum creatinine level ($P < 0.001$) were significantly positively correlated. Depressive symptoms included guilt feeling for leaving family (49.5% patients), suicidal thoughts (9.2%), crying (56.9%) and lost concentration (33.9%).
Conclusions Medical staff should be aware of psychological impact of the disease and refer to specialists if needed.

Keywords Anxiety · Depression · Hyperemesis gravidarum · Vomiting with pregnancy

Introduction

Every woman is unique and experiences different signs and symptoms during pregnancy [1]. Nearly 50–90% of pregnant females experience nausea and vomiting [2]. In a study, only 2% of females experienced vomiting and nausea during morning hours, and in 80% of them, these complaints were persistent throughout the day. However, this self-limiting condition peaks at around 9 weeks of gestation, and in most cases, symptoms typically cease at 20 weeks. In nearly 20% of cases, complaints of nausea and vomiting might continue till the time of delivery [2].

This condition of continuous and severe nausea and vomiting is termed as hyperemesis gravidarum and holds no pathological significance till the time pregnant female feels unwell or has restricted daily life [3]. As per definition of The International Statistical Classification of Disease and Related Health Problems, hyperemesis gravidarium is persistent and excessive vomiting starting before the end of 22nd gestational week and can be sub-divided into mild and severe, wherein in extreme cases leads metabolic alterations, ketonuria, dehydration, imbalance of electrolytes and weight loss [4, 5]. Similarly, the American College of Obstetricians and Gynecologists (ACOG) has given few criteria for the diagnosis of hyperemesis gravidarum: persistence of vomiting with no other related cause, acute starvation (Ketonuria present in urine analysis), abnormalities in the electrolyte and disturbances in acid–base balance, weight loss of 5%. Other abnormalities included mild increase in the level of amylase, lipase and other liver enzymes [6].

Hyperemesis gravidarum is also linked to ethnicity as nearly 4.5 times more immigrants and Asian people are more affected as compared to the native Germans [7, 8]. Also, young female, non-Caucasian, and nonsmoker primiparous mothers are prone to hyperemesis gravidarum [9].

Hyperemesis gravidarum has been correlated with a history of migraine, increased level of human chorionic gonadotropin level, vitamin B deficiency, gastroesophageal reflux disease [10]. A meta-analysis shows *Helicobacter pylori* infection associated with the development of hyperemesis gravidarum [11]. GDF15, a placenta and appetite hormone,

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and receptors such as GFRAL, PGR, and IGFBP7 also contribute to hyperemesis gravidarum [12].

Pregnancy-unique quantification of emesis and nausea scoring index was used to characterize hyperemesis gravidarum. This index considers the daily number of vomiting episodes, the length of nausea per day in hours, and the retching episodes number per day [13].

Hyperemesis gravidarum is associated with various adverse effects on pregnancy such as low birth weight, preterm birth and small-for-gestational age infants [14]. The treatment goal includes adequate replacement of fluids (normal saline or lactate ringer solution) and replacement of depleted electrolytes, especially magnesium, phosphate, and potassium. Staring antiemetic, proton pump inhibitors, anticoagulation during the period of hospital admission, thiamin replacement if needed, admission of corticosteroids if no response to previous medication [15].

Most of the researches related to hyperemesis gravidarium have focused on etiology and treatment options, with little focus on the experiences of patients during its management and consequences. This disease has a significant negative effect on the daily life activities of women and negatively impacts their quality of life, social life, working capabilities, relationships, and parenting [16]. It is also associated with a significantly high risk of depression and anxiety in pregnant women [17].

Few evidences are available regarding the consequences and management of psychological effects of hyperemesis during pregnancy, such as lack of social support and healthcare provisional. Therefore, in the present study, we aim to investigate pharmacological treatment of hyperemesis and further investigate different psychological impacts of this disease during hospital admission.

Materials and Methods

This retrospective study was conducted at Maternity Ain shams university hospital. Patients' inclusion criteria were antenatal mothers with a gestational age of 7–17 weeks and admitted in the hospital with complaints of hyperemesis gravidarum during 2019–2020. The study was approved by the Maternity Ain shams university hospital. Data recorded for the recruited patients included patient age, residence, obstetric history, history of any risk factors, gestational age on admission, and degree of severity. We also recorded the treatment received and any intervention needed the need for ICU admission and, condition of patient on discharge from the medical records of the Maternity Ain shams university hospital. Thereafter, a telephone-based survey was done via contact number mentioned in the records asking about the psychological impact they encountered during the hospital admission including their point of view regarding medical and social support, experience of depression and anxiety symptoms. It included verbal consent for conducting the study and psychiatric items as mentioned in the tables below.

Statistical Method

SPSS Inc., Chicago, Illinois, USA software was used for statistical analysis of the data. Mean ± standard deviation (SD) was used for expression of quantitative data and frequency and percentage were used for expression of qualitative data. Independent-samples t-test of significance was used for the analysis during comparison of two means. To compare proportions between qualitative parameters, we used Chi-square (χ^2) test of significance. 95% confidence interval was set and 5% error was accepted. $P < 0.05$ was considered significant, $P < 001$ was considered highly significant and $P > 0.05$ was considered insignificant.

Results

A total number of admissions in 2 years were 29,999. Total 109 patients were admitted as the cases of hyperemesis gravidarum with different degrees of severity which represented 0.004% of total admission. About 83.5% cases were moderate and 16.5% were severe cases. On admission 97% of cases had only hyperemesis and 3% was having associated medical conditions like Diabetes mellitus, Idiopathic thrombocytopenic purpra and jaundice with pregnancy.

Demographic data has been described in Table 1; mean age of the patients at the time of admission was 25.87 ± 4.41 years, 45.9% were from rural areas and 59% from urban areas. 3.6% of cases had medical disorders, 1.8% had history of molar pregnancy and 94.5 had no history of medical disorders with mean gestational age at time of admission as 10.91 ± 2.94 weeks.

Alanine transaminase (ALT) and aspartate transaminase (AST) are enzymes commonly found the liver. An increased level of these enzymes in blood corresponds to liver damage and can be monitored together through tests commonly referred to as liver function test (LFT). In this study 20 patients had abnormal liver functions test (16 case in moderate hyperemesis and 4 cases in severe conditions). Basal mean investigations on admission revealed the following: Hb (mg/dl) 11.76 ± 1.60, HCT 34.26 ± 4.67, Na 121.19 ± 37.74, K 3.44 ± 0.61, S.Cr. 1.50 ± 4.00, AST 66.29 ± 146.72 and ALT 72.84 ± 142.80. As for abnormal results on admission, 15.6% had abnormal Hb level, 17.4% had abnormal Na level, 6.4% had abnormal serum creatinine level, 13.8% and 18.3% had abnormal AST and ALT, respectively. Viral markers, viz. HBsAg, HCV AB and HAV AB, were negative in 94.5% of the cases.

Table 1 Distribution of patients according to their baseline characteristics age (n = 109)

Baseline characteristics	Total (n = 109)
Age (years)	
≤ 20 years	15 (13.8%)
> 20–25 years	39 (35.8%)
> 25–30 years	36 (33.0%)
> 30 years	19 (17.4%)
Range [Mean ± SD]	18–36 [25.87 ± 4.41]
Residency	
Rural	50 (45.9%)
Urban	59 (54.1%)
Parity	
PG	39 (35.8%)
Para 1	25 (22.9%)
Multipara	33 (30.3%)
CS	36 (33.0%)
Abortion	
1	24 (22.0%)
> 1	4 (3.7%)
Duration of marriage (year)	0.2–16 [4.26 ± 4.37]
GA (weeks)	7–19 [10.91 ± 2.94]
Past history: medical	
Diabetes mellitus	1 (0.9%)
On insulin	1 (0.9%)
Previous pregnancy ICU admission	1 (0.9%)
Rheumatic fever + tachycardia	1 (0.9%)
Vesicula mole	2 (1.8%)
No	103 (94.5%)
Past history: surgical	
Appendectomy	3 (2.8%)
Cholecystectomy	1 (0.9%)
Diagnostic laparoscopy + hemiarthroplasty	1 (0.9%)
History of supra umbilical hernial repair	1 (0.9%)
laparoscopic cholecystectomy	1 (0.9%)
Lt breast lumpectomy	1 (0.9%)
Tonsillectomy	3 (2.8%)
Tonsillectomy + appendectomy	1 (0.9%)
Missed	1 (0.9%)
No	95 (87.2%)
Duration of hospital stay	2–16 [5.61 ± 2.62]

The duration of hospital admission was from 2 to 16 days with mean 5.61 ± 2.62 days. Medication received during hospital admission included anti-emetics (96.3%), fluids (96.3%), proton pump inhibitors (95.4%), Corticosteroid (14.7%), K Infusion (11.9%), oral K (3.7%) and Oral Antibiotics (20.2%), Anticoagulant (100.0%), Vitamin B complex (74.3%), Nuerazin (6.4%), Liver support (0.9%) and Parenteral iron (0.9%).

Out of 109 cases of hyperemesis gravidarum, 18 cases were admitted to ICU (16.5%), 4 cases were discharged against medical advice (3.7%), 5 cases escaped (4.6%) and 100 cases were discharged after improvement in their conditions (91.7%), and there was no mortality found (Table 2).

The study showed positive correlation between the severity of the cases and duration of hospital admission with p-value < 0.001 (Fig. 1) and also positive correlation between severity and laboratory investigations abnormalities, especially electrolytes level (Na, K) with P value 0.007 and < 0.001, respectively, and serum creatinine level with P value < 0.001.

Regarding psychological impact on our patients during hospital admission, 58 cases had family support (63.7%), 52 cases had support from medical team (57.1%) and 28.8% were lacking medical team support. Depressive symptoms analysis revealed 46 cases had guilt feeling due to leaving their siblings (51.6%), 7 cases thought about suicidal attempt (7.7%), 46 cases suffered from crying (50.5%) and 33 cases had loss of concentration (36.3%). On the other hand, anxiety symptom analysis showed that 53 cases suffered from worry sensation (58.2%), 41 cases were nervous (45.1%) and 18 cases suffered from commotion (19.8%) (Fig. 2).

Table 2 Distribution of patients according to their ICU admission, condition at discharge and mortality (n = 109)

	Total (n = 109)
ICU admission	
No	91 (83.5%)
Yes	18 (16.5%)
Condition at discharge	
DAMA	4 (3.7%)
Escaped	5 (4.6%)
Improved	100 (91.7%)
Mortality	
No	109 (100.0%)

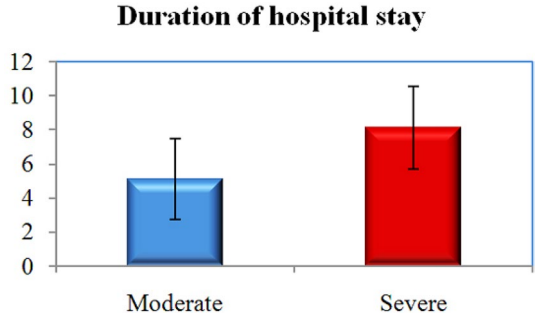

Fig. 1 Association between degrees of severity of hyperemesis according to duration of hospital stay

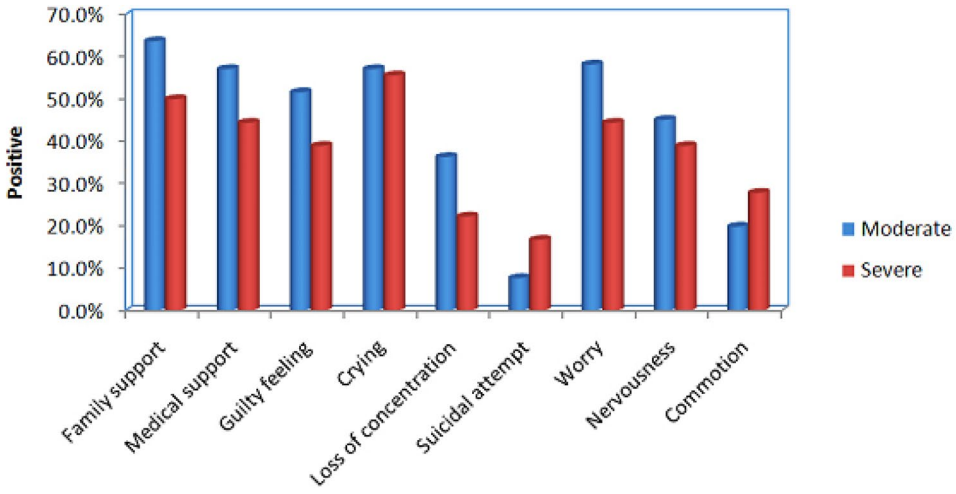

Fig. 2 Association between degrees of severity of hyperemesis according to their psychological impact of Hyperemesis gravidarum during hospital admission regarding depression symptoms

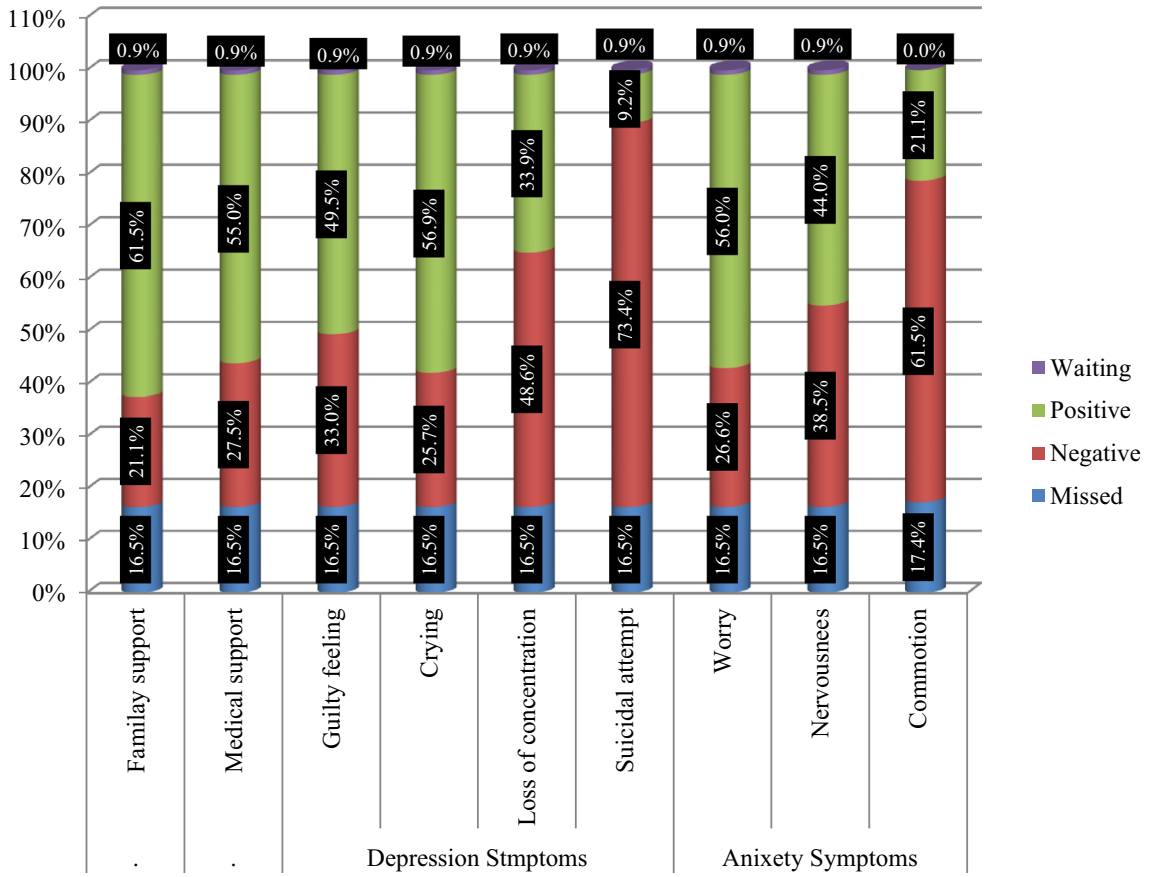

Fig. 3 Association between degrees of severity of hyperemesis according to psychological impact of hyperemesis in during hospital admission

Figure 3 revealed a statistically significant difference between degree of severity and depressive symptoms during hospital admission with *p*-value 0.011 with excessive crying and 0.048 with suicidal attempt thinking (Fig. 3).

Discussion

The data from the present study revealed that the prevalence of hyperemesis gravidarum was 0.004% in the recruited cohort, which was less when compared with the study done

by Vikanes et al. [18] who conducted the study among 900,074 primiparous patients from Norway within the age of 38 years and found this prevalence as 0.8%. Kjeldgaard et al. [19] also showed different results from our finding, wherein 0.9% of pregnant women in the recruited cohort were suffering from hyperemesis gravidarum. This discrepancy could be explained by the restriction in antenatal care cases in our hospital due to Covid 19 pandemic.

Regarding medical treatment, our findings were comparable to a cross-sectional study done by Havnen et al. on 107 Norwegian patients based on an online questionnaire. They have shown that antiemetics were used by > 90% of the pregnant females recruited for the study and frequently prescribed "as needed." Metoclopramide (71%) and meclizine (51%) were the most commonly used drugs. Our study has also analyzed that 96.3% of the recruited patients received antiemetics as the main line in the management [20]. However, reports have shown the controversial use of antiemetics for hyperemesis gravidarum due to the mentioned teratogenic risk of these drugs [21]. However, Koren and Levichek mentioned that this misconception of associated teratogenic risk could delay in initiation of pharmacotherapy [22]. When it comes to the treatment prescribed during pregnancy, the benefit versus risk trade-off should be considered for both the mother and the fetus, and hyperemesis gravidarum has been found to be associated in extreme cases with the feeling of pregnancy termination as an only option among females due to the severity of the symptoms. This clearly indicates that not initiating the treatment could be fatal for the fetus. Havnen et al. showed that 2/5 of the women thought about elective termination of pregnancy [20]. Considering these findings, the risk of using antiemetics is far lower.

We observed a positive correlation between the severity of the disease and electrolytes level (Na, K), which could be secondary to severe dehydration. Statistically significant associations of serum creatinine level with the severity of the disease were found, which has been shown in previous studies that hyperemesis gravidarum leads to acute kidney injury [23].

As for the psychological effects of hyperemesis gravidarum, we found more cases with depressive symptoms, crying, and suicidal attempt (51.6% and 7.7%, respectively), which were in agreement with the study by Senturk et al. [24] They reported that the patients were at an increased risk of depression during the first trimester and postpartum (95% CI 3.77–11.30).

On the contrary, Havnen et al. [20] did not report any case of depression or anxiety, but the psychological impact affected their daily activities, quality of life, and sociability. 7.5% of women reported a history of elective pregnancy termination due to hyperemesis gravidarum.

McCarthy et al. [25] found a correlation between hyperemesis gravidarum and altered cognitive, behavioral, and emotional aspects of pregnant women. The SCOPE study included 3423 nulliparous women of 15–20 weeks gestation. They measured State-Trait Anxiety Inventory (STAI) score, Perceived Stress Scale score, Edinburgh Postnatal Depression Scale score along with behavioral responses and found that pregnant women suffering from hyperemesis gravidarum have significantly higher scores than women without the disease. This further supported our data that hyperemesis gravidarum increases the risk of cognitive, behavioral, and emotional dysfunction in pregnancy.

Mitchell-Jones et al. found that nearly 49% of cases had probable depression and postnatal depression, while 29% of cases showed probable depression in our study. Regarding depression symptoms, 51.6% had guilt sensations, 50.5% suffered from crying, and 36.3% suffered from loss of concentration [26]. Our study also found a positive correlation between the severity of disease, duration of hospital admission, and effect on psychological impact.

The difference between our results and other studies could be that our study stressed on psychological impact during the time of hospital admission, in cases with hyperemesis only and did not encroach to postpartum period.

Overall, our study showed that hyperemesis gravidarum is significantly associated with psychological impacts like anxiety and depression. However, it was retrospective in nature; some data were missed and others could not be assessed like risk factors that may cause hyperemesis.

Conclusion

We found that the main line of treatment for hyperemesis gravidarum included antiemetics. Disease severity was significantly associated with increased serum creatinine, suggesting that severe hyperemesis gravidarum could cause acute kidney injury. Many women with hyperemesis gravidarum reported a lack of support from the medical support team. As for psychological impact is concerned, a strong association between anxiety and depression leads to severe illness. Data suggest that more awareness and knowledge is needed among healthcare workers for improving the care for patients of hyperemesis gravidarum. Optimal management of hyperemesis gravidarum requires a good understanding of the patient's perspective and providing psychological support accordingly.

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Author Contributions Protocol design: AMA; Data collection, analysis, and manuscript writing: RGElS; Manuscript writing: RMA.

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Data Availability Data can be shared if required.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical Approval The study was approved by the Institutional Review Board of Ain Shams University. We also recorded the treatment received and any intervention needed, need for ICU admission and condition of patient on discharge from the medical records of the Obstetrics and Gynecology Department, Ain Shams Maternity Hospital. The research protocols used in this research were approved by the local Institutional Review Board and in accordance with the Declaration of Helsinki.

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