Use Of The Modified Pregnancy -Unique Quantification Of Emesis Score To Evaluate The Need For Admission And Response To Treatment In Women With Hyperemesis Gravidarum

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Abstract

Objectives: To evaluate the usefulness of the modified Pregnancy Unique Quantification of Emesis (PUQE) score in monitoring the response to treatment and determining whether hospitalization is necessary for women with Hyperemesis Gravidarum (HG).

Methods: A cross-sectional study with a diagnosis of HG was conducted at Assiut University Women's Health Hospital. Two hundred women were admitted to the hospital with a diagnosis of HG. The modified PUQE score was recorded on admission and then daily until discharge. The demographic, obstetric, and clinical data of the patients were recorded.

Results: 142/150 of the admitted women for HG had severe emesis by the modified PUQE score. At discharge, two women still had moderate emesis. The modified PUQE score was significantly positively correlated to hematocrit value, serum AST, and potassium levels. Hematocrit was the only independent predictor of a high PUQE score. The score was also positively correlated to the duration of severe nausea and vomiting before admission and negatively correlated to the weight change from prepregnancy weight, but this lacked statistical significance. The score on admission was the strongest factor correlated to the days of admission and had a sensitivity of 71% and specificity of 87% in diagnosing the need for admission >5 days.

Conclusion:

The modified PUQE score can be used to assess the need for admission to the hospital and monitor the response to treatment.

Introduction

Nausea and vomiting of pregnancy (NVP) impacts as many as 80% of pregnant females (1). Nausea and vomiting during pregnancy (NVP) exhibit a wide range of severity levels, spanning from mild, sporadic nausea to severe, uncontrollable vomiting that necessitates medical attention at the hospital (2). About 0.3–3.6 percent of pregnant women develop hyperemesis gravidarum, the most severe form of NVP (3, 4, 5).

Based on a characteristic presentation and the absence of alternative diagnoses that could account for the observed symptoms, hyperemesis gravidarum is a clinical diagnosis of exclusion. A measure of acute starvation (often significant Ketonuria), prolonged vomiting unrelated to other reasons, and clear evidence of weight loss—typically a minimum of 5 percent of prepregnancy weight—are the criteria most frequently referenced. In addition, electrolyte, thyroid, and liver issues are occasional findings in this condition (6).

Admission for hyperemesis gravidarum depends on the attending physician's clinical assessment at our medical facility. Utilizing an objective and validated assessment of nausea and vomiting, such as the Pregnancy-Unique Quantification of Emesis (PUQE) score, is recommended by the Royal College of Obstetricians and Gynecologists (6). The original score asked about symptoms and effects on the quality of life in the last 12 hours, but it was later modified to encompass the last 24 hours. The score and its modification were widely used to assess patients with HG and monitor the response to treatment in inpatients (7, 8, 9).

However, using the PUQE score was not assessed in our setting. So, the study aims to assess the agreement between the modified PUQE score cut-off for the need to hospitalize the woman with the clinical

impression of the attending physician and the correlation between admission score and clinical/laboratory markers of severity. Also, the study aims to evaluate the role of the score in monitoring the response to treatment.

Materials And Methods

A cross-sectional study was conducted at the Department of Obstetrics and Gynecology (Women's Health Hospital), Assiut University, Assiut, Egypt. It was performed between October 2021 and October 2022.

Women were eligible to participate if they met two criteria and were hospitalized for hyperemesis gravidarum: dehydration, weight loss exceeding 5 percent of the prepregnancy weight (if known), or electrolyte imbalance/Ketonuria. The pregnant women also had a gestational age ranging from 6 to 16 weeks and consented to participate. At the time of admittance, women were initially excluded if they were afflicted with other illnesses that induce nausea and vomiting or if their gestational age exceeded 16 weeks. Women who met the exclusion criteria after enrollment were excluded from the research.

The sample size was calculated using Epi-Info7. According to the results of previous studies (3, 4, 5), the prevalence of HG was 3%. Based on this frequency and the finite population of 2000(expected patient flow/year), confidence limits of 1.5%, and a confidence level of 80%, an estimated 192 patients comprised the sample size required for the investigation. The Medical Ethics Committee of the Institutional Review Board of the Faculty of Medicine, Assiut University, Egypt, approved the study procedure (IRB No 17101433).

After the eligibility assessment, demographic, obstetric, and present conditions were recorded. Also, careful examination was done to assess severity (vital signs, Body mass index with change in weight from prepregnancy, mucous membrane, and skin turgor). The Arabic-modified PUQE score (6) was recorded.

Results of investigations in the patients' files were recorded as complete blood count, coagulation profile, liver & kidney enzymes, thyroid function tests, and HBA1C.

During the stay, the modified PUQE score was taken daily, the drugs were taken, and the feeding strategy was monitored. This continued until the day of discharge.

Data was analyzed using SPSS (Statistical Package for the Social Sciences, version 20, IBM, and Armonk, New York). Continuous data was expressed as mean ± SD or median (range), while nominal data was expressed as frequency (percentage). The significance of the Correlation of the PUQE score to clinical and laboratory findings was assessed by the Spearman correlation coefficient for continuous data and Fisher's exact test for categorical data. The ability of the modified PUQE score to diagnose stay > 5 days was assessed using the Receiver Operating Characteristic curve.

Results

From November 2021 to November 2022, 200 women were found to be eligible. After enrollment, 150 women were included in the study, and fifty women were excluded. Five women refused to participate after consenting, and 45 were excluded. Those were excluded for the following reasons: 15 cases were diagnosed as gastritis and peptic ulcer documented by upper endoscopy, 8 cases had pyelonephritis,7 cases were diagnosed as Thyrotoxicosis, 5 cases had undiagnosed diabetes mellitus with diabetic ketoacidosis and 10 cases had a miscalculation with a gestational age above 16 weeks (figure 1). Table [1] includes a summary of the baseline characteristics of the study group.

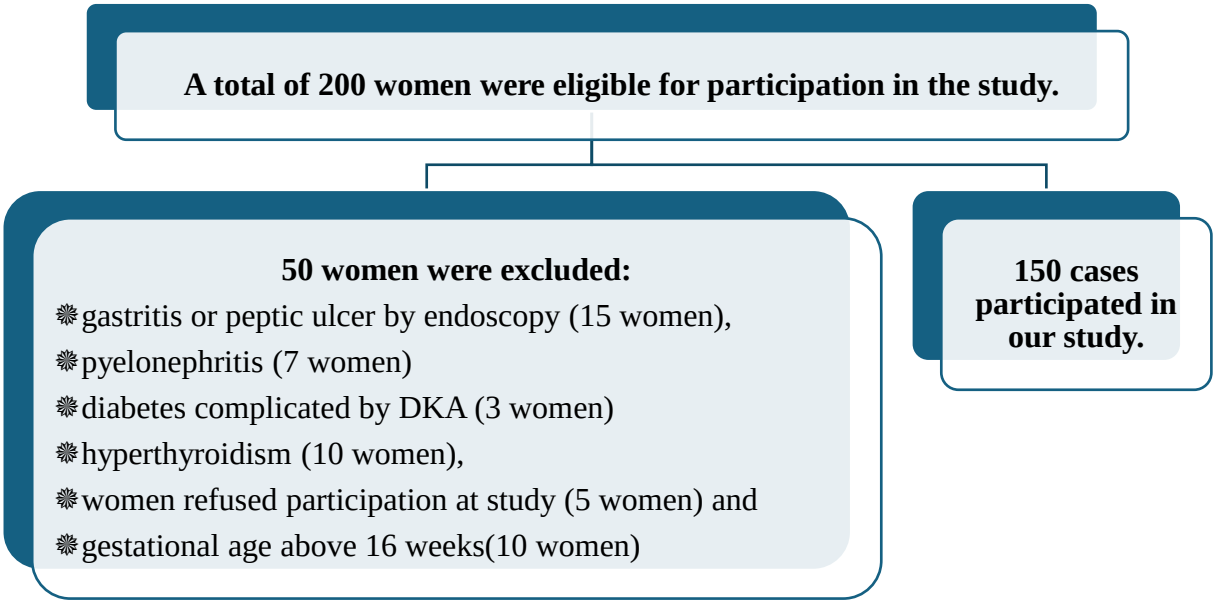

***Figure 1*: Flow chart of the current study**

Table 1 Demographic, medical, and obstetric history of the studied cases (n= 150)

		n= 150
Percentage of Smokers	9 (6 %)	
Social class	Low	59 (39.3 %)
	Middle	81 (54 %)
	High	10 (6.7 %)
HEG history	Positive	14 (9.3 %)
Type of pregnancy	Assisted conception	19(12.6 %)
No. of fetus	Singleton	130 (86.7 %)
	Multiple	19 (12.7 %)
	Molar	1 (0.7 %)
Age in years	Mean ± SD	27.6 ± 5.1
Parity	Median (IQR)	2 (2 - 3)
Gestational age in weeks	Mean ± SD	10.7 ± 2.3
Duration of nausea and vomiting in days	Mean ± SD	٣٢.4 ± 15.5
Duration of severe nausea and vomiting in days	Mean ± SD	17.7 ± 10.2

IQR: Inter quartile range, SD: Standard deviation, HEG: Hyperemesis gravidarum,

Examination and investigations' findings on admission in the study group

On admission, patients underwent a focused physical exam to evaluate the severity and complications of HG. Of special note is that a dry mucus membrane was found in only half the studied cases and poor skin turgor in 14.7% (Table 2). Also, Ketonuria was found in only 8 (5.3%) of women only.

Table 2: Examination of the studied cases

	n= 150
Mucous membrane (% dry)	74 (49.3 %)
Skin turgor (%Poor)	22 (14.7 %)
BMI Kg/m2(Mean ± SD)	25.8 ± 3.3
Weight Kg(Mean ± SD)	69.35 ± 9.95
Ketonuria(%positive)	8 (5.3 %)
HCT(Mean ± SD)	37.3 ± 5.7
AST (Mean ± SD)	41.23 ± 66.07
ALT(Mean ± SD)	37.9 ± 57.44
K (Mean ± SD)	3.47 ± 0.46
Na (Mean ± SD)	136.1 ± 3.03

SD: Standard deviation, BMI: Body mass index.

Score agreement with clinical impression for admission and discharge.

On admission, Using the modified Pregnancy-Unique Quantification of Emesis (PUQE) score, no patients suffered mild emesis, and 8 (5.3 %) patients suffered moderate emesis. In comparison, 142 (94.7 %) patients suffered severe emesis, with a score ranging from 10 to 15. At discharge, 148 (98.3 %) patients suffered mild emesis, 2 (1.7%) patients suffered moderate emesis, and no patients suffered severe emesis, with a score ranging from 4 to 12.

Correlation of the modified PUQE score on admission and some clinical and laboratory markers of severity:

An analysis of the modified PUQE score at admission concerning social class, age, parity, or gestational age in weeks did not reveal any statistically significant correlations. Meanwhile, a strong negative correlation was seen between serum potassium and the score, while a substantial positive correlation was limited to hematocrit and AST.

Table 3: Correlation of Modified PUQE score of the studied cases at the time of admission and current history, physical examination, and lab markers

	Score at the time of admission	
	Rs	P
Duration of nausea and vomiting in weeks	0.141	0.09
Duration of severe nausea and vomiting in days	0.100	0.212
BMI	0.031	0.704
Change in weight	-0.244	0.066
HCT	0.ᵒ	0.006*
AST	0.6	0.041*
ALT	0.1	0.171
K	-0.7	0.012*

Rs: spearman correlation, *: Statistically significant at $P \leq 0.05$, HCT: Hematocrit, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase, K: Potassium.

Correlation between Modified PUQE score at the admission of the studied cases and days of admission:

Modified PUQE score significantly correlated with days of admission (Spearman coefficient r = 0.8 and P value = 0.000).

PUQE score on admission can significantly discriminate long hospital stay (more than 5 days) (P = <0.001) with an AUC of 0.85. At a cut-off > 13.5, PUQE had a sensitivity of 97.6% and a specificity of 46.7%. At a cut-off value of 14.5%, the sensitivity was 71.4%, while specificity was 87%.

Discussion

The study showed that 142/150 of the admitted women for HG had severe emesis by the modified PUQE. At discharge, two women still had moderate emesis. The modified PUQE score was significantly positively correlated to hematocrit value, serum AST, and potassium levels. Hematocrit was the only independent predictor of a high PUQE score. The score was also positively correlated to the duration of severe nausea and vomiting before admission and negatively correlated to the weight change from prepregnancy weight, but this lacked statistical significance. The score on admission was the strongest factor correlated to the days of stay and had a sensitivity of 71% and specificity of 87% in diagnosing the need for admission >5 days.

The results of the study should be interpreted, given its limitations. Pre-admission information relied only on patient recall, which may be subjective, such as weight before pregnancy and severity of nausea and vomiting before admission. Also, follow-up after discharge was not feasible in our patient population, restricting the aims of our study to assessing the outcome from admission to discharge. The prospective design of the study is a merit.

The fact that the PUQE score was useful in guiding the need for admission and discharge agrees with previous reports. Three previous studies (1, 10, 11) showed improved PUQE scores after treatment (10). Moreover, a correlation was established between elevated PUQE scores, inadequate dietary intake, and diminished general well-being (10). Laitinen and colleagues concluded that Modified PUQE scores alleviated NVP severity in women hospitalized due to HG. Additionally, a reduction in the PUQE score was correlated with enhanced physical quality of life and, to a lesser extent, improved mental health. (1)

The correlation of the PUQE score to Hematocrit and serum potassium concurs with the contention that the PUQE score is a valid indicator of case severity. Previous reports showed a positive correlation to investigative results. Metabolic hyperchloremic alkalosis is characterized by Ketonuria, elevated hematocrit, hyponatremia, and hypokalemia, all related to NVP and HG. Metabolic acidosis may develop in extreme cases (6). 15–50 percent of individuals with hyperemesis have increased liver enzyme levels, which are typically below four times the upper limit of normal. (12)

Ketonuria was present in a minority of patients diagnosed with HG. Previous research has demonstrated no significant correlation between Ketonuria and extended hospital stays (13). A systematic review found no clinical utility of Ketonuria as a marker of severity of emesis. This is why the PUQE score replaced these markers as a basis for hospital admission (14)

Another finding of interest in this study was the highly positive correlation with days of stay (as a marker of improvement of symptoms). Laitinen and colleagues reported that PUQE scores decreased after two days of treatment from 12.4 to a mean value of 5.5 (1). This was also reported in a large multicenter study by Koot and colleagues, who found that the mean PUQE-24 score decreased from 10 on admission to 8 after one week (15). Women with persistently high symptom scores one week after admission can be identified using the PUQE-24 questionnaire; however, patient characteristics do not serve as predictors of the duration and severity of HG. Both concluded that the PUQE was a valid marker

for symptom improvement in the hospital (1, 15).

Conclusion

The modified PUQE score on admission was the strongest factor correlated to the days of stay and had a sensitivity of 71% and specificity of 87% in diagnosing the need for admission >5 days. The score was significantly positively correlated to hematocrit value, serum AST, and potassium levels. Hematocrit was the only independent predictor of a high PUQE score.

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