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Original Research Article

Clinical study assessing the severity of nausea and vomiting of pregnancy using PUQE score and pregnancy outcomes

Aditi R. Ramugade*, Shweta A. Khade, Vibha S. More

Department of Obstetrics and Gynecology, LTMMC and General Hospital, Sion, Mumbai, Maharashtra, India

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*Correspondence:

Dr. Aditi R. Ramugade,

E-mail: aditir264@gmail.com

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ABSTRACT

Background: Nausea and vomiting of pregnancy (NVP) is a common condition that varies from mild symptoms to severe hyperemesis gravidarum. The Pregnancy-Unique Quantification of Emesis (PUQE) score provides an objective assessment of symptom severity. This study evaluated the severity of NVP using the PUQE score and its association with maternal and fetal outcomes.

Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynaecology at a tertiary care hospital attached to a medical college after ethical approval. A total of 130 pregnant women aged 18–40 years with intrauterine pregnancy of less than 22 weeks presenting with nausea and vomiting were enrolled after informed consent. Demographic, obstetric, clinical, laboratory, and ultrasonographic data were recorded. Severity was assessed using the modified PUQE score. Participants were followed until delivery, and maternal and fetal outcomes were evaluated.

Results: Higher PUQE scores correlated with increased risk of maternal complications such as preterm birth, proteinuria, gestational hypertension, and persistent pelvic girdle pain, and hospital admission. Severe cases were also associated with adverse perinatal outcomes, including low birth weight and increased risk of preterm delivery, NICU admission whereas women with mild-to-moderate scores generally had favourable outcomes.

Conclusions: The PUQE score is a simple and effective tool to objectively assess NVP severity. Its use in clinical practice may help identify women at risk of complications, allowing timely interventions that improve maternal health and optimize fetal outcomes.

Keywords: Nausea and vomiting of pregnancy, Hyperemesis gravidarum, PUQE score, Fetomaternal outcomes

INTRODUCTION

Nausea and vomiting of pregnancy (NVP) is one of the most frequent medical problems in early gestation, affecting up to 80% of women.¹ Symptoms usually start within 2–4 weeks of conception, peak between 9 and 16 weeks, and resolve by 20–22 weeks in most cases.² Although often referred to as “morning sickness,” nearly all affected women experience symptoms throughout the day, which may disrupt daily functioning and psychosocial wellbeing.³ A minority develop hyperemesis gravidarum

(HG), reported in 0.3–2% of pregnancies and recognized as the most common reason for hospital admission in the first half of pregnancy.⁴ HG is characterized by persistent vomiting with weight loss, dehydration, ketonuria, and electrolyte imbalance, and may result in severe complications such as Wernicke’s encephalopathy or hepatic and renal dysfunction.⁵

The etiology of NVP and HG is multifactorial, with hormonal, genetic, and psychosocial factors implicated. Higher levels of human chorionic gonadotropin (hCG), as

seen in multiple gestations and trophoblastic disease, are associated with increased severity.⁶ To standardize assessment, the Pregnancy-Unique Quantification of Emesis (PUQE) score was developed as a simple tool to grade symptoms over 24 hours. It has since been validated as a reliable measure of severity, useful for clinical management and research.⁷ Thus, this report presents clinical study of NVP, highlighting the role of the PUQE score in objective assessment and its implications for maternal and fetal outcomes.

METHODS

This prospective observational study, titled “Clinical Study Assessing the Severity of Nausea and Vomiting of Pregnancy Using PUQE Score and Its Association with Maternal and Fetal Outcome”, was conducted in the Department of Obstetrics and Gynaecology at a tertiary care hospital after obtaining ethical approval during the period January 2023 to June 2024.

A total of 130 pregnant women aged 18-40 years with intrauterine pregnancies <22 weeks gestation presenting with nausea and vomiting were enrolled after providing informed consent. Exclusion criteria included unmarried women, ectopic pregnancies, and nausea or vomiting due to non-obstetric causes. The sample size was calculated based on a reported prevalence of NVP of 33% (Arthur C et al), with 95% confidence limits and 8.25% absolute precision.

Demographic and obstetric data, comorbidities, and clinical parameters including vitals, body mass index, and systemic examination findings were recorded. Laboratory investigations including complete blood count, blood glucose, thyroid profile, serum electrolytes, liver and renal function tests and ultrasonography findings were noted from patient records. Severity of nausea and vomiting was assessed using the modified PUQE score, and treatment details were documented. All participants were followed until delivery to record maternal and fetal outcomes, including mode of delivery and gestational age at birth. Data were entered into Microsoft Excel and analyzed using SPSS version 22.0. Continuous variables were summarized as mean $\pm$ standard deviation, and categorical variables as frequencies and percentages. Associations between variables were analyzed using the Chi-square test, with a significance level set at $p < 0.05$.

RESULTS

An investigation was conducted on 130 women at a tertiary care hospital to evaluate the severity of nausea and vomiting of pregnancy (NVP) using the PUQE score and its relationship with maternal and fetal health outcomes.

Participant demographics and clinical findings

The study population had a mean age of 23.18 years, with a high incidence of NVP observed in younger women (≤ 20

years, 43.1%), with majority being primigravida (74.6%). Most women presented between 6 and 9 weeks of gestation (45.4%). Individual PUQE components revealed that nausea lasting 4-6 hours (39.2%), vomiting 7 or more times (41.5%), and 3-4 episodes of retching (36.2%) were the most frequently reported. Clinical examination findings frequently included positive urine ketones (18.5%), followed by tachycardia (16.1%) and signs of dehydration (15.4%). Among the 28 high-risk patients who received a Doppler ultrasound, 42.9% had abnormal results, with 9 cases of Stage 1 Intrauterine Growth Restriction (IUGR) and 3 cases of Stage 2 IUGR (Table 1).

PUQE scores and delivery outcomes

The study cohort reported that the most prevalent PUQE score was moderate (64.6%), while severe symptoms were found in 33.8% of the women. A small proportion experienced mild symptoms (1.5%). There was a significant association between PUQE severity and gestational age at delivery ($p < 0.001$). Preterm births were predominantly seen in the severe PUQE group (66.7%), compared with 33.3% in the moderate group, while no preterm births occurred in the mild group. Mode of delivery was not significantly associated with PUQE severity ($p = 0.314$), although LSCS was more frequent in the severe group (29.5%) compared with the moderate group (14.3%) (Table 2).

Maternal and perinatal outcomes

A statistically significant link was observed between higher PUQE scores and several adverse maternal outcomes ($p < 0.001$). Women with severe PUQE scores had a higher likelihood of preterm birth (50.0%), proteinuria (40.9%), gestational hypertension (29.5%), and persistent pelvic girdle pain (27.3%). In contrast, no significant relationship was found between PUQE scores and either the mode of delivery or gestational diabetes mellitus.

Higher PUQE scores also showed a strong correlation with adverse perinatal outcomes ($p < 0.001$). Infants born to mothers with severe NVP symptoms demonstrated a higher incidence of low birth weight (54.5%), were more frequently small for gestational age (22.7%), and required NICU admission (52.3%) (Table 3, Figure 1, Table 4 and Figure 2).

Management strategies

Management strategies were adapted based on the severity of symptoms. Lifestyle and dietary modifications were implemented exclusively for all mild cases (100%).

Most moderate cases (86.9%) were managed in an outpatient setting, whereas all severe cases (100%) and those who did not respond to outpatient care required inpatient admission (Table 5 and Figure 3).

Table 1: Demographic characteristics of study subjects (n=130).

Characteristics	n=130	%
Maternal age (years)		
≤20	56	43.1
21-25	37	28.5
26-30	21	16.2
31-35	16	12.3
Mean (SD)	23.18 (4.83)	
Range	18-35	
Parity		
Primigravida	97	74.6
Multigravida	33	25.4
Gestational age (weeks)		
6-9	59	45.4
9-12	50	38.5
12-15	21	16.2

Table 2: Association of delivery outcomes with PUQE scoring (n=130).

Characteristics	Category	PUQE scoring: mild (n=2) N (%)	PUQE scoring: moderate (n=84) N (%)	PUQE scoring: severe (n=44) N (%)	Overall P value
Gestational age at delivery (weeks)					<0.001*
	34+1 to 37	–	11 (33.3)	22 (66.7)	
	37+1 to 40	2 (2.1)	73 (75.3)	22 (22.7)	
Mode of delivery					0.314
	Spontaneous vaginal	2 (100.0)	58 (69.0)	26 (59.1)	
	Induced	–	22 (26.2)	7 (15.9)	
	Assisted vaginal	–	6 (7.2)	–	
	LSCS	–	12 (14.3)	13 (29.5)	

The proportion of preterm births was overwhelmingly concentrated in the Severe PUQE group (66.7% of all preterm births in the cohort).

Table 3: Association between severity of PUQE scoring with maternal outcome (n=130).

Maternal outcome	PUQE scoring N (%)			P value
	Mild (n=2)	Moderate (n=84)	Severe (n=44)	
Preterm birth	-	11 (13.1)	22 (50.0)	<0.001*
Proteinuria	-	4 (4.8)	18 (40.9)	<0.001*
Gestational hypertension	-	1 (1.2)	13 (29.5)	<0.001*
GDM	-	7 (8.3)	-	0.132
Persistent pelvic girdle pain	-	6 (7.14)	12 (27.27)	<0.001*

Chi-square test, p value *-Significant.

Table 4: Association between severity of PUQE scoring with perinatal outcome (n=130).

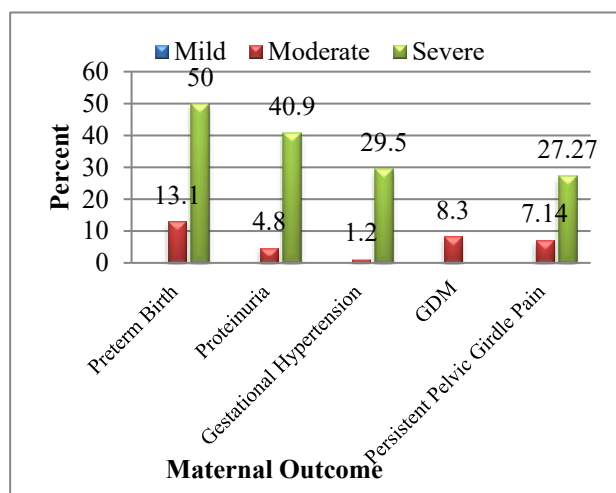
Perinatal outcome	PUQE scoring N (%)			P value
	Mild (n=2)	Moderate (n=84)	Severe (n=44)	
Low birth weight	-	12 (14.9)	24 (54.5)	<0.001*
Small for gestational age	-	3 (3.57)	10 (22.7)	0.003*
NICU admission	-	10 (11.9)	23 (52.3)	<0.001*

Chi-square test, p value *-Significant.

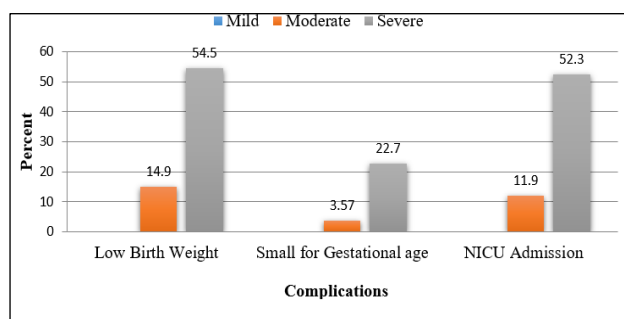
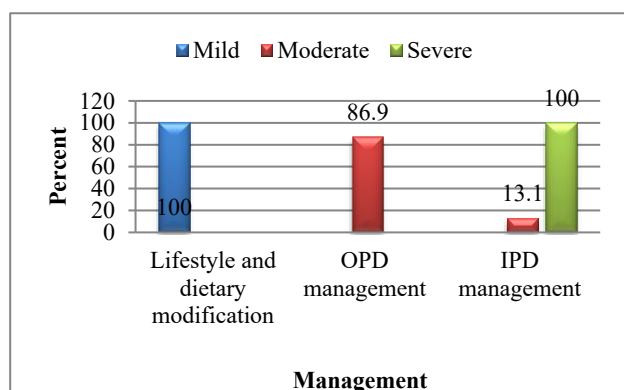
Table 5: PUQE scoring and management approaches.

Management	PUQE scoring N (%)			P value
	Mild (n=2)	Moderate (n=84)	Severe (n=44)	
Lifestyle and dietary modification	2 (100.0)	-	-	<0.001*
OPD management	-	73 (86.9)	-	
IPD management	-	11(13.1)	44 (100.0)	

Chi-square test, p value *-Significant.

**Figure 1: PUQE scoring and maternal outcome.**

Note: *-No significant association was found for Gestational Diabetes Mellitus (GDM, $p=0.132$) or Mode of Delivery ($p=0.314$).

**Figure 2: PUQE scoring and perinatal outcome.****Figure 3: PUQE scoring and management.**

DISCUSSION

This study evaluated the clinical utility of the PUQE score in assessing the severity of nausea and vomiting of pregnancy (NVP) and its association with maternal and fetal outcomes. Our findings provide valuable insights into the demographic profile, symptom burden, and clinical management of NVP in our patient population.

Demographics and clinical presentation

Participants in the study had a mean age of 23.18 years, with a high incidence of NVP observed in younger women (≤ 20 years, 43.1%). This finding aligns with previous studies that report a greater prevalence of severe NVP among younger women.^{8,9} The majority of our cohort were primigravida (74.6%), a result that is consistent with the established understanding that first-time pregnancies carry a higher risk for NVP.¹⁰ Most women presented with symptoms early in their gestation, between 6-9 weeks, which corresponds to the period of peak human chorionic gonadotropin (hCG) levels. This is in accordance with other research indicating that symptoms typically subside before the end of the second trimester.¹¹

Symptom severity and outcomes

The PUQE score proved to be an effective tool for quantifying symptom severity. A substantial portion of the cohort reported moderate (64.6%) to severe (33.8%) symptoms, with a majority experiencing prolonged daily nausea and frequent vomiting. This highlights the significant impact of NVP on a patient's quality of life. We found a strong association between higher PUQE scores and a range of adverse maternal outcomes ($p<0.001$). Women with severe NVP were significantly more likely to experience preterm birth, proteinuria, gestational hypertension, and persistent pelvic girdle pain. These findings are supported by evidence suggesting that severe NVP, with its associated dehydration and electrolyte imbalances, can lead to systemic complications.¹² For instance, dehydration can affect kidney function, increasing the risk of proteinuria, while fluid and electrolyte shifts may disrupt cardiovascular regulation, potentially leading to gestational hypertension. Our results are consistent with previous studies by McCarthy et al and Chortatos et al who reported similar associations. Our analysis also revealed a significant link between higher PUQE scores and adverse perinatal outcomes ($p<0.001$). Infants born to mothers with severe NVP had a higher

incidence of low birth weight, small for gestational age, and required NICU admission. These negative outcomes are likely attributable to the physiological stress on the maternal body. Persistent vomiting and dehydration can impair the flow of nutrients and oxygen to the fetus, potentially leading to placental insufficiency and restricted fetal growth. While our findings on preterm birth and low birth weight are consistent with some studies the literature on this topic is not entirely uniform.¹³ These discrepancies may be due to differences in study design, population demographics, or the clinical definition of NVP.

Management strategies

The PUQE score was instrumental in guiding clinical management. The treatment approach was directly tailored to symptom severity, with mild cases managed with lifestyle changes, moderate cases handled primarily in an outpatient setting, and all severe cases requiring inpatient management. This validates the PUQE score as a practical and effective tool for triaging patients and predicting the level of care needed.¹⁴

CONCLUSION

This prospective clinical investigation confirms that the Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) score is a highly valuable and practical tool for objectively assessing NVP severity. We present robust statistical evidence of a significant association between increasing PUQE scores and adverse maternal and perinatal outcomes (all major outcomes $p < 0.001$). Thus, the PUQE score proves to be a practical and valuable tool for the early identification of high-risk pregnancies. We recommend its routine use in prenatal care to facilitate early intervention and implement tailored management strategies, which may ultimately improve both maternal well-being and infant health. Future research should investigate the long-term effects of severe NVP and focus on developing optimized treatment protocols.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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