# Assessment of Anxiety Complaint: Concerning PUQE Score of Nausea and Vomiting in the First Trimester

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## ABSTRACT

**Background:** Hyperemesis gravidarum (HG), a more serious variant of nausea and vomiting during pregnancy (NVP), significantly impacts family life, social functioning, daily activities, and the intent to have more children.

**Objectives:** To assess the correlation between the grade of nausea and vomiting in the first trimester of pregnancy [assessed by pregnancy unique quantification of emesis score (PUQE score)] and the degree of anxiety [assessed by General Anxiety Disorder assessment questionnaire (GAD-7 questionnaire)].

**Patients and methods:** This was a prospective cross-sectional study conducted at Department of Obstetrics and Gynecology, Menoufia University Hospital from June 2023 to April 2024. The study comprised 104 pregnant women in the first trimester complaining of NVP. For each participant, total PUQE-24 score was computed. Accordingly, participants were divided into 3 groups: mild NVP (4 – 6), moderate NVP (7 – 12), and severe (≥13, also known as HG). Additionally, GAD-7 questionnaire was completed by all participants and accordingly, the anxiety degree was categorized into 4 groups: minimal anxiety (0–4), mild anxiety (5–9), moderate anxiety (10–14), and severe anxiety (15–21). Then, the correlation between degree of NVP and anxiety level was investigated.

**Results:** The mean age was 27.29 ±5 years, the mean BMI was 22.51 kg/m$^2$ and the mean gestational age was 10.16±2.31 weeks. Regarding PUQE Score, it was mild grade in 63.5% of cases (66/104), moderate grade in 36.5% of cases (38/104) and none of the participants experienced a severe degree of PUQE Score. Regarding GAD-7, minimal, mild and severe GAD-7 grades were observed in 87.5%, 11.5 % and 1% of cases respectively. There was a statistically significant correlation between PUQE scores and GAD-7 questionnaire scores.

**Conclusion:** There was a significant correlation between the grade of nausea and vomiting in the first trimester of pregnancy (assessed by PUQE score) and the degree of anxiety (assessed by GAD-7 score), however the majority of cases (87.5%) developed minimal anxiety disorder.

**Keywords:** PUQE, Vomiting, GAD-7 anxiety.

## INTRODUCTION

Pregnant women commonly encounter a range of symptoms related to nausea and vomiting in first trimester, commonly referred to as morning sickness, and the severity of these symptoms can range from moderate to severe [(1)].

Vomiting and nausea usually occur between the 5$^{th}$ and 18$^{th}$ weeks of gestation. Pregnant women who have severe nausea and vomiting may develop HG, a syndrome different from the more frequent NVP, with a triad of symptoms including dehydration, weight loss of more than 5%, and electrolyte imbalances. If untreated, HG can cause higher maternal and fetal morbidity [(2)].

HG is less common in comparison to NVP and happens in approximately 0.3% to 2% of all pregnancies. There may be a variation in the degree of complaints among pregnant women indicating the influences of psychological, biological, and genetic factors [(3)]. Several trials have examined the correlation between NVP and anxiety with contradictory findings. Also, the majority of research had certain limitations including lack of objective and standardized diagnostic criteria. The investigation's goal was to evaluate the correlation between NVP assessed by the PUQE score and anxiety level assessed by the GAD-7 questionnaire.

## PATIENTS AND METHODS

The current cross-sectional study was performed on 104 pregnant women who were chosen from antenatal ward and outpatient clinic of Obstetrics and Gynecology Department, Faculty of Medicine, Menoufia University.

**Inclusion criteria:**

- First-trimester pregnant women complaining of NVP.
- The age ranged from 18 to 40 years.

**Exclusion criteria:**

- History of a recognized illness (e.g., gastrointestinal sickness and endocrine imbalances).
- Recognized psychiatric disorders, present or past, (e.g., psychotic illness, eating disorders, delirium, bipolar disorder, anxiety, and depression)
- Multiple pregnancies.
- Known obstetric complications (miscarriage, gestational trophoblastic disease, ectopic pregnancy, or non-viable pregnancy).
- Medications (like anti-psychotic, antidepressant in the previous 6 months or use of narcotics or illegal drugs that could influence the outcomes of the study.
- History of cognitive impairment or difficulty understanding how to complete the GAD-7 questionnaire.

**Study procedures and intervention:**

- Pregnant women complaining of NVP in the first trimester were enrolled.
- Eligible patients were underwent through history taking, examination, and investigations (serum creatinine, SGPT, SGOT, potassium, serum sodium, urine acetone, complete blood count, and ultrasound).
- Each patient's total PUQE-24 score was computed (Table 1). Accordingly, patients were divided into 3



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groups: mild NVP (4 – 6), moderate NVP (7 – 12), and severe (≥13, also known as HG).

**Table (1): PUQE-24 Score.**

| | | | | |
|---|---|---|---|---|
| **Q1.** In the last 24 hours, for how long have you felt nauseated or sick to your stomach? | | | | |
| Not at all **(1)** | 1 hour or less **(2)** | 2-3 hours **(3)** | 4-6 hours **(4)** | More than 6 hours **(5)** |
| **Q2.** In the last 24 hours have you vomited or thrown-up? | | | | |
| I did not vomit **(1)** | 1-2 times **(2)** | 3-4 times **(3)** | 5-6 times **(4)** | 7 or more times **(5)** |
| **Q3.** In the last 24 hours, how many times have you had retching or dry heaves without throwing up? | | | | |
| None **(1)** | 1-2 times **(2)** | 3-4 times **(3)** | 5-6 times **(4)** | 7 or more times **(5)** |

- Each patient's GAD-7 questionnaire was computed (Table 2). GAD-7 total score for the seven questions ranges from 0 to 21. Accordingly, the anxiety degree was categorized into 4 groups: minimal anxiety (0–4), mild anxiety (5–9), moderate anxiety (10–14), and severe anxiety (15–21).

**Table (2): GAD-7 questionnaire score.**

| | Not at all | Several days | More than half the days | Nearly every day |
|---|---|---|---|---|
| | **0** | **1** | **2** | **3** |
| **Q1** Feeling nervous, anxious, or on edge | | | | |
| **Q2** Not being able to stop or control worrying | | | | |
| **Q3** Worrying too much about different things | | | | |
| **Q4** Trouble relaxing | | | | |
| **Q5** Being so restless that it is hard to sit still | | | | |
| **Q6** Becoming easily annoyed or irritable | | | | |
| **Q7** Feeling afraid, as if something awful might happen | | | | |

**Sample size estimation:**

Anxiety disorders were shown to be 6.7 times more common in HG patients than in controls, according to a prior study **Topalahmetoğlu *et al.*** [4]. According to the Open Epi calculator [5], the sample size needed to analyze the current research's data with a significant P < 0.05 and an 80% power of study is determined. Additionally, 104 participants were the minimum total sample size after accounting for a 10% drop-out rate.

**Ethical approval:**

**This study has been approved by the Menoufia Faculty of Medicine's Medical Ethics Committee. Following receipt of all information, signed consent was provided by each participant. The Helsinki Declaration was adhered to at every stage of the investigation.**

***Statistical analysis***

SPSS version 15.0 was used to analyze the gathered data. Categorical data were presented as numbers or percentages, while for continuous variables, mean and standard deviation (SD) were used. Statistical significance was considered as a two-tailed p-value less than 0.05.

**RESULTS**

The majority of the participants (93%) were with low parity (primigravida up to para 2). Also, it was observed that about ⅔ of the participants showed no history of miscarriage **(Table 3)**.

**Table (3): Socio-demographic and clinical data of the study population.**

| | | |
|---|---|---|
| **Age (years)** Mean±SD | | 27.29±5.00 |
| **BMI(Kg/m$^2$)** Mean±SD | | 22.51±4.35 |
| **Gestational age (Weeks)** Mean±SD | | 10.16±2.31 |
| **Parity N (%)** | **Primigravida** | 34(32.7%) |
| | **1** | 34(32.7%) |
| | **2** | 25(24%) |
| | **3** | 8(7.7%) |
| | **4** | 2(1.9%) |
| | **5** | 1(1.0%) |
| **Miscarriage N (%)** | **0** | 74(71.2%) |
| | **1** | 13(12.5%) |
| | **2** | 9(8.7%) |
| | **3** | 6(5.8%) |
| | **4** | 1(1.0%) |
| | **5** | 1(1.0%) |

The mean PUQE score among the study population was 5.88 ±2.47. Approximately ⅔ of the participants experienced a mild degree at the PUQE score, and only about ⅓ experienced a moderate degree at the PUQE score. None of the participants experienced a severe degree at the PUQE Score **(Table 4)**.

**Table (4): Pregnancy Unique Quantification of Emesis score (PUQE score) among the study population**.

| | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| | **N (%)** | **N (%)** | **N (%)** | **N (%)** | **N (%)** |
| **Q1** | 25 (24.04%) | 28 (26.92%) | 20 (19.23%) | 13 (12.5%) | 18 (17.31%) |
| **Q2** | 44 (42.31%) | 23 (22.12%) | 18 (17.31%) | 11 (10.58%) | 8 (7.68%) |
| **Q3** | 104 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| **Total PUQE-24 score** | | | | | |
| **Grade** | | | **N (%)** | | |
| **Mild** | | | 66 (63.5%) | | |
| **Moderate** | | | 38 (36.5%) | | |
| **Severe** | | | 0 (0.00%) | | |

**Table (5)** shows General Anxiety Disorder assessment questionnaire score (GAD-7 questionnaire score) among the study population. The mean GAD-7 score among the study population was 2.19. The majority of the participants (87.5%) developed minimal anxiety disorder, and only 1 percent was at the severe form of the GAD-7 score.

**Table (5): General Anxiety Disorder assessment questionnaire (GAD-7 questionnaire score) among the study population.**

| | **0** Not at all | **1** Several days | **2** More than half the days | **3** Nearly every day |
|---|---|---|---|---|
| | **N (%)** | **N (%)** | **N (%)** | **N (%)** |
| **Q1** Feeling nervous, anxious, or on edge | 39 (37.5%) | 45 (43.3%) | 19 (18.3%) | 1 (0.9%) |
| **Q2** Not being able to stop or control worrying | 58 (55.77%) | 34 (32.69%) | 11 (10.58%) | 1 (0.9%) |
| **Q3** Worrying too much about different things | 88 (84.62%) | 12 (11.53%) | 4 (3.85%) | 0 (0%) |
| **Q4** Trouble relaxing | 92 (88.46%) | 11 (10.58%) | 0 (0%) | 1 (0.9%) |
| **Q5** Being so restless that it is hard to sit still | 100 (96.15%) | 3 (2.88%) | 1 (0.9%) | 0 (0%) |
| **Q6** Becoming easily annoyed or irritable | 70 (67.31%) | 27 (25.96%) | 7 (6.73%) | 0 (0%) |
| **Q7** Feeling afraid, as if something awful might happen | 102 (98.08%) | 2 (1.94%) | 0 (0%) | 0 (0%) |

| **Total GAD-7 score** | |
|---|---|
| **Grade** | **N (%)** |
| **Minimal** | 91(87.5%) |
| **Mild** | 12(11.5%) |
| **Moderate** | 0(0.00%) |
| **Severe** | 1(1.00%) |

**Table (6)** shows the correlation between PUQE score and GAD-7 questionnaire score. There was a statistically significant positive correlation between PUQE and GAD-7 scores.

**Table (6): Correlation between PUQE score and GAD-7 questionnaire score.**

| | **GAD-7 questionnaire score** | |
|---|---|---|
| **PUQE score** | **Spearman's rho** 0.341 | **P-value** **<0.001**** |

******** *Highly significant*

**Table (7)** shows the correlation between PUQE score and GAD-7 questionnaire score with demographic and clinical data. When investigating the possible effects of many clinical and socio-demographic parameters on developing nausea and vomiting during pregnancy, all these parameters (age, BMI, parity and previous miscarriage) were determined to be unrelated. Predictive variables for developing anxiety disorder in pregnant women with nausea and NVP were also investigated and found that lower BMI was another significant contributor to anxiety disorder. There was a statistically significant negative correlation among GAD-7 and BMI**.**

**Table (7): Correlation between PUQE score, GAD-7 questionnaire score, demographic and clinical data.**

| | **PUQE score** | | **GAD-7 questionnaire score** | |
|---|---|---|---|---|
| | **Spearman's rho** | **P-value** | **Spearman's rho** | **P-value** |
| **Age** | 0.036 | 0.722 | 0.096 | 0.335 |
| **BMI** | -0.133 | 0.184 | -0.206 | **0.038*** |
| **Parity** | -0.074 | 0.459 | -0.075 | 0.455 |
| **Miscarriage** | -0.195 | 0.05 | -0.180 | 0.071 |
| **Gestational age (weeks)** | 0.065 | 0.518 | -0.124 | 0.215 |

## DISCUSSION

According to the psychological hypothesis explaining the pathophysiology of HG, HG may result from either somatization disease or the patient's increased reaction to stress [6].

Furthermore, as NVP adversely impacts the mental and psychological health of pregnant women, this study aimed to assess correlation between NVP assessed by PUQE score, and anxiety assessed by the GAD-7 questionnaire.

The PUQE is the only particular severity index utilized in the case of NVP [7,8]. The NVP's severity, which may be mild, moderate, or severe, can be ascertained using the PUQE score, which can also be used to monitor the effectiveness of therapy [9].

In the current study, the mean age was 27.29 ±5 years. The mean BMI was 22.51 kg/m$^2$. Mean gestational age was 10.16±2.31 weeks. The majority of the participants (93%) were with low parity (primigravida up to para 2). Also, it was observed that about ⅔ of the participants showed no history of miscarriage.

The current study supported **Beyazit and Sahin's** [10] result that the average mother age in the study group was 28.4±5.5 years. The average gestational age of the subjects was 11.1 ± 2.1 weeks. Our findings were consistent with **Lacasse *et al.*** [11] who observed that the average age of participants was 32±4.6 years and the average gestational age at enrollment was 11±1.7 weeks. In 65.33% of patients, the BMI ranged from 18.5 - <25 kg/m$^2$.

In the present study, the score for PUQE was of mild grade in 63.5% of cases (66/104) and of moderate grade, in 36.5% of cases (38/104). None of the participants experienced a severe degree at the PUQE Score. Regarding the General Anxiety Disorder assessment (GAD-7) questionnaire score in our study, the majority of the participants (87.5%) developed minimal anxiety disorder, and only 1 percent was at the severe form of the GAD-7 score. Furthermore, there was a statistically significant positive correlation among PUQE and GAD-7.

These results are in line with some earlier research [10–13]; however, several other investigations were unable to show a connection between the severity of HG and anxiety [14]. Also, **Bozzo *et al.*** [14] found no significant connection between NVP and anxiety/depressive symptoms, possibly attributed to their study population being so small. While the univariate analysis failed to establish a connection between anxiety/depression and severe NVP, it was found that severe NVP patients exhibited significantly higher anxiety levels.

Additionally, the current study looked into the potential effects of a wide range of clinical and sociodemographic parameters on the development of nausea and NVP. It found that the PUQE score did not significantly correlate with age, BMI, parity, history of miscarriage, or gestational age (in weeks).

Contrary to our results, **Birkeland *et al.*** [15]**,** who discovered a relationship between PUQE and gestational age score. The correlation between gestational age and group (hyperemesis group vs. controls) was significant (p-value 0.013), demonstrating a various impact of gestational age among the two groups.

Furthermore, predictive variables for developing anxiety disorder in pregnant women with nausea and NVP were also explored in the current study, which indicated that there was no statistically significant link between GAD-7 questionnaire score and characteristics such as age, parity, miscarriage, or gestational age (weeks), except for BMI. The current study reported that lower BMI was another significant contributor to anxiety disorder and there was a statistically significant negative correlation between GAD-7 questionnaire score and BMI**.**

Our results agree with **Sousa *et al.*** [16], who found that there is no significant distinction in the GAD-7 index concerning age, parity, miscarriage, or gestational age. A few studies have assessed risk variables for anxiety disorder development in HG pregnant women [17–19]. **Tan *et al.*** [18] looked at the prevalence and contributing variables of anxiety in a group of 209 pregnant women with HG. It was discovered that HG was the sole independent risk factor for anxiety development. The relationship between HG and eating attitudes on anxiety symptoms in 48 HG-afflicted women and 44 control participants was recently examined by **Annagür *et al.*** [17]**.** The scientists came to the conclusion that whereas eating attitudes were unrelated to HG, anxiety symptoms were.

The adoption of objective inclusion criteria and a comparatively large patient population are the study's merits.

## CONCLUSION

Patients with NVP were more likely to experience anxiety disorders; nevertheless, the majority of cases (87.5%) experienced very mild anxiety disorders. Additionally, anxiety development in pregnant women was significantly influenced by a lower BMI. Thus, while evaluating the physical health of women with NVP, it is equally important to take note of the patients' psychological condition.

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