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Assessing the Utility of Pregnancy-Unique Quantification of Emesis Questionnaire's Score in Managing Women with Nausea and Vomiting of Pregnancy

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Abstract

A lower quality of life and unfavorable pregnancy outcomes are linked to the severity of nausea and vomiting during pregnancy (NVP). This study used the Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) scale to compare the severity of NVP with the various demographic and maternal parameters among pregnant women. To analyse the association of severity of nausea and vomitting using a modified PUQE scale with the various demographic and maternal characteristics This was a cross-sectional study conducted on 380 pregnant women who were receiving antenatal care at a tertiary health care centre between January 2023 and March 2024. The severity of NVP was evaluated by the PUQE scale which was later compared with the various maternal characteristics. Statistical analyses were performed to determine the risk factors associated with NVP. Gestational age was significantly associated with increasing NVP. Most of the subjects in the moderate (45.2%) and severe (47.7%) PUQE group were gravida 1 while 43.9% were gravida 2 in the mild group. PUQE scale can be used to assess the severity of NVP thus aiding the healthcare professionals in providing required treatment.

Keywords: *Nausea and Vomiting During Pregnancy, Pregnancy-Unique Quantification of Emesis and Nausea Scale.*

Introduction

The degree of nausea and vomiting during pregnancy (NVP) is linked to a lower quality of life and negative consequences on a number of social, professional, and household functioning domains [1, 2]. Furthermore, NVP has been linked to elevated stress levels and symptoms of depression [1]. Depression is more common in women with severe NVP symptoms than in those with mild NVP; among the former, 39% of respondents said they felt depressed, compared to 4.8% in the latter group [2]. NVP affects between 50-80% of expectant women, with varying degrees of severity [3]. The most severe disorder associated with NVP, hyperemesis gravidarum (HG), affects 0.5% to 2% of pregnancies. Weight loss, dehydration, deficiencies in nutrition, and frequent hospitalization are the outcomes of HG [4]. According to Fairweather, HG is defined as vomiting that happens during pregnancy before the twentieth week of gestation, is severe enough to warrant

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hospitalization, and isn't related to any other coincidental disorders that also cause vomiting [5].

Frequent vomiting combined with a chronic low food intake can cause weight loss, metabolic imbalance, dehydration, and nutritional deficits [6]. Adverse fetal outcomes, including preterm delivery and growth restriction, have been associated with severe maternal weight loss during the early stages of pregnancy or inadequate catch-up weight [7, 8]. While there isn't a single tool that can accurately diagnose, measure, or assess hyperemesis, the English Pregnancy-Unique Quantification of Emesis (PUQE) questionnaire has been designed to gauge the intensity of emesis (vomiting and nausea) in pregnancy [4]. Although it has been translated into other languages, including Norwegian, Spanish, French, Italian, and utilised to evaluate NVP in the respective populations, PUQE has never been used in a South Indian population. Thus, the goal of our study was to evaluate the severity of NVP in such a population from a tertiary health care centre in TamilNadu using a modified PUQE scale and to analyse the association of NVP severity with various maternal characteristics.

Methodology

Participants

The current study was a cross-sectional study conducted after getting approval from the institutional ethical committee. It was carried out for 3 months and involved 380 pregnant women reporting to the outpatient unit of the Department of Obstetrics and Gynaecology at a tertiary care hospital in Tamilnadu. All the participants were explained about the study and written consent was obtained prior to the commencement of the study. Individuals with illnesses unrelated to pregnancy, such as gastroenteritis or pyelonephritis that induces nausea and vomiting, and those unable to read/write English or Tamil were excluded from the study. The maternal characteristics encompassed the following: maternal age, gestational age, gravidity status, marital status, employment status, education level, cigarette smoking status, alcohol intake, and intake of prenatal vitamins.

Questionnaire

A modified version of the PUQE questionnaire, as followed by Choi et al, [9] was made available to the participants in English as well as in Tamil (local language). Both were distributed to all patients, who were told to fill out the form in whichever language they felt most comfortable in. We followed the modified version of the PUQE questionnaire utilized in a study by Choi et al [9]. First, in the original questionnaire, there was a 1-hour gap between the groups when the length of nausea was first reported as "<1 hour" for the second category and as "from 2 to 3 hours" for the third. To address this issue, Choi et al [9] slightly modified their version so that the 1-hour gap was eliminated by using the categories "<1 hour" and "from 1 to 3 hours." Second, the purpose of the questionnaire was initially limited to gathering data on NVP that had occurred within the previous 12 hours. Additionally, some studies expanded the time frame to include the previous day for the gathering of NVP data [8, 10]. But in the current investigation, the worst day of NVP in the current pregnancy which could have happened recently or a few weeks ago was retrospectively recorded using the PUQE questionnaire. We extended the objective time period of NVP in order to accomplish a wider spectrum of analysis.

Data Extraction and Statistical Analysis

The analysis comprised 380 expectant mothers who submitted their filled-out questionnaires. The following baseline and demographic data were gathered as binary variables: Participants' ages ranged from 18-40 years; they were either married or single; they

had either completed graduate level education or not; and they were either employed or jobless at the time of the survey. The response was gathered and classified as "yes" or "no" for the following five variables: marital status, education status, employment status, alcohol intake, cigarette smoking and prenatal multivitamin supplementation. Gravidity data was gathered in three categories: one, two, or ≥ three pregnancies.

The responses were tabulated in an Excelsheet, and the data was then analysed in Excel workbook. The descriptive statistics, maternal characteristics and PUQE scores were mentioned as counts and percentages. The χ^2 test (Monte Carlo method) was used to compare data from participants who reported having mild, moderate and severe PUQE scores in their current pregnancy. A p value of < 0.05 was considered significant.

Results

Table 1: Distribution of Maternal Characteristics

Characteristics	**Count**	**Percentage**
Maternal age		
<30 YEARS	308	82.11%
>30 YEARS	72	17.89%
Gestational age		
0-12 weeks	201	52.89%
13-26 weeks	100	28.32%
>27 weeks	79	20.79%
Gravida		
1	161	42.37%
2	151	39.21%
>3	68	17.89%
PUQE		
Mild	123	35
Moderate	190	44.21
Severe	67	20.79
Married		
Yes	380	100
No	0	0
Graduate education and above		
Yes	351	92.4
No	29	7.6
Employed		
Yes	130	34.2
No	250	65.8
Smoking		
Yes	0	0
No	380	100
Alcohol		
Yes	0	0
No	380	100
Prenatal vitamin intake		

Yes	334	87.9
No	46	12.1

Table 2: Association of Maternal Characteristics with PUQE

Characteristic	**PUQE**			**Chi-square significance**
	Mild Count (%)	**Moderate Count (%)**	**Severe Count (%)**	
Maternal Age				
<30 years	102 (82.9)	153 (80.5)	54 (80.5)	p = 0.939
>30 years	21 (17.07)	37 (19.4)	13 (19.4)	
Gestational Age				
0-12 weeks	40 (32.5)	105 (55.2)	56 (83.5)	p <0.0001
13-26 weeks	44 (35.7)	49 (25.7)	7 (0.10)	
>27 weeks	39 (31.7)	36 (18.9)	4 (0.05)	
Gravida				
1	43 (34.9)	86 (45.2)	32 (47.7)	p = 0.322
2	54 (43.9)	74 (38.9)	23 (34.3)	
>3	26 (21.1)	30 (15.7)	12 (17.9)	
Graduate education and above				
Yes	115 (93.4)	172 (90.5)	64 (95.5)	p = 0.335
No	8 (6.5)	18 (9.47)	3 (4.4	
Employed				
Yes	47 (38.2)	57 (30)	26 (38.8)	p = 0.223
No	76 (61.7)	133 (70)	41 (61.1)	
Smoking				
Yes	0 (0)	0 (0)	0 (0)	p = 1
No	123 (100)	190 (100)	67 (100)	
Alcohol				
Yes	0 (0)	0 (0)	0 (0)	p = 1
No	123 (100)	190 (100)	67 (100)	
Prenatal vitamin intake				
Yes	15(12.1)	28 (14.7)	3 (4.4)	p = 0.054
No	108 (87.8)	162 (85.2)	64 (95.5)	

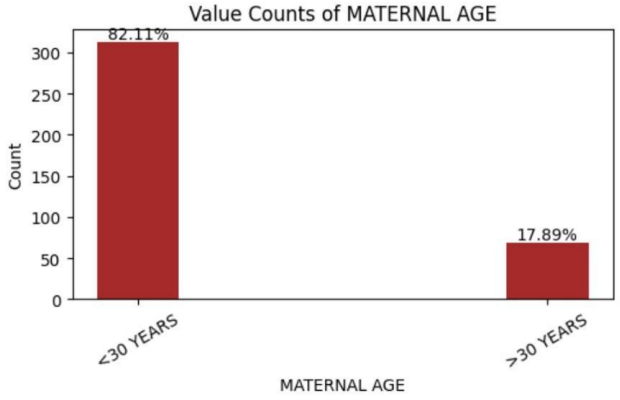

Fig 1: Graphical Representation of Maternal Age of the Participants

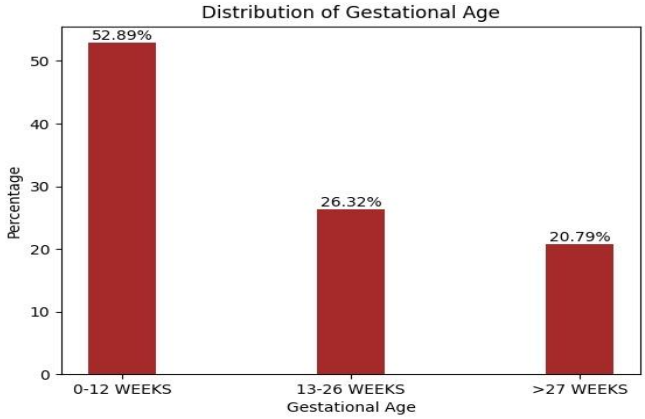

Fig 2: Graphical Representation of the Gestational Age of the Participants

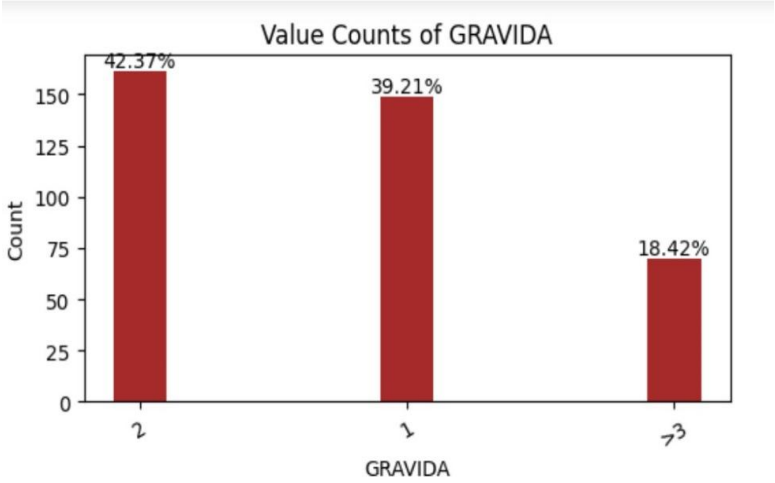

Fig 3: Graphical Representation of The Gravida Status of The Participants

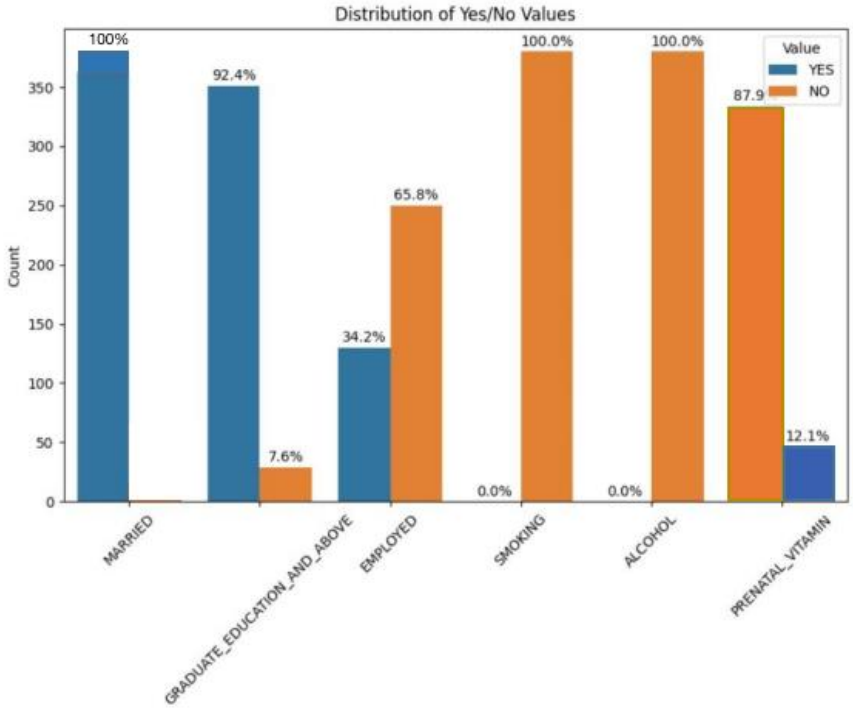

Fig. 4: Graphical Representation of the Demographic Characteristics of the Participants

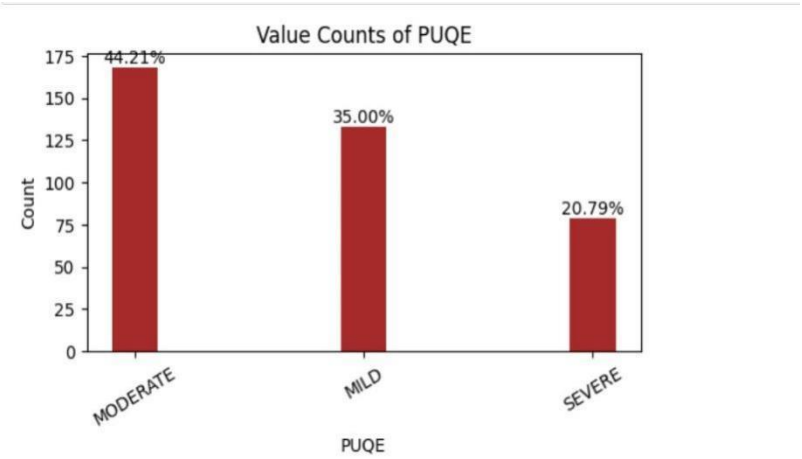

Fig 5: Graphical Representation of the PUQE Scores of the Participants

A total of 380 pregnant women receiving prenatal care at a tertiary health care center in Tamil Nadu were asked to fill out the PUQE questionnaire. Furthermore, this study did not include any incomplete questionnaires.

Maternal Characteristics

The majority of the participants had education above graduation (92.4%). 5.8% of participants were unemployed. None of the participants smoked or drank alcohol. Prenatal vitamins were taken by 12.1% (Fig. 4). The majority (82.11%) of the participants were less than 30 years of age (Fig. 1). Most of the pregnant women were in the 0-12 weeks (52.89%) of pregnancy followed by the 13-26 weeks group (26.32%) and then the >27 weeks group (20.79%) (Fig. 2). Gravida 2 was the most common (42.37%) followed by gravida 1 (39.21% and gravida >3 (18.42%) (Fig. 3). On evaluating the PUQE, the majority of the participants were classified as moderate (44.21%) followed by mild (35%) and severe (20.79%) (Fig. 5) (Table 1).

Association of PUQE Score with the Various Parameters

Most of the participants in each group of PUQE belonged to the <30 years age group. Similarly, the majority of the participants in each group belonged to the 0–12-week gestational age group, with the most seen in the moderate and severe PUQE group with 55.2% and 83.5% respectively. Most of the subjects in the moderate (45.2%) and severe (47.7%) PUQE group were gravida 1 while 43.9% were gravida 2 in the mild group. In all the groups, all of the participants were married and most of them had an education level of graduation and above. Most of them were unemployed and none of them smoked or drank alcohol. None of the associations were found to be statistically significant. Prenatal vitamin intake was seen in minimal number of participants of all groups (Table 2).

Discussion

The current study offers compelling evidence that the PUQE questionnaire modification, which was initially designed to gather data on NVP experienced in the previous 12 hours, can be used to successfully collect data about the worst day of NVP in the current pregnancy in the past [4, 9]. This day may have occurred recently or several weeks prior to the questionnaire being completed. Furthermore, we did not restrict the gestational phase time period to the first trimester because most women experience nausea and vomiting before 20 weeks gestation, but in some severe cases, between 10% and 45% of women, the symptoms do not go away until after delivery [10]. Our results demonstrate the possibility of using the questionnaire to more thoroughly track NVP development in clinical situations because of its ease of use.

On evaluating the PUQE, majority of the participants in the current study were found to be moderate (44.21%) which was contrary to that obtained in a study by Birkeland et al., who observed severe NVP to be predominant [8], and Cicek et al., who observed mild NVP to be prominent in their study. Most of the participants in each group of PUQE belonged to the <30 years age group. Similarly, majority of the participants in each group belonged to the 0–12-week gestational age group, with the most seen in the moderate and severe PUQE group with 55.2% and 83.5% respectively. Gestational age was observed to be significantly associated with the severity of NVP and PUQE score [11]. Lower gestational age was associated with increased NVP. Most of the subjects in the moderate (45.2%) and severe (47.7%) PUQE group were gravida 1 which was contradicting to a study by Mitsuda et al., who observed multiparity to be associated with severe NVP. They also evaluated the relation between gestational age and NVP and noted that it majorly affected females in 37-41 weeks of gestation [12].

An intriguing discovery is that employed women had a lower rate of NVP than housewives. Given that NVP only lasts a few weeks, it is unlikely to stop a woman from looking for or accepting a job. This was in concordance with the findings of Kallen et al. [13]**.** Although the focus of most research on NVP these days is on its biological foundation, this observation suggests that psychological variables may also be important, as has been noted time and time again in literature.

Even though the exact cause of NVP is unknown, placenta-mediated mechanisms play a part in the complex etiopathogenesis [14]. The hormone most frequently associated with the pathology of nausea and vomiting of pregnancy (NVP) and hyperemesis gravidarum (HG) is human chorionic gonadotropin (hCG). This connection is primarily based on the timing, as the peak of NVP coincides with the peak of hCG production, both of which occur during the most severe NVP symptoms between weeks 9 and 12 of gestation [15]. Trophoblast-derived tumor necrosis factor (TNF)-α, interleukin (IL)-1, and IL-6 contribute to the regulation of human chorionic gonadotrophin (hCG) production and release [16]. This hormone subsequently stimulates placental prostaglandin E2, which peaks between 9 and 12 weeks of gestation. North et al. (1991) measured maternal serum prostaglandin E2 levels and observed that they were higher during periods of nausea and vomiting [17].

Additionally, nausea and vomiting tend to be more severe in pregnant women with conditions linked to elevated hCG levels, such as molar pregnancies, multiple gestations, Down syndrome, and pregnancies with female fetuses [18]. According to Niebyl, NVP is less common among smokers, older women, and multiparous women because of their reduced placental volumes [19]. These results are in line with those of the current study. The associations between various parameters studied and PUQE was statistically insignificant in the current study. However, Numerous other studies have examined the risk variables for HG, including youth, ethnicity, parity, and concluded that alcohol use and NVP history were risk factors for HG [20,21] Maternal genetics, endocrine, and gastrointestinal variables are likely to be risk factors for NVP, even if the pathophysiology of HG and NVP is still unknown. Among the risk factors for NVP, prior history of NVP is significant because, in comparison to women who had no prior HG, those who suffered HG during their first pregnancy have a significantly higher chance of experiencing it again [22].

It is necessary to conduct more research to understand the pathophysiology of HG and NVP. Pregnant women with NVP have been shown to have better outcomes than those without symptoms in certain studies. These outcomes include reduced rates of

miscarriages, preterm, low birth weight, small for gestational age, and congenital malformations, as well as improved developmental outcomes for their offspring [23,24]. However, NVP pregnant women are more prone to experience pregnancy-related problems like proteinuria, pelvic girdle discomfort, hypertension, high blood pressure, placental abruption, and spontaneous preterm birth [24,25]. When treating pregnant women with NVP, the relevance of these issues needs to be carefully assessed because even seemingly insignificant symptoms like heartburn, regurgitation, headaches, and dizziness can have a big influence on daily living [26].

Strengths and Limitations

The rigorous translation and back-translation of a questionnaire that has been previously validated in multiple languages across various cohorts of expectant mothers is the study's strongest point. The major limitation of the study was its cross-sectional design. Future research using a longitudinal design and a larger study population should further enhance the data. Furthermore, even though we aimed to obtain a wider spectrum of analysis by extending the target time period of NVP, this study may introduce recall bias because some of the NVP groups that took part completed the questionnaire after a comparatively long period from the peak time of suffering. The mode of conception was not considered in the study. Few studies have proved a significant relation between assisted pregnancies and NVP [20, 27-30]. More research is advised to illustrate the effectiveness of the questionnaire in a clinical context; to direct and track the outcomes of nutritional and antiemetic interventions.

Conclusion

Our research shows that the modified PUQE questionnaire can be effectively used to monitor as well as assess the prognosis of the subjects depending on the severity of NVP during periods longer than 12 hours. Its ease of use and practicality as a tool for evaluation of the severity of NVP may also benefit physicians, healthcare professionals, and researchers.

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Conflict of Interest

The authors hereby declare that there is no conflict of interest in this study.

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