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Nausea and vomiting of pregnancy: A study with pregnancy-unique quantification of emesis questionnaire

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ABSTRACT

Objectives: Nausea and vomiting of pregnancy (NVP) is frequent, affecting up to 70–85% of pregnant women. However, severity of NVP especially in clinical practice is often uncertainly assessed and thus both under- and overdiagnosing is probable. Furthermore, risk factors for NVP, although recognized, are not well established. The aim of our study was to evaluate the severity of NVP with a structured questionnaire and evaluate associative risk factors.

Study design: Sample of 2411 women were recruited from maternity health care clinics. Severity of NVP was assessed with pregnancy-unique quantification of emesis (PUQE) questionnaire. Age, previous pregnancies, previous deliveries, previous miscarriages including ectopic pregnancies, previous pregnancy terminations, nationality, pre-pregnancy body mass index, smoking, marital status and employment were used as explanatory factors.

Results: Altogether 88.0% of the women reported some level of NVP, of which 6.4% was severe, 52.2% moderate and 29.4% mild. Daily duration of NVP was ≥ four hours in 12 h in 45.0%. Further, 18.8% of the women had vomiting episodes ≥ three times and 37.4% retching episodes ≥ three times in 12 h. Women with ≥ two previous pregnancies had increased risk for more severe NVP (OR 2.17, 95%CI; 1.34–3.51, $p < 0.0001$). Older women had increased daily duration of nausea (OR 1.03, 95%CI; 1.00–1.06, $p = 0.004$) but lower number of vomits (OR 0.93, 95%CI; 0.93–0.97, $p < 0.0001$) and lower number of retching (OR 0.93, 95%CI; 0.90–0.96, $p < 0.0001$). Smokers had shorter daily duration of nausea (OR 0.49, 95%CI; 0.33–0.73, $p < 0.0001$), but higher number of vomiting episodes compared to non-smokers (OR 1.83, 95%CI; 1.26-2.66, $p = 0.021$).

Conclusions: Women suffered from NVP very frequently. The daily duration of NVP was moderately long, in nearly half of the women four hours or more. In addition, retching was more frequent than vomiting. From studied risk factors, few associations with different aspects of NVP emerged, but only multiparity was associated with the severity of NVP. As NVP affects several women during pregnancy, in future, the impact of NVP on quality of life, future family planning and health costs should be evaluated.

Introduction

Nausea and vomiting of pregnancy (NVP), also called emesis gravidarum, occurs in up to 70–85% of pregnant women, typically in the first trimester [1]. NVP decreases quality of life and causes often absences from work [1]. Moreover, the severe form of NVP, hyperemesis gravidarum (HG), can be considered as a health risk. HG is described as intractable vomiting associated with weight loss of more than 5% of pre-pregnancy weight, dehydration and electrolyte imbalances, which may lead to hospitalization [2]. Estimates of the incidence of HG range from 0.3%–2% of pregnancies [3,4]. NVP has been less studied than HG. The exact etiology of NVP still remains unclear but it has been considered to stem from multiple factors.

NVP and HG are associated with younger maternal age [3,5,6]. Further, pre-pregnancy maternal weight has shown to have U-shaped association; both under- and overweight [7–10] women

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have increased risk. Smoking, in contrast, is associated with lower risk of NVP. [5]. Previous studies are inconsistent about the effect of parity on NVP and HG; in some studies nulliparous are in greater risk [7,11], whereas others have found the increase in risk along increasing pregnancies [12,14]. And furthermore, lack of nausea and vomiting as a symptom is associated with increased risk of spontaneous abortion [15]. In addition, various socioeconomic factors, like marital status [16,17], working at home [5] and lower education [10,18] have shown to be associated with NVP. Mechanisms behind NVP involve hormonal influences, vestibular system, gastrointestinal, allergenic and psychoneurotic factors [7,19,20]. Also genetic basis presumably plays a role [17,21].

In Finland, in clinical practice, NVP is assessed by a simple question of the existence of nausea, no structured questionnaire is available. In our study, we used the pregnancy-unique quantification of emesis (PUQE) questionnaire [22] to evaluate the severity of NVP in a sample of maternity health care clinics (MHCCs). We hypothesized that when utilizing a systematic questionnaire, emesis is more frequent and severe than commonly acknowledged. Further, associations between parity, health-related behaviour, socioeconomic factors and NVP were evaluated.

Material and methods

The participants to this cohort were recruited on their visit to MHCCs in Turku city area and surrounding municipalities between October 2011 and November 2014. In Finland, more than 99% of mothers use the public maternity health care services during pregnancy [23]. During the study period, the amount of deliveries varied from 4698 to 4812 annually in Hospital District of Southwest Finland [23]. Public health nurses, carefully instructed of the study by the researchers, recruited the women from 33 MHCCs. After oral and written information about the study, the women filled in the study questionnaire, which was then considered as informed consent. The study was approved by the Joint Ethics Committees of Turku University and Turku University Hospital, Turku, Finland (43/180/2011). Altogether 2411 women, mean aged 30.3 years (SD 4.7, range 15.2–45.9), participated in the study.

NVP was evaluated by Motherisk PUQE scoring system [22], which has been validated [24] and used worldwide. The participants were instructed to recall the worst period of their NVP during the present pregnancy and to reply accordingly. The PUQE consists of three questions; daily duration of nausea (question 1), number of vomits (question 2) and number of retching (question 3) in 12 h with a scale from 1 to 5, where higher points indicates higher symptoms. In question '2' the answers are reversed as the item is phrased in descending order. The PUQE total score is a sum of the replies to these three questions and ranges between 3–15 [22]. According to PUQE total score, the severity of NVP is divided into four categories: no symptoms (sum is 3 points), mild (4–6 points), moderate (7–12 points) and severe (13–15 points) [22]. The questionnaire was translated into Finnish by a professional translator and retranslated into English by another professional translator in order to ensure the validation of the translation with the permission of the PUQE owners. The mean gestational week (gwk) in filling in the questionnaire was 20.2 (range 7–40). Since the PUQE was assessed in most of the women after their NVP had relieved, a sub-analysis including only women who replied $\leq$ 20 gwk was performed.

The basic characteristics of the women were collected from the Medical Birth Register of National Institute for Health and Welfare, including previous pregnancies (number), previous deliveries (number), previous miscarriages including ectopic pregnancies (number), previous pregnancy terminations (number), pre-pregnancy body mass index (BMI, kg/m^2) calculated by weight and height, smoking (no/yes), marital status (cohabited/single) and employment (working/not working). Age (years) was calculated by comparing the date of birth to the answering date and nationality (Finnish/others) was assessed from the study questionnaire. The characteristics of the participants are described in Table 1.

Statistical analysis

Data was submitted first for descriptive analysis, where continuous variables were characterized by means and standard deviations (SD) and categorical variables by frequencies and percent. Cumulative logit regression analysis was used to study the associations between NVP (Total Score of three PUQE questions) and the basic characteristics, as well as the associations between distinguished PUQE questions and the basic characteristics. Thereafter, multiple cumulative logit regression analysis was performed to study the association between NVP (Total Score of three PUQE questions) and the basic characteristics including variables with the level of association of $p < 0.10$ in the univariate analysis (previous pregnancies, previous deliveries, previous miscarriages and marital status). Since most of these variables (previous pregnancies, previous deliveries, previous miscarriages) were related, an additional analysis using previous pregnancies as a categorical variable (0=no previous pregnancies, 1=one previous pregnancy and 2=two or more previous pregnancies) was performed. The results were presented with p values, odd rations (ORs) and 95% confidence intervals (CIs). Statistical analyses were carried out using a 9.4 version of SAS Institute Inc. (Cary, NC, USA) for Windows, and p values of < 0.05 were considered as statistically significant.

Results

Of 2411 women, the questionnaire was incomplete in 30 women, leaving the data of 2381 women into the analysis. The mean of total PUQE score was 7.4 (SD 3.1, range 3–15). Of the severity of NVP, the most common was moderate NVP (52.2%, n = 1243), followed by mild NVP (29.4%, n = 700). Among all women, 6.4% (n = 152) had severe NVP, whereas 12.0% (n = 286) of the women stated not having NVP (total score 3) (Fig. 1). The mean

Table 1
Basic characteristics.

	Mean ± SD or % (n)	Range
Age (years)	30.3 ± 4.7	15.2–45.9
Previous pregnancies	1.3 ± 1.4	0–15
Previous deliveries	0.8 ± 1.0	0–12
Nulliparous	46.0 (1069)	
Multiparous	54.0 (1256)	
Previous miscarriages[a]	0.3 ± 0.7	0–5
Previous abortions	0.1 ± 0.4	0–4
Nationality		
Finnish	98.8 (2326)	
Other	1.2 (29)	
BMI	24.6 ± 4.8	15.1–57.8
Smoking		
No–smokers	87.0 (2018)	
Smokers	13.0 (301)	
Marital status		
Cohabited	96.2 (2218)	
Single	3.8 (88)	
Employment		
Working	83.1 (1697)	
Not working	16.9 (346)	

[a] Including both spontaneous and ectopic pregnancies.