

Relationships between nausea and vomiting, perceived stress, social support, pregnancy planning, and psychosocial adaptation in a sample of mothers: A questionnaire survey

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Abstract

Background: Women worldwide experience pregnancy-related nausea and vomiting yet tolerate this significant prenatal stressor. The physical and emotional stress caused by pregnancy-related nausea and vomiting may influence maternal psychosocial adaptation yet few studies have examined these relationships.

Objectives: The purpose of the study was to examine the relationships between nausea and vomiting, perceived stress, social support and their ability to predict maternal psychosocial adaptation among Taiwanese women during early pregnancy.

Design: A correlational, cross-sectional research design.

Setting: Four prenatal clinics in Taiwan.

Participants: Women ($n = 243$) who had completed the 6–16 week of gestation consented to participate.

Methods: Subjects completed four self-report questionnaires in addition to providing demographic data: Index of Nausea, Vomiting, and Retching (INVR), Perceived Stress Scale (PSS), Interpersonal Support Evaluation List (ISEL), and the Prenatal Self-Evaluation Questionnaire (PSEQ).

Results: Pregnancy-related nausea and vomiting was experienced in varying degrees by 188 (77.4%) women. Stepwise multiple regression analysis revealed that 37.6% of the variance in maternal psychosocial adaptation was explained by the severity of nausea and vomiting, perceived stress, social support, and pregnancy planning.

Conclusions: Women at higher risk for poor maternal psychosocial adaptation have not planned their pregnancy and experience severe pregnancy-related nausea and vomiting. Severe pregnancy-related nausea and vomiting associated with high-perceived stress levels may be mediated by social support.

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What is already known about the topic?

- Qualitative research findings indicate that prenatal stress occurs with pregnancy-related nausea and vomiting (PRNV).
- Social support is important for maternal psychosocial adaptation.

What this paper adds

- Predictors of maternal psychosocial adaptation among Taiwanese women during early pregnancy include severity of nausea and vomiting, perceived stress, degree of social support, and pregnancy planning.
- Women at high risk for poor maternal psychosocial adaptation have not planned their pregnancy and experience severe PRNV.
- Severe PRNV associated with high-perceived stress levels may be mediated by social support.

1. Introduction

Pregnancy is arguably one of the most normal of physiological processes; socially and individually it is usually perceived as a joyful experience of expectation. Being pregnant, however, has its stressors, especially for women who experience uncomfortable symptoms such as nausea and vomiting (Chou and Chen, 2000; O'Brien et al., 2002). The incidence of PRNV in women residing in Western countries ranges from 50% to 80% (Lacroix et al., 2000; Chou et al., 2003). Symptoms often begin early in the pregnancy and disappear or diminish by the end of the fourth month (Murray et al., 2002). Nausea and vomiting impacts the physical and psychological health of the pregnant woman (Deuchar, 1995) as well as the quality of the woman's perinatal life (O'Brien and Naber, 1992), family relationships, and fetal outcomes (e.g., birth weight) (Zhou et al., 1999). Such effects and consequences influence maternal adaptation to pregnancy.

Adaptation to pregnancy has been seen as essential for the development of a good relationship between mother and newborn (Beck, 1999) and foretells the mother's success in carrying out maternal tasks (Rubin, 1984). Thus, by identifying predictors of psychosocial adaptation to pregnancy in women who experience nausea and vomiting interventions can be designed to promote perinatal and fetal outcomes.

PRNV impacts family, social, and occupational roles and functions (O'Brien and Naber, 1992). Research has suggested that social support is positively associated with adaptation to the parental role (Dormire et al., 1989), expectant mothers' health (Glazier et al., 2004; Hung, 2004; Jesse et al., 2005), and mothers' confidence

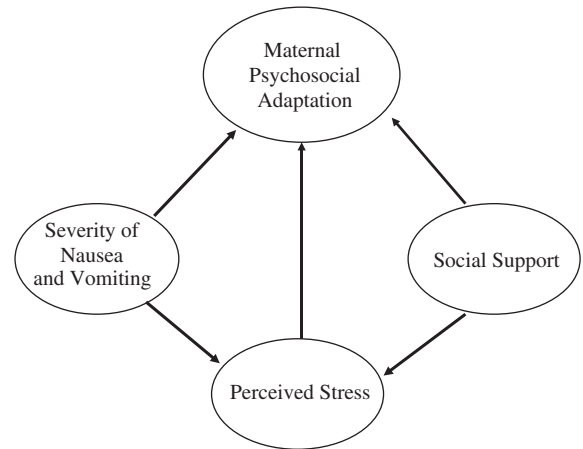


Fig. 1. A theoretical model of the relationships among nausea and vomiting, perceived stress, social support, and maternal psychosocial adaptation.

in carrying out parenting tasks (Cronenwett, 1985). Norbeck and Anderson (1989) suggested that the combination of low partner support and high life stress and is associated with mal-adaptation. Mercer et al. (1986) likewise argued that stress is negatively related and social support is positively related to the psychosocial adaptation of motherhood.

The stress of PRNV and its effect on adaptation to pregnancy is unknown. No studies could be identified that describe the relationship between stress, social support and maternal psychosocial adaptation in pregnant women. Furthermore, the presence of nausea and vomiting as a prenatal stressor has not been investigated. In order to provide effective prenatal care and promote the quality of women's prenatal lives and improve fetal outcomes, health care providers must be aware of the variables, which influence maternal psychosocial adaptation.

Therefore, this study aimed to (1) examine the relationships among PRNV, perceived stress, social support, and select demographic variables; (2) determine the ability of predictor variables to explain maternal psychosocial adaptation during early pregnancy. Based on the available literature, a model to predict maternal psychosocial adaptation was proposed (Fig. 1).

2. Methods

A correlational, cross-sectional research design with convenience sampling was used to recruit women from four hospital-based private prenatal clinics in southern Taiwan. Inclusion criteria required that the women be at least 18 years old, be in their 6–16 week of gestation, and have the ability to read and write Chinese. Based on the

survey design, power analysis calculations indicated that 246 subjects were required to detect significance (95.0% confidence interval, power of .80) (Rosner, 2006).

2.1. Instruments

- (a) *Index of Nausea, Vomiting, and Retching (INVR)*: The INVR was originally developed by Rhodes and McDaniel (1999) to measure chemotherapy-induced nausea and vomiting. Subsequent researchers have adapted the instrument to measure the nausea and vomiting of pregnancy (Zhou et al., 1999) with good reliability and validity. As this was the first time, the INVR was used for maternal research in Taiwan; a pilot study was conducted to establish the feasibility of a Chinese version. Forward and backward translations including cultural appropriateness and language accuracy were developed to build the Chinese versions of the scale. Construct validity and test–retest reliability have been previously reported (Chou et al., 2005). The eight-item INVR measures the self-reported severity of gastrointestinal distress over three subscales: nausea, vomiting, and retching, with each item ranked on a five-point Likert scale. INVR scores range from 0 to 32; the higher the score, the greater severity of nausea and vomiting. Severe nausea and vomiting is defined as a score from 17 to 32, moderate nausea and vomiting is a score from 9 to 16, and mild nausea and vomiting ranges from 1 to 8. In the current study, the internal consistency of the Chinese INVR was $\alpha = .92$ and test–retest reliability of 1 week was .97. Cronbach's alphas ranged from .81 to .92 for the INVR subscales.
- (b) *Perceived Stress Scale (PSS)*: The PSS was developed by Cohen et al. (1983) to measure the degree to which life situations are considered stressful. The 10-item scale measures perceived stress by asking respondents their feelings and thoughts during the past month of pregnancy. Rated on a five-point Likert scale, ranging from 0 (never) to 4 (very often), PSS scores range from 0 to 40; the higher the score, the greater the perceived stress. Internal consistency for the Chinese version of the PSS ranges from .79 to .85 with test–retest reliability of .81 (Chen, 1994). In the current study, the internal consistency was .83.
- (c) *Interpersonal Support Evaluation List (ISEL)*: Cohen et al. (1985) developed the original 40-item ISEL to determine the role that social support plays in protecting individuals from the effects of stress. The 16-item measure includes several categories of social support including interpersonal appraisal, belonging, tangible support, and self-esteem support. Each item is scored on a four-point Likert scale, ranging from 0 (strongly disagree) to 3

(strongly agree). ISEL-16 scores range from 0 to 48; the higher the score, the greater the social support. Test–retest reliability and Cronbach's alpha of the ISEL-16 Chinese version have been reported as .77 and .81, respectively. Factor analysis of the ISEL-16 Chinese version revealed that the four factors accounted for 87.4% of the variance in social support (Chen, 1994). In the current study, the internal consistency was .85.

- (d) *Prenatal Self-Evaluation Questionnaire (PSEQ)*: The 79-item PSEQ, developed by Lederman (1996), measures maternal psychosocial adaptation during pregnancy. Similar to the INVR, the PSEQ underwent pilot testing to establish feasibility of the Chinese version and has been previously reported (Chou et al., 2005). Conflict in the maternal developmental tasks is rated on a four-point Likert scale, from 1 (not at all) to 4 (very much so). The PSEQ comprises seven domains: acceptance of pregnancy, identification of a motherhood role, relationship with her mother, relationship with husband, preparation for labor, fear of helplessness or loss of control in labor, and concern for the well-being of self and baby. The PSEQ scores range from 79 to 316 with higher scores indicating less maternal psychosocial adaptation. Cronbach's alpha among the seven dimensions ranges from .71 to .93 when tested over three trimesters (Lederman, 1996; Beck, 1999). The internal consistency of the Chinese PSEQ in the current study was $\alpha = .95$, with reliability coefficients for the seven subscales between .76 and .87.

Demographic data were collected to reflect potential influence on the research variables. In addition to age, categorical demographic data included occupation (housewife vs. employed outside home), parity (primipara vs. multipara), gravity (1, 2, or more than 2), pregnancy plan (unplanned or planned), education (junior high, senior high school, college, or graduate school), and socioeconomic level (low, middle, or upper class).

2.2. Procedures

The human subjects review board from each clinic granted approval for the study. Women were approached by the researcher during prenatal clinic visits and the study was explained. If the inclusion criteria were met, written informed consent was obtained and each subject was provided with a research packet. The research packet included the research instruments, demographic data and an unmarked envelope. Participation in the study required approximately 40 minutes and was completed before the subject was seen by the clinic physician. Completed questionnaires

were returned to the researcher in the unmarked envelope with no identifying information placed on the questionnaires. Each subject was offered free nursing consultation on pregnancy-related symptom management and a gift (approximate value US \$9.00) for participating.

2.3. Data analysis

SPSS (10.0) was used for data analysis. The assumptions of normality and homogeneity of variance for *t*-test, one-way ANOVA and regression were tested and met. Pearson's correlation was applied to examine the bivariate relationships among the variables. Stepwise multiple regression analysis was used to test the ability of the predictor variables (nausea and vomiting, perceived stress, and social support) and demographic variables to predict maternal psychosocial adaptation. Multicollinearity among the predictor variables was assessed utilizing tolerances, as well as variance inflation factors (VIF). The tolerance of the predictor variables ranged from .77 to .98, indicating that multicollinearity was not be a concern because the values were not close to 0 (Norusis, 1995). The VIF of the predictor variables ranged from 1.03 to 1.30, indicating that there were no multicollinearity concerns (Stevens, 1996).

3. Results

Two hundred and fifty pregnant women were agreed to participate, however, only 243 returned complete research data, three less than required by power analysis calculations. The sample ranged from 18 to 41 years old ($M = 28.4$, $S.D. = 4.3$) with a mean pregnancy gestation of 11.6 weeks ($S.D. = 3.2$). All of the women were married and half ($n = 126$) were primigravida. A majority of the sample were employed ($n = 169$, 69.5%) and were well educated. Forty-three percent ($n = 105$) had completed high school and nearly half ($n = 120$) reported a college education. Half ($n = 123$) of the women reported that their pregnancy was unplanned.

Over three-quarters of the sample ($n = 188$) reported PRNV with a mean score of ($M = 8.77$, $S.D. = 7.38$). Based on the INVR score, over one-quarter ($n = 70$, 28.8%) reported mild nausea and vomiting, 36.2% ($n = 88$) reported moderate nausea and vomiting, and 12.3% ($n = 30$) severe nausea and vomiting. Using *t*-test and one-way ANOVA to test group differences between demographic characteristics and PRNV, the results indicated that there were no significant differences between the INVR scores and occupation [$t(241) = -.887$, $p = .38$], parity [$t(241) = .185$, $p = .85$], gravidity [$F(2, 240) = .005$, $p = .99$], education level [$F(3, 239) = 1.284$, $p = .28$], or socioeconomic level [$F(2, 240) = .909$, $p = .40$].

Table 1

Correlation matrix of predictor variables and maternal psychosocial adaptation ($n = 243$)

| Variable | INVR | PSS | ISEL | PUP |
|------------------|-------|--------|--------|---------------------|
| PSS | .19** | | | |
| ISEL | .07 | -.42** | | |
| PUP ^a | -.04 | .13* | -.11 | |
| MPA ^b | .17** | .52** | -.49** | .19 ^a ** |

INVR, severity of nausea and vomiting; PSS, perceived stress; ISEL, social support; PUP, planned/unplanned pregnancy; MPA, maternal psychosocial adaptation.

^aPoint biserial correlation.

^bThe higher the score, the less the adaptation.

* $p < .05$.

** $p < .01$.

Scores on the PSS ranged from 0 to 29 with a mean stress score of 16.5 ($S.D. = 5.38$). The mean ISEL score of 35.4 ($S.D. = 6.59$) with a range of 15–48 indicated the women in this study experienced a high level of interpersonal support. The severity of nausea and vomiting had a small but positive and significant association with perceived stress. In turn, perceived stress had a moderately strong and significant negative relationship with social support. Maternal psychosocial adaptation ranged from 86 to 247 with a mean score of 149.7 ($S.D. = 30.52$). Each predictor variable was significantly correlated with maternal psychosocial adaptation. One demographic variable, pregnancy planning, was significant correlated with the PSEQ score (Table 1).

Stepwise multiple regression revealed that 37.6% of the variance in maternal psychosocial adaptation during early pregnancy was explained by a combination of the predictor variables and pregnancy planning (Table 2). The standardized regression equation, $MPA = .141 \times (INVR) + .327 \times (PSS) - .349 \times (ISEL) - .116 \times (\text{planned pregnancy})$, indicates that less maternal psychosocial adaptation occurs when nausea and vomiting are severe, perceived stress is greater, and there is decreased social support. There is an added risk for mal-adaptation if the pregnancy is unplanned.

4. Discussion and conclusions

Three predictor variables, severity of PRNV, perceived stress and social support, in addition to pregnancy planning explained more of the variance in maternal psychosocial adaptation than any single variable taken alone.

Rates and severity of nausea and vomiting among the pregnant Taiwanese women in the current study are similar to Jarnfelt-Samsioe et al. (1985) study of

Table 2
Stepwise multiple regression of predictor values explaining maternal psychosocial adaptation

| Variable | B | S.E. | Beta | t-value | p-value |
|---------------------------------|---------|--------|-------|---------|---------|
| Severity of nausea and vomiting | .585 | .218 | .141 | 2.691 | .008 |
| Perceived stress | 1.852 | .329 | .327 | 5.630 | .000 |
| Social support | −1.614 | .263 | −.349 | −6.130 | .000 |
| Planned pregnancy | −7.096 | 3.133 | −.116 | −2.265 | .024 |
| Constant | 174.635 | 12.544 | | 13.922 | .000 |

$R^2 = .386$, adjusted $R^2 = .376$, $F = 37.388$, $p < .001$.

pregnant women in Sweden. In that study 50% of the pregnant women had mild nausea and vomiting; 33% had moderate symptoms and 17% had severe symptoms. While Jarnfelt's group did not use a scale to measure nausea and vomiting, the INVR used in the present study has the potential for comparative analysis for future research.

The findings of this study, that PRNV is positively associated with stress, support previous reports (Chou and Chen, 2000; O'Brien et al., 2002). The inverse relationship between stress and social support found in this study is consistent with earlier findings by Younger (1991) and Halman et al. (1995). These relationships appear to cross any cultural differences held between Western and Eastern pregnant women.

While all three predictor variables were significantly correlated with maternal psychosocial adaptation, the strong relationship with social support and perceived stress are notable. The more social support women receive, the further their adaptation to pregnancy is enhanced. Similar findings have been reported by previous researchers (Glazier et al., 2004; Jesse et al., 2005; Zekowitz et al., 2004). Women with social support reported significantly less stress. While the results of this study can not determine cause and effect, it is possible that social support can mediate the impact of PRNV. The impact of perceived stress on maternal psychosocial adaptation has been reported by Reece (1995) on mothers over 35. Based on a multicultural sample of pregnant women, Affonso et al. (1999) concluded that strategies to improve cognitive adaptation would promote stress reduction. The results of the current study suggest that numerous factors, including PRNV, contribute to stress which impacts maternal psychosocial adaptation. As 62.4% of the variance in maternal psychosocial adaptation remains unexplained by the predictive model of this study, further research is needed to identify additional predictors in order to better understand maternal psychosocial adaptation.

The finding that pregnancy planning contributed to maternal psychosocial adaptation has not been previously reported. In this study, women who reported an

unplanned pregnancy also reported more stress and less social support. It is unclear how these variables combine to contribute to less maternal psychosocial adaptation. Further, as the women in this study were all married, it is reasonable to expect that unmarried women experiencing an unplanned pregnancy with severe nausea and vomiting may be at higher risk for mal-adaptation. Additional research is warranted to examine the impact of marriage and unplanned pregnancy on maternal psychosocial adaptation.

A possible limitation of this study was the use of a convenience sample. Although the sample of women in this study completing high school and college were similar to the larger population of women of childbearing age in Taiwan (43.2% vs. 40.0%; 49.4% vs. 45.5%, respectively) (Ministry of the Interior in Taiwan, 2007), the study findings cannot be generalized to the entire population of pregnant women in Taiwan.

The women in this study with an unplanned pregnancy who had severe nausea and vomiting, higher stress and lower social support were at an increased risk of developing adjustment difficulties. These findings suggest that nurses must be cognizant of these risk factors in order to identify early signs of maternal psychosocial adjustment difficulties. Interventions designed to treat nausea and vomiting, reduce stress and promote social support for these women can impact maternal adjustment and fetal outcomes. The findings from this study indicate that a multifaceted approach may be more effective than any single intervention in promoting the adaptation of pregnant women with nausea and vomiting.

As nausea and vomiting can persist throughout a pregnancy, additional research is needed to identify the predictors of maternal psychosocial adaptation during the second and third trimesters. A longitudinal study exploring the development of maternal psychosocial adaptation along the PSEQ dimensions could lead to a predictive model. Continued research on women's perceived stress, social support, and maternal psychosocial adaptation can contribute to both quality of life and quality of nursing care for women with PRNV.

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This is a correlational, cross-sectional study to examine the relationships between perceived stress, social support and maternal psychosocial adaptation and to explore the predictors of maternal psychosocial adaptation among Taiwanese women with nausea and vomiting during early pregnancy.

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