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# The Relationship between Pregnancy Stress and Anxiety in High-risk Pregnant Women: The Mediating Effect of a Sense of Mastery

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***Abstract***

*This study was conducted to investigate the relationship between pregnancy stress and anxiety in high-risk, pregnant Korean women and the mediating effect of the sense of mastery. The participants in this study were 118 high-risk pregnant women. They were diagnosed with high-risk pregnancy during the 20th–38th weeks of gestation at university hospitals between March 3rd, 2015, and March 30th, 2015, and they either visited obstetrics and gynecology outpatient clinics for prenatal examinations or entered delivery rooms. Collected data were analyzed with IBM SPSS Statistics 22 program. Participants' general and obstetric characteristics were analyzed using descriptive statistics, such as frequency, percentage, mean, and standard deviation. The relationship between the participants' pregnancy stress, anxiety, and sense of mastery was investigated using the Pearson's correlation coefficient. In order to investigate the mediating effect of the sense of mastery on the relationship between the participants' pregnancy stress and anxiety, a multiple regression analysis was conducted. To investigate the significance of the mediating effect, the Sobel test was conducted. We confirmed that the sense of mastery exerted a significant partial mediating effect on the influence of the participants' pregnancy stress on anxiety. This study is significant since it empirically verified that the anxiety of high-risk pregnant women decreased as the pregnancy stress decreased and as the sense of mastery increased. Based on the findings of the present study, future studies should focus on developing prenatal intervention programs aimed at the prevention and management of high-risk pregnant women's anxiety and on investigating the effectiveness of such programs.*

***Keywords****: Pregnancy stress, Anxiety, Sense of mastery*

## 1. Introduction

### 1.1. Background

Along with the increased age for both men and women at their first marriage and the increase in late pregnancies among Korean women, the incidence of high-risk pregnancies has recently increased [1]. High-risk pregnancy, which refers to a state in which there are risks for the health and life of the pregnant mothers and their fetuses, includes conditions that deviate from those of a normal pregnancy, such as premature labor, premature rupture of membranes, cervical incompetence, and placenta previa [2]. An important cause of

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high-risk pregnancy is the increased age of pregnant women; the proportion of high-risk pregnancies among pregnant women over 35 years of age is increasing rapidly [3]. According to statistics provided by the Health Insurance Review and Assessment Service, the proportion of high-risk pregnancy is only 7% among pregnant women between 25 and 30 years of age; the proportion increases to 24% in pregnant women between 35 and 40 years of age and to 39% in those over 40, and high-risk pregnancy accounts for 42.8% of all pregnancies [3].

High-risk pregnant women experience emotional anxiety during the gestational period, including concerns about the health of the fetus and themselves, physical discomfort, and premature birth [4]. Anxiety is a common emotion and stress response experienced by high-risk pregnant women [5]. Since high-risk pregnant women experience more anxiety as the severity of high-risk pregnancy increases, anxiety influences the growth and well-being of both pregnant women and their fetuses during gestation [5]. Mercer, *et al.*, [5] and Becker [6] reported that high-risk pregnant women experience more anxiety than do normal pregnant women. Since high-risk pregnant women are not aware of their own states of high-risk pregnancy and cannot predict the well-being of their fetuses, it is difficult for them to connect emotionally with their fetuses, and they experience anxiety [7]. Moreover, as they are anxious about the pregnancy outcome, it can be difficult for them to perform proper prenatal care; when risks in pregnancy increase further, they cannot react properly, and can possibly experience more severe health problems [8].

Stress is a factor that has been shown in previous studies to increase the anxiety of high-risk pregnant women [9]. Although the stress experienced by pregnant women can act as a dynamic strength in survival and well-being to a certain extent, stress can become excessive when excessive changes in living environment occur within short periods of time without sufficient time to adapt [10]. According to the stress vulnerability model, people with multiple risk factors have less energy to endure stress and thus can easily experience psychological disorders [11]. In particular, experiences of high stress occurring within short periods of time, including high-risk pregnancy, aggravate emotional anxiety and exert influences on the pregnant mothers and their fetuses, and this, in turn, can cause obstetric complications that cause further anxiety [12]. Moreover, stress experienced by high-risk pregnant women decreases their participation in prenatal care and exerts negative influences on the growth and development of fetuses and the health of newborns [13].

The sense of mastery refers to the belief and enthusiastic attitude that one's will and efforts can lead his/her life [14], and it acts as an important parameter in measuring the quality of life and satisfaction with life. In particular, the sense of mastery was found to exert significant influences on emotional stability in stress research, and it is now receiving attention as an important psychological resource [14]. Moreover, the sense of mastery is also known to protect and improve the physical and mental health under various stress conditions [15, 16]. According to previous studies, individuals with a high sense of mastery can successfully face challenges and thus experience less negative influences from daily life stress [17, 18]. According to the study of Skaff, Mullan, Fischer, and Chesla [19], individuals with a high sense of mastery were more likely to have healthy life habits, and Steunenberg, *et al.*, [20] reported that treatment for depression was more effective in people with a high sense of mastery. Moreover, programs aimed at treating and improving problematic behaviors, such as smoking, alcohol addiction, obesity, and eating disorders, were more effective in individuals with a high sense of mastery [21].

Challenges for physical health, such as chronic diseases, disabilities in activities of daily living, and declines in vision and hearing, not only limit the daily living and leisure activities, but also threaten one's sense of mastery. In particular, people who require the help of others for basic daily living due to severe disabilities experience substantial decreases in emotional well-being and sense of mastery [22]. High-risk pregnancy is a life

 

event that causes serious stress; the stress from high-risk pregnancy can cause negative emotions, such as anxiety, and it also exerts physical and emotional influences [23]. Mercer, *et al.*, [5] reported that negative life events, including high-risk pregnancy, make pregnant women experience high stress and anxiety, exerting influences on their sense of mastery.

In order to reduce the stress and anxiety experienced by the increasing numbers of high-risk pregnant women, the sense of mastery, which is an individual psychological factor, should be treated as important. However, research on the sense of mastery among high-risk pregnant women has been almost absent in previous studies conducted in Korea and other countries. Also, with respect to research on high-risk pregnancy, studies have been conducted on the type of pregnancy experience of high-risk pregnant women [24], on the view on marriage, view on having children, and knowledge of high-risk pregnancy of single women over 30 years of age [25], and on the current conditions of delivery rooms and delivery conditions of high-risk pregnant women [26]; however, no studies have investigated the mediating effect of the sense of mastery on the relationship between high-risk pregnant women's stress and anxiety. Therefore, by investigating the relationship between stress and anxiety in high-risk pregnant women and the mediating effect of the sense of mastery, this study aimed to provide basic data for nursing intervention programs to increase the sense of mastery among high-risk pregnant women to decrease their stress and anxiety.

### 1.2. Purpose

The purpose of the present study was to investigate the relationship between pregnancy stress and anxiety among high-risk pregnant women and to investigate the mediating effect of the sense of mastery; the detailed purposes of the study are as follows:

- To investigate the general and obstetric characteristics of high-risk pregnant women.
- To investigate the levels of pregnancy stress, anxiety, and sense of mastery among high-risk pregnant women.
- To investigate the relationships between pregnancy stress, anxiety, and sense of mastery among high-risk pregnant women.
- To investigate the mediating effect of the sense of mastery in the relationship between pregnancy stress and anxiety in high-risk pregnant women.

## 2. Methods

### 2.1. Study Design

In order to assess the relationship between high-risk pregnant women's pregnancy stress and anxiety and the mediating effect of the sense of mastery, we suggested the research model shown in Figure 1.

### 2.2. Participants and Data Collection

This study was conducted between March 3, 2015, and March 30, 2015, upon agreement of directors at three university hospitals and with cooperation from obstetrics and gynecology outpatient clinics and delivery rooms. The participants were 118 high-risk pregnant women diagnosed with high-risk pregnancy during the 20th to 38th weeks of gestation at three university hospitals located in B, D, and Y cities; the participants either visited obstetrics and gynecology outpatient clinics for pre-delivery examinations or entered delivery rooms. The number of samples was

calculated with G*power 3.1. We calculated that a sample size of 77 would have 80% power to detect differences at the $p < 0.05$ significance level with an effect size of 0.15 for the three predictor variables. However, we recruited 120 participants to allow for a 20% non-response rate. Among the 120 questionnaires that were returned, 118 questionnaires, with the exception of two excluded for insufficient responses, were used for statistical analysis.

### 2.3. Instruments

**2.3.1. Pregnancy Stress:** In order to measure pregnancy stress, the instrument developed by Ahn [27] for primigravidas and revised and complemented by Jo and Kim [28] was used. This instrument included a total of 27 questions rated on a five-point Likert scale. The score for each question ranged from one point ("never been stressed") to five points ("always stressed"), and the total scores ranged from 27 to 135 points, with higher scores indicating greater stress. The reliability of the instrument at the time of development was Cronbach's $\alpha = 0.85$, and at the time of this study was Cronbach's $\alpha = 0.88$.

**2.3.2. Anxiety:** In order to measure anxiety, the State Trait Anxiety Inventory developed by Spielberger [29] and adapted by Kim and Shin [30] was used. This instrument consists of a total of 20 questions rated on a four-point Likert scale. Each question has a total score ranging from 20 to 84, including one point ("very much"); two points ("mostly"); three points ("little"); and four points, ("almost never"). Negative questions were reverse-coded, and higher scores indicate greater anxiety. The reliability of this instrument was Cronbach's $\alpha = 0.92$ both at the time of development and at the time of this study.

**2.3.3 Sense of Mastery:** In order to measure sense of mastery, the Sense of Mastery-measuring Instrument developed by Pearlin, *et al.,* [14] and adapted by Korean Gerontology [31] was used. This instrument consists of a total of seven questions rated on a four-point Likert scale. The score for each question ranges from one point ("strongly agree") to four points ("not agree at all"), and the total score ranges from 7 to 28. Negative questions were reverse-coded, and higher scores indicate a greater sense of mastery. At the time of development, Cronbach's $\alpha$ for this instrument was 0.70, and it was 0.74 at the time of this study.

### 2.4. Data Analysis

Collected data were analyzed using IBM SPSS Statistics 22. General features and obstetric characteristics of participants were analyzed using descriptive statistics, such as frequency, percentile, mean, and standard deviation. The correlations among pregnancy stress, anxiety, and sense of mastery of participants were verified using Pearson's correlation coefficient. A multiple regression analysis was performed in order to investigate the mediating effects of the relation between pregnancy stress and anxiety of participants, and a Sobel test was used to explore the significance of mediating effects.

## 3. Results

### 3.1 Participants' General and Obstetric Characteristics

Participants' mean age was 33.13 years, with 66.1% <35 years and 33.9% >35 years. With respect to education level, 83.1% had graduated from college, and 51.7% did not have occupations. Pregnant religious women accounted for 60.2% of

 

participants, exceeding the percentage of non-religious women, and 49.2% of women had household monthly incomes ranging from 2,000,000 to 4,000,000 won, marking the highest percentage. Mean gestational age was 30.4 weeks, with 35.6% in the second trimester and 64.4% in the third trimester. Pregnant women without a history of childbirth accounted for 52.5% of all participants, those who planned the pregnancy accounted for 85.5% of all participants, those who received regular prenatal tests accounted for 71.2% of all participants, and those who had experienced complications during a previous pregnancy accounted for 39.8% of all participantes (Table 1).

**Table 1. General and Obstetric Characteristics of Participants (*N* = 118)**

| | | | Maternal-fetal attachment | | |
|---|---|---|---|---|---|
| Variable | Category | N (%) | Mean ± standard deviation | t or F | *p* Duncan |
| Age (years) | <35 | 78 (66.1) | 72.23 ± 12.01 | -0.560 | 0.577 |
| | ≥35 | 40 (33.9) | 73.50 ± 10.91 | | |
| | | | | -0.446 | 0.656 |
| Education level | High school or less | 20 (16.9) | 74.28 ± 12.29 | | |
| | Above college | 98 (83.1) | 72.87 ± 11.51 | | |
| | | | | -1.428 | 0.156 |
| Occupation | Yes | 57 (48.3) | 71.09 ± 10.79 | | |
| | No | 61 (51.7) | 74.13 ± 12.25 | | |
| | | | | | |
| Religion | Yes | 71 (60.2) | 74.00 ± 12.79 | -1.646 | 0.102 |
| | No | 47 (39.8) | 70.63 ± 9.37 | | |
| | | | | | |
| Family income | <200 | 10 (8.5) | 77.2 ± 10.58 | 1.067 | 0.348 |
| (Ten thousand won) | 200–400 | 58 (49.2) | 72.95 ± 12.10 | | |
| | >400 | 50 (42.3) | 71.42 ± 11.21 | | |
| | | | | | |
| Gestational age | 20–28 | 42 (35.6) | 71.83 ± 12.80 | -0.573 | 0.567 |
| (weeks) | 29–38 | 76 (64.4) | 73.11 ± 10.98 | | |
| | | | | | |
| Childbirth experience | 0[a] | 62 (52.5) | 73.94 ± 10.17 | 3.795 | 0.025 (a,b>c) |
| | 1[b] | 44 (37.3) | 73.19 ± 12.82 | | |
| | ≥2[c] | 12 (10.2) | 64.17 ± 11.48 | | |
| | | | | | |
| Antepartum care | Regular | 84 (71.2) | 74.32 ± 11.84 | 2.49 | 0.014 |
| | Irregular | 34 (28.8) | 68.56 ± 10.10 | | |
| | | | | | |
| Planned pregnancy | Yes | 94 (85.5) | 74.04 ± 11.51 | 2.619 | 0.010 |
| | No | 24 (14.5) | 67.25 ± 10.63 | | |
| | | | | | |
| Previous pregnancy complication | Yes | 47 (39.8) | 71.30 ± 11.46 | 1.037 | 0.302 |
| | No | 71 (60.2) | 73.56 ± 11.72 | | |
| | | | | | |

### 3.2 The Participants' Levels of Pregnancy Stress, Anxiety, and Sense of Mastery

The mean scores for participants' levels of pregnancy stress, anxiety, and sense of mastery were 59.69 ± 12.87, 39.02 ± 8.61, and 20.93 ± 2.92, respectively (Table 2).

**Table 2. Participants' Levels of Pregnancy Stress, Anxiety, and Sense of Mastery (*N* = 118)**

| Variable | Mean | Standard deviation | Range | Minimum | Maximum |
|---|---|---|---|---|---|
| Pregnancy stress | 59.69 | 12.87 | 27.00–135.00 | 27.00 | 90.00 |
| Anxiety | 39.02 | 8.61 | 20.00–80.00 | 21.00 | 60.00 |
| Sense of mastery | 20.93 | 2.92 | 7.00–28.00 | 14.00 | 28.00 |

### 3.3 Relationships between the participants' pregnancy stress, anxiety, and sense of mastery

When relationships between the participants' pregnancy stress, anxiety, and sense of mastery were analyzed, a significant direct correlation between pregnancy stress and anxiety was observed (r = 0.560, $p < 0.000$). Both pregnancy stress (r = -0.490, $p < 0.000$) and anxiety (r = -0.576, $p < 0.000$) had a significant inverse correlation with sense of mastery (Table 3).

**Table 3. Relationships among Participants' Pregnancy Stress, Anxiety, and Sense of Mastery (*N* = 118)**

| Variable | Pregnancy stress | Anxiety | Sense of mastery |
|---|---|---|---|
| | r (p) | | |
| Pregnancy stress | 1 | 0.560** (0.000) | -0.490** (0.000) |
| Anxiety | .560** (0.000) | 1 | -0.576** |
| Sense of mastery | -0.490** (0.000) | -0.576** (0.000) | 1 |

**

### 3.4 The Mediating Effects of Participants' Pregnancy Stress, Anxiety, and Sense of Mastery and Verification of the Mediating Effects

In order to investigate whether the sense of mastery mediates the relationship between pregnancy stress and anxiety in high-risk pregnant women, we applied the mediating effect verification protocol suggested by Baron and Kenny [32] and conducted a regression analysis.

In the first stage, we conducted a multiple regression analysis with pregnancy stress as the independent variable and with anxiety as the dependent variable; the influence exerted by pregnancy stress on anxiety and the dependent variable was statistically significant ($\beta = 0.560$, $p < 0.001$). In the second stage, we conducted a multiple regression analysis with pregnancy stress as the independent variable and the sense of mastery as the dependent variable; the influence exerted by pregnancy stress on the sense of mastery, the dependent variable, was statistically significant ($\beta = -0.490$, $p < 0.001$). Finally, in the last stage, we conducted a multiple regression analysis with pregnancy stress and the sense of mastery as independent variables and with anxiety as a dependent variable; the influence exerted by pregnancy stress on anxiety, the dependent variable, was statistically significant ($\beta = 0.366$, $p < 0.001$), and when pregnancy stress was controlled, the influence of the sense of mastery, the intervening variable, on anxiety was also statistically significant ($\beta = -0.397$, $p < 0.001$). Therefore, we confirmed that the sense of mastery exerted an influence as a partial intervening variable on the relationship

 

between the participants' pregnancy stress and anxiety (Table 4). When this effect was tested with the Sobel test, the z value was 4.74 ($p < 0.001$), indicating a significant mediating effect. In other words, the results showed that the sense of mastery exerted a significant partial mediating effect on the influence of the participants' pregnancy stress on anxiety (Table 5), [Figure 2].

**Table 4. Mediating Effects of the Sense of Mastery**

| | B | B | $R^2$ | Adj. $R^2$ | F | p |
|---|---|---|---|---|---|---|
| Step 1 | | | | | | |
| Pregnancy stress → Anxiety | 0.506 | 0.560 | 0.314 | 0.308 | 53.055 | <0.001 |
| Step 2 | | | | | | |
| Pregnancy stress → Sense of mastery | -0.429 | -0.490 | 0.240 | 0.234 | 36.682 | <0.001 |
| Step 3 | | | | | | |
| Pregnancy stress →Anxiety | 0.330 | 0.366 | 0.434 | 0.424 | 44.024 | <0.001 |
| Sense of mastery → Anxiety | -0.410 | -0.397 | | | | |

**Table 5. Mediating Effects of the Sense of Mastery**

| Path | a (SEa) | b (SEb) | Zab |
|---|---|---|---|
| **Pregnancy stress → Sense of mastery** | **-0.429 (0.071)** | **-0.595 (0.078)** | **4.74 (p < 0.001)** |
| **→ Anxiety Pregnancy stress → Anxiety** | | | |

## 4. Discussion

This was a cross-sectional study conducted on 118 high-risk pregnant women in order to investigate the mediating effect of the sense of mastery on the relationship between high-risk pregnant women's pregnancy stress and anxiety. We found that the pregnancy stress and anxiety of high-risk pregnant women exerted direct influences. Moreover, the pregnancy stress of high-risk pregnant women was found to influence the sense of mastery, and the sense of mastery was found to exert an indirect influence on the anxiety of high-risk pregnant women. Based on the aforementioned findings of the present study, we would like to discuss the following.

High-risk pregnant women's pregnancy stress had a significant direct correlation with anxiety, indicating that high-risk pregnant women experience more anxiety as their pregnancy stress increases. This finding supports the findings of Ayers, *et al.*, [9] and Choi and Cho [33], who reported that stress exerts influences on anxiety. The stress vulnerability model is applied for anxiety disorders that do not have clear biomedical causes. In the study of Rangaraj and Pelissolo [34], the elderly were found to experience more mental and social stress than did other age groups, and they were also more likely to experience anxiety from various physical diseases. High-risk pregnant women experience more stress than do normal pregnant women, and they also experience more anxiety due

to physical and emotional discomfort [5]. Taken together, the findings of previous studies and of this study indicate that the characteristics of high-risk pregnant women cause higher levels of pregnancy stress, eventually leading to an emotional problem called anxiety. Therefore, prenatal programs aimed at investigating and decreasing high-risk pregnant women's pregnancy stress and anxiety should be developed and applied.

The sense of mastery was found to mediate the relationship between high-risk pregnant women's pregnancy stress and anxiety, indicating that the sense of mastery not only influences the anxiety of high-risk pregnant women but also acts as a partial intervening variable on the relationship between pregnancy stress and anxiety. Such findings support the findings of Bandiura [17] and Schwarzer [18], who reported that individuals with a higher sense of mastery experience fewer negative influences from daily life stress. As an individual vulnerability factor, the sense of mastery, which is a belief that one's efforts can allow one to overcome challenges and obstacles in the environment, indicates the level of self-confidence [14]. The perceived sense of mastery plays important roles in maintaining the self-efficacy and psychological well-being under change or stressful circumstances. Pearlin, *et al.*, [14] reported that the sense of mastery was directly influenced by self-esteem and that the sense of mastery increased when self-esteem increased. Putting the findings of previous studies and this study together, high-risk pregnant women with a low sense of mastery experience severe pregnancy stress, and the level of anxiety experienced by the women increases as a result; this demonstrates that the low sense of mastery of high-risk pregnant women can indicate cognitive vulnerability to anxiety. Therefore, during prenatal care for high-risk pregnant women, nursing intervention programs that can manage and improve the women's self-esteem and sense of mastery are required.

This study demonstrated the mediating effect of the sense of mastery in the relationship between high-risk pregnant women's pregnancy stress and anxiety. In other words, this study is significant since it empirically verified that the anxiety of high-risk pregnant women decreased as pregnancy stress decreased and as the sense of mastery increased. However, since the participants of the present study represented a sample of convenience, it is difficult to generalize these findings to all pregnant women.

## 5. Conclusion

This study was conducted to determine ways to decrease the anxiety of high-risk pregnant women by investigating the mediating effect of the sense of mastery on the relationship between high-risk pregnant women's pregnancy stress and anxiety. The anxiety of high-risk pregnant women was lower when the pregnancy stress was lower and when the sense of mastery was higher. Therefore, health care providers, including nurses, should provide prenatal care to prevent the anxiety of high-risk pregnant women from early phases. Based on the findings of the present study, we make the following suggestions:

First, it is required to conduct replication studies aimed at decreasing pregnancy stress and anxiety of high-risk pregnant women.

Second, based on the findings of the present study, future studies should develop prenatal intervention programs aimed at the prevention and management of the anxiety of high-risk pregnant women and investigate their effectiveness.

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