



Correlation analysis of stress and family function and coping modes in pregnant women with pregnancy-induced hypertension syndrome

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Background: Pregnancy-induced hypertension is a common complication in obstetrics and an important cause of maternal death. We explored the correlations among stress, family function and coping mode in women with pregnancy-induced hypertension syndrome.

Methods: A total of 58 pregnant women with pregnancy-induced hypertension syndrome were included in the study. The perceived stress scale (PSS), family assessment device (FAD), and medical coping modes questionnaire (MCMQ) were used to assess stress level, family function, and coping mode, respectively.

Results: The PSS score was 28 (interquartile range: 20–43). The total FAD score was 128.1±27.1. The subscale scores were problem-solving, affective responsiveness, communication, roles, behavior control, affective involvement, and general function, in order of decreasing score. Significant correlations were noted between PSS score and total FAD score, affective responsiveness, problem-solving, communication, roles, affective involvement, and behavior control (all $P < 0.05$). PSS score was significantly correlated with “Escape” ($P = 0.016$) and “Yield” ($P < 0.001$) in the MCMQ. Single-factor analysis showed that education level, average household income, and FAD total score were significantly different in those with a low or high PSS score. Logistic regression indicated the FAD total score as an independent factor for the PSS score.

Conclusions: Women with pregnancy-induced hypertension syndrome with a high PSS score tended to adopt the “Escape” and “Yield” coping modes. Family function integrity is essential for reducing PSS scores.

Keywords: Coping modes; family function; pregnancy-induced hypertension syndrome; stress

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Introduction

Pregnancy-induced hypertension is a group of obstetric clinical and common diseases, including preeclampsia, eclampsia, pregnancy with chronic hypertension, and

chronic hypertension with preeclampsia. Studies have shown that gestational hypertension accounts for about 5–10% of all pregnancies (1). An epidemiological survey of 5,521 pregnant women aged 20–40 in the United States found that 7.7% suffered from hypertension

during pregnancy (2), and it is the second leading cause of maternal death in China. At present, the specific cause of hypertension in pregnancy is not clear, and it may be related to factors such as abnormal trophoblast cell invasion, immune regulation disorders, vascular endothelial damage, genetics, and nutrition. Pregnancy-induced hypertension not only leads to adverse pregnancy outcomes but also has a significant psychological effect on the pregnant woman. Studies have shown that pregnant women with gestational hypertension are in a state of stress. Their risk of postpartum depression, anxiety, and post-traumatic stress disorder syndrome is significantly higher than that of unaffected pregnant women (3). Family function refers to the emotional connection, family rules, family communication and the effectiveness of responding to external events in the family system. Perfect family function not only helps to ease maternal anxiety but also maintains family harmony, thus promoting maternal physical and mental wellbeing. For example, a cross-sectional study in Hengyang showed that the family dysfunction was closely related to maternal depression (4). In contrast, a perfect family function can help pregnant women make full use of medical resources to reduce their stress and adverse pregnancy events (5). A study showed that the psychological factors, family and social support of pregnant women are related to the occurrence of hypertension during pregnancy (6). Affected pregnant women may adopt different coping modes, such as “Escape”, “Face”, or “Yield”, in response to stress. In this study, we explored the correlations between the stress level of pregnant women with pregnancy-induced hypertension and their family function and coping mode to provide more targeted diagnosis, treatment, and nursing care for pregnant women with pregnancy-induced hypertension. We present the following article in accordance with the STROBE reporting checklist (available at <https://dx.doi.org/10.21037/apm-21-2662>).

Methods

Study subjects

From January 2019 to December 2020, 58 pregnant women with pregnancy-induced hypertension were enrolled. The inclusion criteria were: (I) able to understand the content of the study and agree to participate in it; (II) no additional stressors other than hypertensive disorder complicating pregnancy. The exclusion criteria were: (I) unable to read

or understand the content of this study, and so informed consent was not available; (II) severe organ dysfunction, such as liver failure, severe thrombocytopenia. (III) The patient has non-pregnancy-related hypertensive factors such as primary hypertension and secondary hypertension. All procedures performed in this study involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Ethics Committee of Haikou Hospital of the Maternal and Child Health (No. 2018042) and informed consent was given by all the patients.

Survey tools

Questionnaires were distributed by 2 medical staff trained in our department. When necessary, explain the specific meaning of each item to the survey object, and the survey object will fill in and collect it on the spot. Excluding missing items and invalid questionnaires, 58 final questionnaires were valid questionnaires. The women’s general information, such as disease diagnosis, age, gestational age, primipara/multipara, education level, monthly family income, medical expenses payment, etc., was collected by a self-administered survey.

Evaluation of stress level

A subjective stress scale, the perceived stress scale (PSS), was used to evaluate the emotional stress level associated with pregnancy-induced hypertension. Research shows that the Chinese version of PSS has high reliability and validity (7). The correlation coefficient of Cronbach α is 0.91, and the retest correlation coefficient is 0.69.

Family function

The Chinese version of the family assessment device (FAD) was used to evaluate the family function of the pregnant women. There are 60 questions in the latest version, covering seven dimensions of family function: solution, communication, role, emotional response, emotional intervention, behavior control, and general function. The higher the score, the more serious is the family dysfunction.

Assessment of the response to stress

The Chinese version of the medical coping modes

Table 1 General information of the study group of pregnant women (n=58)

Variables	Count/mean
Age (years), mean \pm SD	26.7 \pm 3.7
Gestational age (weeks), mean \pm SD	32.9 \pm 2.4
Parity, n (%)	
Primipara	46 (79.3)
Multipara	12 (20.7)
Education level, n (%)	
Junior high school or below	8 (13.8)
High school	24 (41.4)
University or postgraduate	26 (44.8)
Average monthly household income (RMB), n (%)	
<5,000	7 (12.1)
5,000–10,000	26 (44.8)
>10,000	25 (43.1)
Payment of medical expenses, n (%)	
Medical insurance	53 (91.4)
Self-funded	5 (8.6)

SD, standard deviation.

questionnaire (MCMQ) was used to assess how pregnant women respond to stress (8). The MCMQ Chinese edition consists of 20 entries, covering three dimensions, “Face” (8 entries), “Escape” (7 entries), and “Yield” (8 entries), each with a score of 1–4. The higher the score per dimension, the more frequently the patient responds to stress.

Statistical analysis

SPSS 22.0 was utilized for data processing and statistical analysis. General information about the patient was expressed as mean \pm standard deviation or rate/percentage. Because the PSS scores were not normally distributed, the correlation between the PSS score and the family function dimensions was calculated using Spearman-related calculations. According to the median PSS score, the subjects were divided into low-stress and high-stress groups. The risk factors affecting stress levels were identified through single-factor and multifactor analysis. A two-sided $P < 0.05$ indicated statistical difference.

Results

General information of the pregnant women (Table 1)

The mean age and gestational age of the 58 pregnant women with pregnancy-induced hypertension were 26.7 \pm 3.7 years and 32.9 \pm 2.4 weeks, respectively. Most of the patients were primipara, most of whom had graduated from high school, university, or postgraduate. The average monthly family income was 5–10 k RMB and >10 k RMB.

Stress level, family function and coping modes

As shown in Table 2, the total score of family function (FAD) of the pregnant women included in the study was 128.1 \pm 27.1, and the average score of items was 2.14 \pm 0.45. The average scores of FAD in decreasing order were problem-solving, emotional response, communication, role, behavior control, emotional intervention, and general function. The median stress level (PSS) of the pregnant women was 28, and the interquartile range was 20–43. The scores of coping mode (MCMQ) were 20.4 \pm 5.7 for “Face”, 18.8 \pm 4.8 for “Escape”, and 21.3 \pm 5.0 for “Yield”.

Correlation analysis of stress level, family function and coping mode (Table 3)

The PSS score significantly correlated with total FAD score, emotional response, problem-solving, communication, role, emotional intervention, and behavior control. The correlation between the PSS score and the total score of FAD was the largest ($\rho = 0.746$, $P < 0.001$). There was no significant correlation between the PSS score and the total function of the FAD subscale.

As shown in Figure 1, there was no significant correlation between PSS score and the “Face” coping mode in the MCMQ ($\rho = -0.144$, $P = 0.28$), between the PSS score and “Escape” coping mode ($\rho = 0.314$, $P = 0.016$), or the “Yield” coping mode ($\rho = 0.507$, $P < 0.001$).

Single-factor analysis of stress level of the pregnant women

According to the median PSS score (28 points), the pregnant women were divided into low-stress group and high-stress group. The univariate analysis is shown in Table 4. The results showed that there were significant differences between the groups in education level, average

Table 2 Stress level (PSS), family function (FAD), and coping mode (MCMQ) scores of the pregnant women

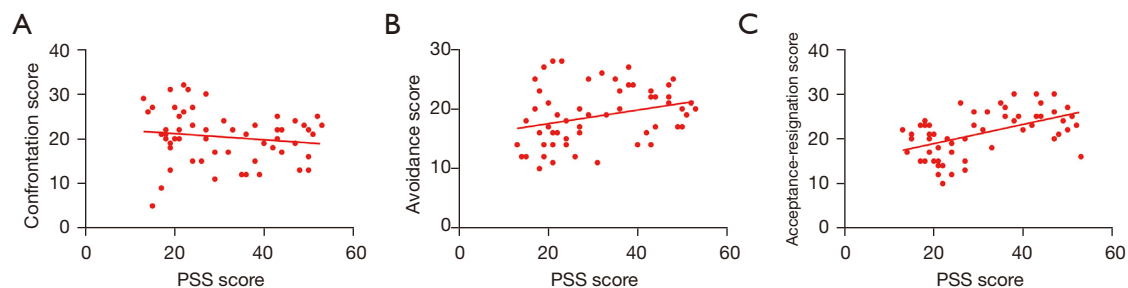
Evaluation scale	Instrument	No. of entries	Total score, mean \pm SD	Average score, mean \pm SD
Family function	Total FAD score	60	128.1 \pm 27.1	2.14 \pm 0.45
	Emotional response	6	14.2 \pm 5.2	3.09 \pm 1.51
	Problem-solving	6	14.6 \pm 4.9	3.14 \pm 1.43
	Communication	9	21.8 \pm 6.2	2.43 \pm 0.69
	Role	11	24.4 \pm 7.3	2.21 \pm 0.66
	Emotional intervention	7	13.6 \pm 5.7	1.95 \pm 0.81
	Behavior control	9	19.6 \pm 6.6	2.18 \pm 0.73
	General function	12	19.9 \pm 8.4	1.66 \pm 0.70
Stress level	PSS	14	Median [IQR]: 28 [20–43]	–
Coping modes	“Face”	8	20.4 \pm 5.7	2.55 \pm 0.71
	“Escape”	7	18.8 \pm 4.8	2.69 \pm 0.69
	“Yield”	8	21.3 \pm 5.0	2.67 \pm 0.63

PSS, perceived stress scale; FAD, family assessment device; MCMQ, medical coping modes questionnaire; SD, standard deviation; IQR, interquartile range.

Table 3 Correlation between stress level (PSS score) and family function (total FAD score) and each subscale score (rho, n=58)

Variables	Total FAD score	Emotional response	Problem-solving	Communication	Role	Emotional Intervention	Behavior control	General function
PSS	0.746***	0.612***	0.491***	0.405***	0.512***	0.673***	0.419**	0.117

P*<0.01; *P*<0.001. PSS, perceived stress scale; FAD, family assessment device.

**Figure 1** Correlation between perceived stress scale (PSS) score and coping modes: (A) Face; (B) Escape; (C) Yield.

monthly family income, and total FAD score; the low-stress group had a higher education level, higher family income, and lower total FAD score than the high-stress group.

Analysis of multiple factors influencing the stress level of the pregnant women (Table 5)

Binary logistic regression analysis showed that the total FAD score was still an independent risk factor for pregnant

women with pregnancy-induced hypertension. In contrast, the education level and average monthly family income of pregnant women were not statistically significant after multivariate analysis.

Discussion

Pregnancy-induced hypertension is a common cause of severe adverse pregnancy outcomes. Active fetal testing,

Table 4 Comparison of relevant data of low and high stress level groups

Variables	Low stress level (n=29)	High stress level (n=29)	Inspection value	P
Age (years), mean \pm SD	26.6 \pm 3.5	26.8 \pm 3.9	-0.21	0.83
Gestational week, mean \pm SD	33.0 \pm 2.2	32.7 \pm 2.7	0.43	0.67
Parity			0.42	0.52
Primipara	24	22		
Multipara	5	7		
Education level			8.0	0.02
Junior high school or below	4	4		
High school	7	17		
University or postgraduate	18	8		
Average monthly household income (RMB)			8.8	0.01
<5,000	3	4		
5,000–10,000	8	18		
>10,000	18	7		
Payment of medical expenses			0.22	>0.99
Medical insurance	27	26		
Self-funded	2	3		
Total FAD score, mean \pm SD	108.6 \pm 19.7	147.6 \pm 17.9	-7.89	<0.001

SD, standard deviation; FAD, family assessment device.

Table 5 Multivariate regression analysis of stress levels of pregnant women with pregnancy-induced hypertension

Variables	B	Exp (B)	95% CI	P
Education	-0.278	0.757	0.238–2.409	0.64
Monthly income	-0.645	0.525	0.124–2.225	0.38
FAD score	0.189	1.208	1.069–1.366	0.002

CI, confidence interval; FAD, family assessment device.

blood pressure control and pregnancy termination are the main principles of the treatment of hypertension during pregnancy. Previous studies have found that pregnancy-induced hypertension is closely related to subjective or objective stress. Zhang *et al.*'s meta-analysis showed that mental stress significantly increased the risk of preeclampsia during pregnancy (9). In addition, the diagnosis of pregnancy-induced hypertension increases the anxiety and physical symptoms of pregnant women (10).

The median PSS score of the pregnant women in this study was 28. A cross-sectional study by Sarmasti

and colleagues (11) found that the average PSS score of pregnant women with preeclampsia was 35.6 \pm 8.7, which was significantly higher than that of healthy controls, consistent with the conclusion of this study. Stress not only leads to anxiety, tension, depression, and other negative emotions during pregnancy but also increases adverse pregnancy outcomes. A study of 403 pregnant women undergoing prenatal examination showed that 23.6% of pregnant women had different degrees of subjective stress symptoms, which were closely related to divorce, separation, mental/physical family trauma, marital disputes, and family disputes (12).

In this study, the average scores of problem-solving and emotional responses in the FAD were >3, which was significantly higher than that of normal controls (13). Problem-solving refers to the family's ability to solve problems that threaten family integrity and functional capacity. Based on the McMaster Family Process Model theory, the primary goal and function of the family are to complete daily tasks and deal with crises (14). Most of the patients in this study were primipara. They had no

experience of coping with pregnancy-induced hypertension, so they may have relied more on their families to deal with this stress. Emotional response evaluates the degree of emotional reaction of family members to stimuli and reflects the emotional communication of family members to the patient. Effective and good emotional responses can help to reduce anxiety, depression, and other adverse mood and improve the level of stress (15).

The pregnant women with pregnancy-induced hypertension were more likely to adopt the “Escape” or “Yield” coping mode, which was consistent with the results of similar studies. For example, women undergoing *in vitro* fertilization embryo transfer (IVF-ET) scored significantly higher for the “Escape” coping style than the control group, while women with high social support more often adopted the “Face” coping mode (16). In this study, the PSS score positively correlated with the “Escape” and “Yield” coping modes and positively associated with FAD, indicating that the greater the family dysfunction, the more likely patients were to adopt these coping modes.

Univariate analysis showed that education level, average monthly family income, and total score of FAD were independent risk factors of the PSS score. In contrast, multivariate analysis showed that FAD was the independent risk factor of PSS score. We speculate that patients with low education levels may have insufficient knowledge of the disease, while patients with low average monthly family income may worry that adverse pregnancy outcomes will seriously affect the family’s financial situation and thus increases the stress level of the pregnant woman with hypertension. Studies have found that education level and family income, and other economic and social status can significantly affect the physical and mental health of pregnant women with preeclampsia (17). The total score of FAD had an independent and significant effect on the PSS score of patients, suggesting that a well-functioning family is helpful for pregnant women to cope with the stressor of gestational hypertension (18).

In conclusion, pregnant women with pregnancy-induced hypertension with high stress levels are more likely to adopt the “Escape” and “Yield” coping modes. Family dysfunction will increase the stress level of pregnant women with gestational hypertension. In clinical or nursing practice, medical staff should incorporate a family function evaluation and other support systems into the nursing plan to help improve the patient’s stress level.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at <https://dx.doi.org/10.21037/apm-21-2662>

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://dx.doi.org/10.21037/apm-21-2662>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Ethics Committee of Haikou Hospital of the Maternal and Child Health (No. 2018042) and informed consent was given by all the patients.

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