Factors Predicting Coping of Pregnant Women Working in the Manufacturing Industry: A Cross-sectional Study

Pongsri Buddharak, Nantaporn Sansiriphun, Thanee Kaewthummanukul, Apiradee Nantsupawat*

Abstract: Pregnant women working in the manufacturing industry are at risk of experiencing stress both from pregnancy itself and from their occupation. Supporting them to cope effectively with this stress is an important role of the nurse-midwife. This cross-sectional study investigated the predictive power of job strain, pregnancy-specific stress, sense of coherence, self-esteem, religious belief, and social support in predicting coping among pregnant women working in the manufacturing industry. The participants were 288 women visiting the antenatal department of five provincial hospitals in Thailand. The research instruments were a demographic data recording form, and the Thai versions of the Job Content Questionnaire, the Revised Prenatal Distress Questionnaire, the 13-item Sense of Coherence, the Rosenberg Self-Esteem Scale, the Buddhist Belief Questionnaire, the Social Support Questionnaire, and the Ways of Coping Checklist-Revised. Data were analyzed using descriptive statistics and hierarchical multiple regression.

The study results revealed that job strain, pregnancy-specific stress, sense of coherence, self-esteem, religious belief, and social support altogether could explain 60% of the variance in problem-focused coping and 57% of the variance in emotion-focused coping of pregnant women working in the manufacturing industry. Social support was the strongest predictor of problem-focused coping, while the sense of coherence was the strongest predictor of emotion-focused coping. The findings can be used by nurse-midwives in planning interventions to promote coping of pregnant women working in the manufacturing industry, focusing on enhancing social support and a sense of coherence and reducing pregnancy-specific stress.

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Introduction

A rise in the numbers of women in the labor force and continuing employment while pregnant is an important issue. Pregnant women working in the manufacturing industry (PW-WMI) are at risk of

experiencing stress both from the pregnancy itself and from their occupation. Changes and demands related to the reproductive period, and the emerging social context during the pregnancy can form high stress levels in a number of expectant mothers.[1] Employment during pregnancy is an important issue due to the rising number of women who enter the labor force. In Thailand, 52.73% of workers insured by Thailand's Social Security Office in 2021 were female, and 10.75% of insured workers received child allowance,[2] which reflected pregnancy and childbirth during employment.

Prenatal exposure to harmful substances is a crucial problem for PW-WMI. Chemical substances can cross the placenta and cause spontaneous abortion, stillbirth, intrauterine growth retardation, and congenital anomalies.[3] In Thailand, the work of PW-WMI involves repetitive use of hands and wrists (46.0%), sitting (43.8%) and standing (16.5%) for longer than two hours, working in too hot or too cold environments (12.8%), lifting and carrying heavy objects (12.6%), and working at night or rotating shifts (10.0%).[4] These work characteristics can bring negative health outcomes for these women and their unborn baby, such as pregnancy disorders (45%), miscarriage (15.7%),[5] and severe back pain (29.3%),[4] which can all be perceived as a stressful event that necessitates coping.

Coping is a resilient resource to buffer pregnant women and their fetuses from the effects of harmful prenatal stress exposure.[6] However, PW-WMI may adopt different coping styles, which directly influence their mental and physical well-being.[7] In Thailand, a study contends that they used coping by avoidance,[8] which is linked to various negative outcomes for mental health, such as greater psychological distress and stress. During pregnancy, stress accelerates the synthesis of the corticotrophin-releasing hormone of placental origin (pCRH) through increased levels of cortisol,[9] a stress hormone. Greater maternal pCRH is linked to the date of delivery and the pathogenesis of preterm birth.[9] Thus, there is a need to understand coping and its influencing factors that lead to the varying coping styles among PW-WMI.

Conceptual Framework and Literature Review

This study was guided by the Transaction Model of Stress and Coping by Lazarus and Folkman.[10] Stress is a specific interaction between individuals and their surroundings, perceived as challenging or beyond their capabilities and jeopardizing their well-being. People regularly evaluate environmental stimuli using two main types of appraisal: primary and secondary appraisal.[10] Primary appraisal assigns meaning to a particular individual/environmental interaction and assesses its importance to a person's well-being.[10] The transaction may be classified as benign-positive, irrelevant, or stressful. Then, secondary evaluation entails the identification and assessment of the person's coping resources that can be physical resources (i.e. health and energy), psychological resources (i.e. positive beliefs), competencies (i.e. problem-solving and social skills), and social environmental resources (i.e. social and material resources).[10] When a circumstance is deemed stressful in primary appraisal and necessitates attempts at controlling or resolving the occurrence in secondary appraisal, coping action is activated.

Coping is described as constantly changing cognitive and behavioral efforts to deal with the demands of a particular circumstance appraised as stressful.[10] In PW-WMI's context, pregnancy and working in industrial factories are potentially stressful events that may initiate their primary and secondary appraisals.

In primary appraisal, PW-WMI evaluate the significance of working in industrial factories, concerns and fears caused by being pregnant, and assess how important these situations are to their own health and their baby's well-being. In the literature, factors in

the primary appraisal of pregnant women included job strain and pregnancy-specific stress.

Job strain refers to mentally taxing tasks, organizational constraints on task completion, and job control issues.[11] People see work settings as stressful when they believe there are significant demands on them that are not well fitted to their needs or their knowledge and abilities, particularly when feeling powerless and unsupported at work. Previous research shows that job strain is associated with coping among pregnant women[12] and working mothers.[13]

Pregnancy-specific stress involves worries, concerns and fears related to pregnancy.[14] Becoming pregnant is one of the most crucial times in a woman's life. It can result in maternal stress because of significant adjustments to the family's social, psychological, and physiological functions.[1] Therefore, when pregnant women appraise pregnancy as a stressful situation that may harm their own health and the unborn baby's well-being, they initiate coping responses. Previous studies showed that pregnancy-specific stress was significantly correlated with problem-focused coping[15,16] and emotion-focused coping.[16]

In secondary appraisal, PW-WMI assess their own skills and resources if they will be adequate to address the stressful event. From reviewing the literature about pregnant women, factors in secondary appraisal comprise a sense of coherence, self-esteem, religious belief, and social support.

A sense of coherence refers to a broad attitude that describes how much people feel confident that their surroundings are foreseeable and that things will turn out as they should under the circumstances.[17] A sense of coherence is a psychological coping resource[10] that affects people's appraisal of situations and helps them better adapt or cope with their stressors.[17] People with a strong sense of coherence can handle stress in a healthy way and are less likely to see a circumstance as unpleasant. Those who lack a sense of coherence are more prone to experience anxiety and have unproductive reactions to stressful events.[17] Research among workers in industrial factories shows that a sense of coherence has a positive correlation with problem-focused coping and coping by seeking social support.[18]

Self-esteem refers to self-admiration and a strong sense of self-worth. Low self-esteem is a sign of self-denial, discontentment with oneself, and lack of regard for oneself.[19] Self-esteem is another psychological coping resource[10] that is a positive belief affecting how PW-WMI respond to stressful circumstances and direct their coping actions. Self-esteem can significantly predict problem-focused coping among pregnant women.[7]

Religious belief is a collection of attachments to ideologies, acceptance, and faith in any religion.[20] Religious belief is a psychological resource affecting how people respond to stressful events, and guide their coping methods.[10] Thus, it may enable pregnant women to understand stressful situations and promote better coping mechanisms. Religious belief has been found to be positively related to coping among the general population in Poland.[21]

Social support, for example, describes people's perceptions about receiving assistance from husbands, family members, co-workers, and health care providers that consists of emotional, information, instrumental, and appraisal support.[22] Social support is considered a social-environmental resource to handle the threat or challenge that a stressor presents.[10] People who receive social support might think they have everything they need to deal with pressures in their environment and maintain control, thus being able to cope with stressful situations. Social support predicted emotion-focused coping and problem-focused coping among Chinese pregnant women.[23] In Thailand, social support was found to be positively correlated with coping among pregnant women with gestational diabetes.[24]

To the best of current knowledge, job strain, pregnancy-specific stress, sense of coherence, self-esteem, religious belief, and social support have been studied for their associations with coping in various populations of women and pregnant women. However, there is a lack of research to examine the predictive

ability of these factors on coping among PW-WMI. This particular group of pregnant women may have different context from other populations of women.

Study Aim

To identify the predictive power of job strain, pregnancy-specific stress, sense of coherence, self-esteem, religious belief, and social support in mutually predicting coping among PW-WMI

Methods

Design: A descriptive cross-sectional design was employed. The study is reported here following the STROBE cross-sectional guidelines.

Sample and Setting: The participants were PW-WMI who visited the antenatal department of five hospitals in the industrial zones in three regions of Thailand. The sample size was determined based on a ratio of 40 participants per one independent variable.[25] With six independent variables in this study, the sample size should be 240 plus 20% for possible dropout,[26] totaling 288 PW-WMI.

We used a multi-stage random sampling method. First, three regions were selected from the six regions of Thailand, using simple random sampling by lottery technique without replacement, resulting in the northern, the eastern, and the northeastern regions. In these regions, nine provinces with industrial zones were selected using simple random sampling by lottery technique without replacement, resulting in two northern, four eastern, and three northeastern provinces. Second, provincial hospitals were selected using simple random sampling without replacement based on the proportion of 2:1. This resulted in one hospital from the northern region, two hospitals from the northeastern region, and two hospitals from the eastern region, totaling five hospitals representing the three regions of Thailand where PW-WMI visited for antenatal care. Lastly, the primary investigator (PI) or the research assistants (RAs) screened the Mother and Child Health Records in these hospitals and selected pregnant women who met the inclusion criteria. They used purposive sampling based on the proportion of the numbers of pregnant women in each hospital until reaching the determined sample size of 288 (**Figure 1**).

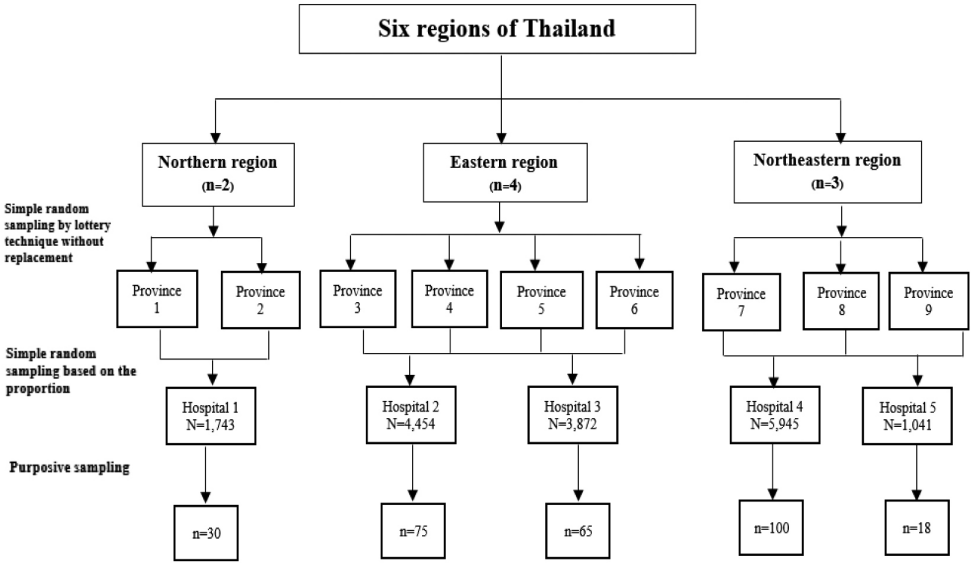

Figure 1. Multi-stage random sampling of this study

The inclusion criteria were: Thai women aged between 20 to 35 years old; gestational age of 24-40 weeks; having worked in an industrial production line during pregnancy for at least six months; Buddhist; ability to communicate in Thai and willingness to participate in the study. Exclusion criteria included having pregnancy complications or high-risk pregnancy.

Ethical Considerations: Approval was obtained by the Research Ethics Committee, Faculty of Nursing, Chiang Mai University (Research ID: 093/2564; Study Code: 2564-EXP073), and the participating hospitals. All participants were informed of the study objective and procedures, benefits and risks, and their rights to refuse participation or withdraw from the study at any time without consequences on their health services. All participants signed a consent form. Confidentiality and anonymity were maintained. During data collection, participants were observed for any potential symptoms of labor pain and minor discomforts.

Instruments: Eight instruments were employed for data collection. All instruments, except the demographic data recording form, were used with permission from original authors.

The Demographic Data Recording Form was developed by the PI to obtain sociodemographic information on age, marital status, education, monthly family income, income sufficiency, and family type; obstetric data on gestational age, pregnancy intent, and parity; type of manufacturing industry; current work duties, and work schedule. The latter included duration of work per week, working hours, working overtime during pregnancy, and work shifts.

The Ways of Coping Checklist-Revised (WCCL-R), created by Vitaliano et al.[27] and translated into Thai version by Sawang et al.,[28] was adopted to measure coping. The seeking social support, blaming self, wishful thinking, and avoidance subscales represent emotion-focused coping.[29] Each item is rated on a 4-point Likert scale from 0 (never used) to 3 (regularly used). Possible total scores range from 0-45 for problem-focused coping and 0-81 for emotion-focused coping, with higher scores indicating higher coping.[28]

The Job Content Questionnaire (JCQ) was developed by Karasek and Theorell[11] and translated into Thai by Phakthongsuk.[30] The two subscales (psychological demand and job control) of the Thai JCQ were employed to assess the job strain of PW-WMI. Items are rated on a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). The job strain score is calculated using a subtraction formula: [(0.5) demands - (0.5) control].[11] The possible total scores range from -16 to 18.5. A higher score indicates higher job strain.[8]

The Revised Prenatal Distress Questionnaire (NuPDQ) was developed by Lobel et al.[14] and translated into Thai by Posaen et al.[24] and employed to measure pregnancy-specific stress. Items are rated on a 3-point Likert scale from 0 (not at all) to 2 (very much). Possible total scores range from 0 to 34, and a higher score indicates higher pregnancy-specific stress.[14]

The 13-item Sense of Coherence (SOC-13) developed by Antonovsky[17] and translated into Thai by Hanucharurnkul et al.[31] was employed to assess a sense of coherence. Each item is rated on a 7-point scale ranging from 1 (not at all) to 7 (a great deal). The scores of five negatively-worded items are reversed. The possible scores range from 13 to 91. A high score indicates a high level of sense of coherence.[31]

The Rosenberg Self-Esteem Scale (RSES), developed by Rosenberg[19] and translated into Thai by Wongpakaran and Wongpakaran,[32] was used to measure self-esteem. Items are rated on a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). The possible total scores range between 10 and 40, and higher scores indicate greater self-esteem.[32]

The Buddhist Belief Questionnaire created by Seesopon et al.[20] was adopted to assess religious belief. Items are rated on a 5-point scale from 1 (not at all believe) to 5 (strongly believe). The possible total scores range between 18 and 90. Higher scores indicate higher levels of religious belief.[20]

The Social Support Questionnaire (SSQ) created by Nualyong et al.[33] was used to measure social support. Items are rated on a 5-point Likert scale from 1 (not at all true) to 5 (very true). Possible total scores range from 18 to 90, with higher scores representing greater social support.[33]

The WCCL-R, JCQ, NuPDQ, SOC-13, RSES, Buddhist Belief Questionnaire, and SSQ were validated in original studies and used in the present study without modification. Thus, no validity testing was conducted. The number of items, item examples, and internal consistency reliability of each instrument are described in **Table 1.**

Table 1. Description and internal consistency reliability of the instruments

Instruments (Number of Items)	Total Scale Reliability (Cronbach's alpha)		Example of Item
	n = 30	n = 288	
WCCL-R (42)	0.86	0.97	Came up with a couple of different solutions to the problem.
Problem-focused coping (15)			
Seeking social support (6)			
Blaming self (3)			
Wishful thinking (8)			
Avoidance (10)			
JCQ (23)	0.87	0.96	My job requires me to work very quickly.
Psychological demand (12)			
Job control (11)			
NuPDQ (17)	0.83	0.94	Are you feeling bothered, upset, or worried at this point in your pregnancy about pain during labor and delivery?
Physical and social changes due to pregnancy, baby and childbirth (9)			
Healthcare quality and health status (3)			
Baby care and postpartum life (3)			
Financial concerns (2)			
SOC-13 (13)	0.83	0.95	How often do you have feelings that you're not sure you can keep under control?
Comprehensibility (5)			
Manageability (4)			
Meaningfulness (4)			
RSES (10)	0.86	0.91	I feel that I'm a person of worth.
Positive beliefs about the self (6)			
Negative beliefs about the self (4)			
Buddhist Belief Questionnaire (18)	0.96	0.97	I believe that birth, old age, sickness and death are natural laws.
Belief in the four components of saddhā (14)			
Belief in the three characteristics of existence (4)			
SSQ (18)	0.97	0.98	I have always been loved and cared for by people close to me.
Emotional support (5)			
Information support (6)			
Instrumental support (4)			
Appraisal support (3)			

Data Collection: Data collection was performed by the PI and four RAs between September 2021 and September 2022. All the RAs were registered nurses with a bachelor's degree or higher and had experience in carrying out research. The PI trained the RAs in recruiting the participants, giving research information to participants, ethical considerations, and administration of the questionnaires. After consent was received, the PI or the RAs gave the questionnaires to the participants in a private zone of the antenatal department in a sequence that accommodated ease of use. Completion time was approximately 40 minutes with a 15-minute break. Prevention measures for COVID-19 were strictly maintained by wearing a hygienic mask, using alcohol spray, and social distancing.

Data Analysis: Demographic data analysis was run with descriptive statistics, including frequency, percentage, mean, and standard deviation. Correlations among the study variables were analyzed using Pearson's product-moment correlation analysis. We interpreted a correlation coefficient (r) into little (.00-.25), low (.26-.49), moderate (.50-0.69), high (.70-0.89) and very high (.90-1.00) levels of relationship.[34] Before running regression analysis, each study variable was tested for assumptions of multivariate analyzes, including normality, linearity, homoscedasticity, and multicollinearity. The results showed that all the assumptions were met.[25] The predictability of the independent variables on coping was analyzed using hierarchical multiple regression analysis.

Hierarchical multiple regression was conducted to analyze the predictors of problem-focused and emotion-focused coping of PW-WMI. The set of independent variables were entered into the model in a series of steps. They consisted of 1) primary appraisal including job strain and pregnancy-specific stress, and 2) secondary appraisal, including sense of coherence, self-esteem, religious belief, and social support.

To analyze the predictors of problem-focused and emotional focus coping, job strain and pregnancy-specific stress were entered in the first step and secondary appraisal variables were entered into the model in the second step.

Results

Demographic characteristics

In this study, there was no missing data, and all 288 participants returned the questionnaires (the response rate was 100%). The mean age of the participants was 28.39. They were all married and graduated from junior high school. They had monthly family incomes of THB 10,001-30,000 (USD 287.47-862.32), which was reported as sufficient. Participants lived in a nuclear family. They were primigravida with a mean gestational age of 31.09 weeks and had a planned pregnancy. Participants worked in footwear manufacturing with the duties of monitoring the supply inventories and packaging. They worked five days a week for eight hours daily. They did not work overtime during pregnancy and worked a regular day shift (**Table 2**).

Table 2. Demographic characteristics of the sample (n = 288)

Demographic Characteristics	Frequency	%
Age (years) (Mean = 28.39, SD =11.24)		
20-25	59	20.50
26-30	148	51.40
31-35	81	28.10
Marital status		
Married	284	98.60
Single/separated	4	1.40

Table 2. Demographic characteristics of the sample (n = 288) (Cont.)

Demographic Characteristics	Frequency	%
Educational level		
Primary school	10	3.40
Junior high school	72	25.00
High School	65	22.60
Diploma degree	70	24.30
Bachelor's degree	71	24.70
Monthly family income in baht (USD)		
Less than 10,000 (295.16)	91	31.60
10,001 (295.19) – 30,000 (885.48)	168	58.30
More than 30,000 (885.48)	29	10.10
Income sufficiency		
Sufficient	238	82.60
Insufficient	50	17.40
Family type		
Nuclear family	216	75.00
Extended family	72	25.00
Gestational age (weeks) (Mean = 31.09, SD = 12.11)		
24^{+1} – 28	69	24.00
28^{+1} – 32	120	41.60
32^{+1} – 36	50	17.40
36^{+1} – 40	49	17.00
Pregnancy intent		
Planned	169	58.70
Unplanned	119	41.30
Parity		
Primigravida	145	50.30
Multigravida	143	49.70
Type of manufacturing industry		
Footwear	86	29.90
Textiles	66	22.90
Food products	54	18.80
Motor vehicles	34	11.80
Electronic components	27	9.30
Paper and paper products	21	7.30
Current work duties		
Monitoring the supply inventories and packaging	146	50.70
Labelling	123	42.70
Assembly and production with machinery	19	6.60
Duration of work (days per week) (Mean = 5.44, SD =1.36)		
4	9	3.10
5	143	49.70
6	136	47.20

Table 2. Demographic characteristics of the sample (n = 288) (Cont.)

Demographic Characteristics	Frequency	%
Working hours / day (Mean = 9.85, SD = 3.21)		
7	104	36.10
8	149	51.70
9	25	8.70
10	10	3.50
Working overtime during pregnancy		
No	212	73.60
Yes	76	26.40
Working shift		
Fixed day shift	211	73.30
Rotating shift*	77	26.70

Note. *morning or evening shift but not beyond the legally permitted time for pregnant women

Relationships among the study variables

Pearson's product-moment correlation demonstrated that social support, sense of coherence, and pregnancy-specific stress had a moderate and positive relationship with problem-focused coping. Self-esteem and religious belief had a low and positive relationship with problem-focused coping, while job strain had a little negative relationship with problem-focused coping (**Table 3**).

Table 3. Relationship between selected factors and problem-focused coping (n = 288)

Variables	1	2	3	4	5	6	7
1. Job strain	1						
2. Pregnancy-specific stress	-.32**	1					
3. Sense of coherence	-.40**	.59**	1				
4. Self-esteem	-.36**	.75**	.62**	1			
5. Religious belief	-.24**	.39**	.28**	.32**	1		
6. Social support	-.29**	.57**	.45**	.47**	.43**	1	
7. Problem-focused coping	-.23**	.56**	.60**	.40**	.39**	.67**	1

* p < .05. ** p < .01.

Moreover, pregnancy-specific stress, a sense of coherence, and self-esteem had a moderate and positive relationship with emotion-focused coping. Social support and religious belief had a low and positive relationship with emotion-focused coping. Job strain had a low negative relationship with emotion-focused coping (**Table 4**).

Table 4. Relationship between selected factors and emotion -focused coping (n = 288)

Variables	1	2	3	4	5	6	7
1. Job strain	1						
2. Pregnancy-specific stress	-.32**	1					
3. Sense of coherence	-.40**	.59**	1				
4. Self-esteem	-.36**	.75**	.62**	1			
5. Religious belief	-.24**	.39**	.28**	.32**	1		
6. Social support	-.29**	.57**	.45**	.47**	.43**	1	
7. Emotion-focused coping	-.33**	.67**	.67**	.58**	.26**	.49**	1

* p < .05. ** p < .01.

Predictors of coping

For problem-focused coping, the results revealed that, in the first step, pregnancy-specific stress and job strain could predict problem-focused coping, accounting for 31% of the variance in problem-focused coping. In the second step, a sense of coherence, self-esteem, religious belief, and social support could explain 29% of the variance in problem-focused coping. The primary and secondary appraisal variables altogether accounted for 60% of the variance in problem-focused coping. Therefore, pregnancy-specific stress and job strain were predictors from the primary appraisal, whereas social support, sense of coherence, self-esteem, and religious belief were the predictors from secondary appraisal of problem-focused coping among PW-WMI (**Table 5**).

Table 5. The hierarchical multiple regression analysis for problem-focused coping of PW-WMI

Predictive variables	R^2	R^2 change	SEE	F change	Regression coefficient	β	T-test
Predictor: problem-focused coping							
Model 1:	0.31	0.31	0.64	72.97**			
Job strain					-0.13	-0.16	-4.20*
Pregnancy-specific stress					0.70	0.44	10.36**
Model 2:	0.60	0.29	0.49	69.98**			
Job strain					0.09	0.09	1.99*
Pregnancy-specific stress					0.34	0.23	3.65**
Sense of coherence					0.38	0.41	8.02**
Self-esteem					-0.43	-0.25	-4.06**
Religious belief					0.08	0.08	1.98*
Social support					0.41	0.46	9.40**

Note. SEE = Standard error of estimate.

*p < 0.05. ** p < 0.01.

For emotion-focused coping, the results showed that in the first step, pregnancy-specific stress and job strain could predict emotion-focused coping, accounting for 46% of the variance of emotion-focused coping. In the second step, the secondary appraisal variables showed that sense of coherence, self-esteem, religious belief, and social support could explain 11% of the variance of emotion-focused coping. The primary appraisal and secondary appraisal variables altogether accounted for 57% of the variance of emotion-focused coping. Therefore, pregnancy-specific stress was a predictor from the primary appraisal whereas sense of coherence and social support were the predictors from the secondary appraisal that could significantly predict emotion-focused coping among PW-WMI. However, job strain was a predictor from the primary appraisal, and self-esteem and religious belief were the predictors from the secondary appraisal of emotion-focused coping among PW-WMI but non-significantly (**Table 6**).

Table 6. The hierarchical multiple regression analysis for emotion-focused coping of PW-WMI

Predictive variables	R^2	R^2 change	SEE	F change	Regression coefficient	β	T-test
Predictor: emotion-focused coping							
Model 1:	0.46	0.46	0.41	121.79**			
Job strain					-0.51	-.13	-2.80*
Pregnancy-specific stress					0.67	0.63	13.66**

Table 6. The hierarchical multiple regression analysis for emotion-focused coping of PW-WMI (Cont.)

Predictive variables	R^2	R^2 change	SEE	F change	Regression coefficient	β	T-test
Model 2:	0.57	0.11	0.37	62.00**			
Job strain					-0.12	-0.03	-0.67
Pregnancy-specific stress					0.42	0.39	5.99**
Sense of coherence					0.26	0.40	7.47**
Self-esteem					0.01	0.01	0.20
Religious belief					-0.04	-0.05	-1.15
Social support					0.06	0.10	1.92*

Note. SEE = Standard error of estimate, *p < 0.05. ** p < 0.01

Discussion

In this study, job strain, pregnancy-specific stress, sense of coherence, self-esteem, religious belief, and social support were the significant predictors from the primary and secondary appraisals that altogether could explain 60% and 57% of the variance in problem-focused and emotion-focused coping of PW-WMI respectively. These factors could affect the coping process of PW-WMI in two functions of problem-focused coping by changing either something in the environment or how they interacted with the environment and emotion-focused coping by regulating the emotion in response to the situation.

Job strain significantly predicted problem-focused coping. PW-WMI might appraise their work situations as stressful that could potentially be harmful to themselves and their unborn child, but their work situation might be perceived as under their control. In Thailand, pregnant women are protected by the law for their occupational safety and environmental health, preventing them from working late at night (between 10 p.m. and 6 a.m.), working overtime, or carrying out any harmful task.[35] In this study, 73.6% of the participants did not work overtime during pregnancy, and 73.3% worked on a fixed day shift. Moreover, during pregnancy, our participants' duties were monitoring supply inventories and packaging (50.7%) and labelling (42.7%), which were adjusted to fit the needs of pregnant women. This implies that the participants might appraise that work situations could be controlled. When a situation is appraised as controllable, individuals tend to use problem-focused coping.[10] However, job strain predicted emotion-focused coping, but non-significantly, which might be attributable to the low negative relationship of job strain with emotion-focused coping. Therefore, job strain might not be sufficiently strong to predict emotion-focused coping in this study. Moreover, most participants were protected by labor laws and worked in relatively safe work environments. Thus, they might not perceive that their job triggered the need to regulate their emotions. Similarly, previous research showed that PW-WMI perceived that they had workplace safety.[4]

Pregnancy-specific stress could significantly predict both problem-focused and emotion-focused coping. That is, the perception of stress due to physiological and psychosocial changes during pregnancy can initiate coping responses. Such responses can be problem-focused coping by obtaining information and advice from midwives regarding birth and fetal health or emotion-focused coping by regulating emotions rather than trying to change to a situation that was beyond their control.[36] Consistently, almost all pregnant women working in large industries in Thailand sought antenatal care immediately after finding out that they were pregnant.[37] However, some tried to deal with unpleasant feelings arising from worries and fear regarding the baby's health as they knew that some illnesses could not be controlled.[38] In other studies, significant correlations

were observed consistently between pregnancy-specific stress and problem-focused coping[15,16] and emotion-focused coping.[16]

A sense of coherence could significantly predict problem-focused coping in our study. This sense enables the PW-WMI to feel that the stimuli or stress is meaningful, explainable, and solvable. People with a high sense of coherence engage in life's challenges, look for purpose, and try to solve problems.[17] Moreover, a sense of coherence was the strongest predictor of emotion-focused coping. It is an internal resource that helps people release tension by discovering and utilizing their resources to prevent the translation of a feeling of tension into a stressful state and stimulate the application of coping mechanisms in challenging circumstances.[17] Consistent with previous research, a sense of coherence had a positive correlation with problem-focused coping and seeking social support that was a form of emotion-focused coping among workers in industrial factories in Congo.[18]

Self-esteem significantly predicted problem-focused among PW-WMI. This finding was commensurate with the Transaction Model of Stress and Coping, where self-esteem is a psychological coping resource of individuals that affects their cognitive appraisal, which in turn influences coping.[10] Thus, people who have high self-esteem believe in their ability to deal with a stressful situation, which leads to problem-focused coping. However, those who lack self-esteem tend to believe less in their capability to manage the stressor. Consistently, pregnant women's higher self-esteem predicted higher problem-focused coping.[7] Surprisingly, self-esteem predicted emotion-focused coping, but this was non-significant. A probable explanation is that the participants in this study were adults, with a mean age of 28.39. Therefore, they might be more emotionally mature despite changing circumstances. As a result, they might be able to tolerate a reasonable amount of frustration from a stressful situation and might not have needed to draw on their self-esteem to regulate their emotions.

In this study, all participants were Buddhist and religious belief could significantly predict problem-focused coping. Religious belief is a psychological resource that affects how people respond to stressful events and guide their coping responses to control the situation.[10] People with a strong religious belief can constructively direct their efforts at resolving an issue, cognitively reorganizing the issue, or changing the circumstance.[21] Religious beliefs can therefore help people understand and manage stressful situations and may promote superior coping mechanisms for challenging circumstances. Believing in Buddhism and partaking in certain of its practices has been demonstrated to cause increased self-confidence and control over one's own direction when making decisions.[39] Nevertheless, religious belief predicted emotion-focused coping, but non-significantly. A possible explanation is that most participants were young adults, with a mean age of 28.39 years, who might not always apply their religious beliefs in regulating their emotions. Consistently, no significant associations were found between religious belief and coping by venting and seeking social support of young adults.[40] Moreover, religious belief had a low positive relationship with emotion-focused coping, which might not be strong enough to predict it.

Social support was the strongest predictor of problem-focused coping. Consistent with the Transaction Model of Stress and Coping, social support is considered a coping resource that allows people to feel that they have control over a situation.[10] Most participants (98.6%) were married and might receive assistance from their husband. Moreover, over half of participants (58.30%) had a monthly family income of 10,001-30,000 baht (approx USD 295-885) that was perceived as sufficient (82.60%). Thus, their family might be able to support them financially, allowing them to feel they were in control of their situation. Furthermore, PW-WMI might receive support from their colleagues. Similarly, colleagues, especially those with similar experiences working in an industrial factory during pregnancy, had a vital role in exchanging health information or

advice regarding pregnancy.[36] Additionally, social support could predict emotion-focused coping. Congruent with the Transaction Model of Stress and Coping, social support is a coping resource that helps improve the morale of people.[10] This, in turn, allows people to feel more encouraged as they have someone to count on and can regulate the emotional consequences of stressful events. Most participants were in the third trimester of their pregnancy (76%), which means that they might need encouragement, love, and care from their husband, family members, and their social networks. Due to changes in the physical, psychological, and social aspects, pregnant women need social support, especially during the third trimester as they experience worries and fear regarding the approaching delivery.[14] Our findings resonate with other studies, reporting the predictive ability of social support on problem-focused and emotion-focused coping of Chinese pregnant women[23] and the association between social support and coping in Thai pregnant women with gestational diabetes.[24]

Limitations and Recommendations

The limitations of this study were that the sample was purposively selected only from five hospitals, and all of the study participants were Buddhist. Thus, this may limit the generalizability of the findings to pregnant women with other religions. In addition, this study does not look at the adaptive outcomes, which is important in the stress coping theory. Further studies are recommended to include various religious backgrounds as one predictor of coping and adaptive outcomes among pregnant women.

Conclusions and Implications for Nursing Practice

Our findings on the predictors of coping showed that job strain, pregnancy-specific stress, sense of coherence, self-esteem, religious belief, and social support predicted coping of PW-WMI. Nurse-midwives can use this finding in monitoring and planning interventions to promote coping among PW-WMI, such as strengthening their sense of coherence and reducing pregnancy-specific stress, as well as providing social support during antenatal care through the involvement of family and social networks. In addition, occupational health nurses can apply the findings in workplaces to further action plans for preventing job strain, as well as promoting a better workplace environment and coping for PW-WMI.

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ปัจจัยทำนายการเผชิญปัญหาของสตรีตั้งครรภ์ที่ทำงานโรงงานอุตสาหกรรม: การวิจัยแบบภาคตัดขวาง

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บทคัดย่อ: สตรีตั้งครรภ์ที่ทำงานโรงงานอุตสาหกรรมมีความเสี่ยงที่จะเผชิญกับความเครียดทั้งจากการตั้งครรภ์และจากการทำงาน การสนับสนุนช่วยเหลือให้สตรีตั้งครรภ์สามารถเผชิญความเครียดดังกล่าวได้อย่างมีประสิทธิภาพเป็นบทบาทสำคัญของพยาบาลผดุงครรภ์ การวิจัยแบบภาคตัดขวางนี้มีวัตถุประสงค์เพื่อทดสอบอำนาจการทำนายของความเครียดจากการทำงาน ความเครียดที่เฉพาะกับการตั้งครรภ์ ความเข้มแข็งในการมองโลก ความภาคภูมิใจในตนเอง ความเชื่อทางศาสนา และการสนับสนุนทางสังคมต่อการเผชิญปัญหาของสตรีตั้งครรภ์ที่ทำงานโรงงานอุตสาหกรรม กลุ่มตัวอย่างคือสตรีตั้งครรภ์ที่ทำงานโรงงานอุตสาหกรรม จำนวน 288 ราย ที่มารับบริการที่แผนกฝากครรภ์โรงพยาบาลประจำจังหวัด 5 แห่งในประเทศไทย เครื่องมือวิจัยประกอบด้วย แบบสอบถามข้อมูลส่วนบุคคล และแบบสอบถามฉบับภาษาไทย ได้แก่ แบบสอบถามความเครียดจากการทำงาน แบบสอบถามความเครียดที่เฉพาะกับการตั้งครรภ์ แบบสอบถามความเข้มแข็งในการมองโลก แบบสอบถามความภาคภูมิใจในตนเองของโรเซนเบิร์ก แบบสอบถามความเชื่อทางพุทธศาสนา แบบสอบถามการสนับสนุนทางสังคม และแบบสอบถามการเผชิญปัญหาฉบับปรับปรุง วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา และสถิติการวิเคราะห์ถดถอยเชิงพหุคูณแบบเชิงชั้น

ผลการศึกษาพบว่า ความเครียดจากการทำงาน ความเครียดที่เฉพาะกับการตั้งครรภ์ ความเข้มแข็งในการมองโลก ความภาคภูมิใจในตนเอง ความเชื่อทางศาสนา และการสนับสนุนทางสังคมร่วมกันทำนายร้อยละ 60 ของการเผชิญปัญหาแบบมุ่งแก้ไขปัญหาและร้อยละ 57 ของการเผชิญปัญหาแบบมุ่งแก้ไขอารมณ์ของสตรีตั้งครรภ์ที่ทำงานโรงงานอุตสาหกรรม การสนับสนุนทางสังคมเป็นปัจจัยทำนายที่สำคัญที่สุดของการเผชิญปัญหาแบบมุ่งแก้ไขปัญหา ในขณะที่ความเข้มแข็งในการมองโลกเป็นปัจจัยทำนายที่สำคัญที่สุดของการเผชิญปัญหาแบบมุ่งแก้ไขอารมณ์ พยาบาลผดุงครรภ์สามารถใช้ข้อค้นพบจากการศึกษาครั้งนี้ในการวางแผนการปฏิบัติการพยาบาลเพื่อส่งเสริมการเผชิญปัญหาของสตรีตั้งครรภ์ที่ทำงานโรงงานอุตสาหกรรม โดยมุ่งเน้นการเพิ่มการสนับสนุนทางสังคมและความเข้มแข็งในการมองโลกและลดความเครียดที่เฉพาะกับการตั้งครรภ์

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คำสำคัญ: การเผชิญปัญหา การวิจัยแบบภาคตัดขวาง ปัจจัยทำนาย สตรีตั้งครรภ์ การทำงานในโรงงานอุตสาหกรรม ความเข้มแข็งในการมองโลก การสนับสนุนทางสังคม

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