

Evaluation of the Efficacy of a Couple Synchronization Intervention Model Based on Dual-Response Theory in Patients with Hyperemesis Gravidarum

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Abstract: *Objective:* To investigate the efficacy of a synchronized couple intervention model based on dual coping theory in patients with hyperemesis gravidarum. *Method:* From June 2024 to June 2025, 80 patients with hyperemesis gravidarum will be randomly assigned to two groups of 40 patients each. The control group received routine nursing interventions, while the observation group underwent a partner-synchronized intervention model based on dual coping theory. The two groups were compared in terms of vomiting severity, dual coping styles, quality of life, and nursing satisfaction. *Results:* The post-care observation group demonstrated lower scores for the frequency of dry heaving episodes, the frequency of vomiting episodes, and the duration of nausea compared to the control group ($p < 0.05$). The post-care observation group scored higher than the control group on measures of pressure communication, mutual support, joint coping, proxy coping, and passive coping ($p < 0.05$). The NVPQOL scores in the post-care observation group were lower than those in the control group ($p < 0.05$). The observation group's nursing satisfaction rate of 97.50% was significantly higher than the control group's 77.50% ($p < 0.05$). *Conclusion:* The partner synchronization intervention model based on dual coping theory significantly reduces vomiting severity in patients with hyperemesis gravidarum, improves quality of life, enhances coping abilities in both patients and partners, and achieves high nursing satisfaction.

Keywords: Hyperemesis gravidarum; Dual-process theory; Partner synchronization intervention; Severity of vomiting; Quality of life

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1. Introduction

Hyperemesis gravidarum, a severe pregnancy complication, causes expectant mothers to experience extremely frequent nausea and vomiting, preventing them from maintaining normal nutritional intake and fluid balance, and even compromising the health of both mother and fetus^[1]. Patients with hyperemesis gravidarum are unable to participate in normal work and social interactions due to their physical condition, making them prone to anxiety and depression. These emotional states can exacerbate vomiting severity, significantly reduce comfort levels, and negatively impact quality of life^[2]. Conventional nursing primarily focuses on managing patients' physical symptoms while neglecting emotional support, resulting in suboptimal care outcomes. The Partner Synchronization Intervention Model, grounded in dual coping theory,

transforms “disease management” into a collaborative intervention for both partners. It emphasizes joint coping and mutual support between the patient and partner, integrating resources and taking action to mitigate the negative impact of stress on individual physical and mental health. This approach maintains relationship stability, fosters intimacy and trust between partners, and contributes to improving the patient’s quality of life ^[3]. To this end, this study investigated the efficacy of a partner synchronization intervention model based on dual coping theory in patients with hyperemesis gravidarum. A total of 80 patients diagnosed with hyperemesis gravidarum admitted to the hospital between June 2024 and June 2025 were enrolled in the study, as detailed below.

2. Materials and methods

2.1. General information

June 2024–June 2025: 80 patients with hyperemesis gravidarum were randomly assigned to two groups of 40 patients each. Control group: Age 20–35 years, mean (28.15 ± 3.15) years; gestational age 6–12 weeks, mean (9.01 ± 1.44) weeks; educational attainment: 16 cases with high school education or below, 24 cases with college education or above. The observation group comprised women aged 19–35 years (mean age: 28.24 ± 3.22 years), with gestational age ranging from 6 to 12 weeks (mean: 9.05 ± 1.36 weeks). Educational attainment was as follows: 18 cases with high school education or below, and 22 cases with college education or above. There were no statistically significant differences in baseline characteristics between the two groups ($p > 0.05$).

2.2. Inclusion and exclusion criteria

2.2.1. Inclusion criteria

- (1) Daily vomiting > 3 times, inability to eat or drink normally, and pre-pregnancy weight loss $\geq 5\%$;
- (2) Meets relevant criteria in the Expert Consensus on Diagnosis and Clinical Management of Hyperemesis Gravidarum (2015) ^[4];
- (3) Singleton pregnancy;
- (4) Partner cooperation with interventions;
- (5) Patient voluntarily signs informed consent.

2.2.2. Exclusion criteria

- (1) Patients with other severe complications;
- (2) Patients with vomiting caused by other diseases;
- (3) Patients with severe cardiac, hepatic, or renal dysfunction;
- (4) Patients with gestational hypertension or gestational diabetes;
- (5) Patients with psychiatric disorders.

2.3 Method

2.3.1. Control group

Standard care interventions were administered, including assessment of vomiting severity, weight changes, and electrolyte levels. Fluid replacement, electrolyte supplementation, and antiemetic medications were provided as medically indicated. Routine patient education was conducted, advising patients to schedule follow-up appointments.

2.3.2. Observation group

In addition to routine care, a partner-synchronized intervention model based on the dual-response theory was implemented. The intervention period lasted one week (from admission to discharge or the first assessment point). The specific frequency, duration, and procedure are as follows:

- (1) Establish a multidisciplinary care team comprising obstetricians/gynecologists, head nurses, and specialized nurses

Educate patients and their partners on the dual-response approach and synchronized partner intervention model. Assess the patient's vomiting severity, comfort level, and the partner's willingness to provide support. Patiently listen to both parties' concerns and needs, identify primary stressors, and evaluate the intimacy of the partner relationship. Invite both the patient and their partner to participate in developing the care plan.

- (2) Education sessions

Once daily, 10–15 minutes per session. Specific procedure: Use health handbooks, videos, and other resources to help both partners understand the physiological mechanisms of severe morning sickness, its potential risks, and common misconceptions about treatment, thereby reducing misunderstandings and blame arising from information asymmetry. This approach reduces misunderstandings and blame stemming from information asymmetry. Explain factors triggering vomiting, daily dietary management, environmental optimization, and weight monitoring to encourage joint participation in interventions. Through role-playing scenarios, help partners experience the patient's helplessness to foster empathy, while teaching them appropriate verbal and physical support methods.

- (3) Emotional support

Provide emotional support once daily for 15–20 minutes. Encourage the couple to communicate with each other using gentle language, avoid accusatory remarks, and create a safe space for expression. Encourage the patient to acknowledge their own feelings and proactively share their discomfort and needs with their partner. Guide the partner to recognize the patient's negative emotions and help alleviate them through companionship, guiding deep breathing, and redirecting their attention.

- (4) Health management

Ask both partners to record the frequency and severity of vomiting, triggering factors, and tolerable foods on a daily basis, to serve as a basis for adjusting the daily health management plan. Caregivers should monitor medication intake to ensure strict adherence to prescribed dosages and schedules. Environmental management is crucial: avoid bright lights, strong odors, and noise. Ventilate indoor spaces regularly to maintain fresh air, and minimize exposure to cooking fumes, perfumes, and other potent scents. Accompany the patient in adjusting their daily diet to prioritize high-protein, low-fat, easily digestible foods. Avoid greasy, spicy, or irritating foods, especially those with strong odors.

- (5) Follow-up care

Before discharge, provide the patient and her partner with a visual checklist outlining symptom management, lifestyle management, and other relevant information. One week later, follow up via phone or WeChat to check on their recent condition, including symptoms, emotional changes, and weight fluctuations, and remind them to strictly adhere to the postpartum follow-up schedule to ensure timely assessment of fetal growth and development.

2.4. Observation indicators

- (1) Assess vomiting severity in both groups before intervention and one week after intervention using the Pregnancy-Specific Quantified Emesis Scale (PUQE)

This scale evaluates symptoms based on the frequency of retching episodes, frequency of vomiting episodes, and duration of nausea. Each dimension is scored from 1 to 5, with higher scores indicating more severe symptoms.

- (2) Assessment of the two groups' binary coping styles before nursing care and one week after nursing care

Binary Coping Scale (DIC) was used to evaluate the dimensions of stress communication (8 items), mutual support (10 items), joint coping (5 items), proxy coping (4 items), and negative coping (8 items). Each item was scored on a 1–5 scale, with negative coping items reverse-scored; higher scores indicate better positive dyadic coping. The Cronbach's alpha coefficients for the scale were 0.914 for patients and 0.930 for spouses.

- (3) Quality of life was assessed in both groups before care and one week after care

The Nausea and Vomiting in Pregnancy Quality of Life (NVPQOL) questionnaire consists of 30 items, each scored on a scale of 1 to 7, with a total score ranging from 30 to 210; a lower score indicates better quality of life.

(4) After one week of care, nursing satisfaction was assessed in both groups

Patients and their partners completed a hospital-developed nursing satisfaction questionnaire consisting of 15 items covering nursing involvement, communication and education, emotional support, and health management. Each item used a 5-point Likert scale (1 = Very Dissatisfied, 5 = Very Satisfied), with a total score range of 15–75 points. A total score of ≥ 45 points (i.e., an average score of ≥ 3 points across all items) was defined as “Satisfied”, while a total score of < 45 points was defined as “Dissatisfied”. Satisfaction rate = (Number of satisfied cases / Total number of cases) $\times$ 100%.

2.5. Statistical analysis

Data were analyzed using SPSS 26.0. Count data are described as [n(%)] and analyzed using the chi-square test. Ordinal data were analyzed using the rank sum test. Continuous data are described as mean ($\pm$ s). Data meeting the criteria for normal distribution underwent *t*-tests. A *p* value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of vomiting severity between the two groups

The post-treatment observation group exhibited lower scores for the frequency of dry heaving episodes, the frequency of vomiting episodes, and the duration of nausea compared to the control group ($p < 0.05$). See **Table 1**.

Table 1. Comparison of vomiting severity between two groups (part $\bar{x} \pm s$)

Group	Example count	Frequency of dry heaving episodes		Number of vomiting episodes		Duration of nausea	
		Before Nursing	After care	Before Nursing	After care	Before Nursing	After care
Observation group	40	4.12 $\pm$ 0.51	2.21 $\pm$ 0.24 ^a	4.23 $\pm$ 0.56	2.21 $\pm$ 0.25 ^a	4.35 $\pm$ 0.54	2.02 $\pm$ 0.33 ^a
Control group	40	4.24 $\pm$ 0.58	3.11 $\pm$ 0.30 ^a	4.32 $\pm$ 0.52	3.07 $\pm$ 0.34 ^a	4.41 $\pm$ 0.55	2.89 $\pm$ 0.45 ^a
<i>t</i>	--	0.983	14.816	0.745	12.888	0.492	9.860
<i>p</i>	--	0.329	< 0.001	0.459	< 0.001	0.624	< 0.001

Note: a indicates a significant difference compared to pre-intervention levels ($p < 0.05$).

3.2. Comparison of Two Sets of Binary Response Patterns

The post-care observation group scored higher than the control group in pressure communication, mutual support, joint coping, proxy coping, and passive coping ($p < 0.05$). See **Table 2**.

Table 2. Comparison of Two Groups' Binary Coping Strategies (Part $\bar{x} \pm s$)

Group	Example count	Pressure communication		Mutual support		Responding together		Agent response		Passive response	
		Before nursing	After care	Before nursing	After care	Before nursing	After care	Before nursing	After care	Before nursing	After care
Observation group	40	28.47 $\pm$ 3.32	35.09 $\pm$ 4.12 ^a	34.41 $\pm$ 4.09	43.63 $\pm$ 4.89 ^a	13.02 $\pm$ 2.52	19.12 $\pm$ 2.64 ^a	11.36 $\pm$ 2.17	16.25 $\pm$ 2.28 ^a	26.28 $\pm$ 3.23	34.45 $\pm$ 3.42 ^a
Control group	40	28.68 $\pm$.317	31.64 $\pm$ 3.76 ^a	34.26 $\pm$ 3.65	38.28 $\pm$ 4.17 ^a	13.15 $\pm$ 2.46	16.20 $\pm$ 2.38 ^a	11.42 $\pm$ 2.24	13.55 $\pm$ 2.25 ^a	26.15 $\pm$ 2.98	30.24 $\pm$ 3.06 ^a
<i>t</i>	--	0.289	3.912	0.173	5.265	0.233	5.196	0.122	5.331	0.187	5.802
<i>p</i>	--	0.773	< 0.001	0.863	< 0.001	0.816	< 0.001	0.904	< 0.001	0.852	< 0.001

Note: a indicates a significant difference compared to pre-intervention levels ($p < 0.05$).

3.3. Comparison of quality of life between the two groups

The NVPQOL scores in the post-care observation group were lower than those in the control group ($p < 0.05$). See **Table 3**.

Table 3. Comparison of quality of life between the two groups (Part $\bar{x} \pm s$)

Group	Example count	NVPQOL	
		Before nursing	After care
Observation group	40	162.15 $\pm$ 10.17	108.15 $\pm$ 8.34 ^a
Control group	40	162.28 $\pm$ 10.34	114.28 $\pm$ 9.57 ^a
<i>t</i>	--	0.0567	3.054
<i>p</i>	--	0.955	< 0.001

Note: a indicates a significant difference compared to pre-intervention levels ($p < 0.05$).

3.4. Comparison of nursing satisfaction between the two groups

The observation group's nursing satisfaction rate of 97.50% was significantly higher than the control group's 77.50% ($p < 0.05$). See **Table 4**.

Table 4. Comparison of Nursing Satisfaction Between the Two Groups [n (%)]

Group	Number of cases	Satisfied	Notsatisfied
Observation group	40	38 (95.00)	2 (5.00)
Control group	40	31 (77.50)	9 (22.50)
<i>Z/c²</i>	--		5.165
<i>p</i>	--		0.023

4. Discussion

The exact mechanism underlying hyperemesis gravidarum remains incompletely understood, but it is generally believed to result from the interaction of multiple factors. Patients experience severe vomiting leading to fluid loss and malnutrition, which can impair fetal development and cause fetal growth restriction, posing significant risks ^[5]. While routine care alleviates vomiting severity through medication adherence and dietary management, its effectiveness remains limited. Moreover, it fails to address patients' individualized needs, resulting in suboptimal nursing outcomes. The dyadic response theory-based synchronized intervention model for couples treats patients and their partners as an integrated "dyadic system," adopting a collaborative approach to health challenges. This strategy enhances the multidimensionality and sustainability of interventions, thereby improving nursing outcomes ^[6].

The results indicate that the post-care observation group had lower scores for the frequency of dry heaving episodes, the frequency of vomiting episodes, and the duration of nausea compared to the control group. Evidence suggests that partner-synchronized intervention models based on dual coping theory can reduce the severity of vomiting. Dual coping theory posits that when patients face physiological and psychological challenges, having partners jointly address these issues can lower both physiological and psychological stress responses in patients. Simultaneous education for both patients and their partners enhances patients' cognitive understanding while enabling partners to empathize with the patient's discomfort. This fosters deep understanding and support, alleviating psychological stress and indirectly reducing the severity of vomiting ^[7,8]. Additionally, when partners collaborate with patients on interventions related to medication, environment, and diet, it can enhance patient compliance, encourage proactive avoidance of vomiting triggers, maintain a healthy lifestyle, and reduce the severity of vomiting ^[9,10].

The post-care observation group exhibited higher Binary Response Scores than the control group, while NVPQOL

scores were lower than those of the control group. The partner synchronized intervention model based on dual coping theory multidimensionally improves patients' quality of life and enhances coping levels for both patients and their partners. In traditional nursing care, patients with hyperemesis gravidarum often face physical symptoms and psychological stress alone, resulting in poor comfort and impaired quality of life. Couple synchrony interventions can partially shift the challenges faced by patients into the couple relationship system, prompting both partners to confront the illness together. Through emotional synchrony and behavioral coordination, they exert positive influences on each other, thereby enhancing their coping capacity^[11]. When partners provide companionship and support in the right way, it can alleviate patients' physical discomfort, help them maintain their daily roles and social functioning, and improve their quality of life in multiple dimensions^[12].

The observation group reported higher nursing satisfaction than the control group. This suggests that the partner-synchronized intervention model based on dual coping theory aligns with the nursing needs of patients and their partners, thereby enhancing nursing satisfaction. This care model addresses the profound needs of patients and their partners during crises for emotional connection, shared decision-making, and relationship development, empowering both parties to overcome challenges together. Moreover, nursing interventions are characterized by their comprehensive and targeted nature, aligning with patients' multidimensional needs and contributing to enhanced satisfaction with care.

In summary, the partner synchronization intervention model based on dual coping theory reduces vomiting severity and improves quality of life in patients with hyperemesis gravidarum. It also enhances dual coping levels in both patients and their partners, while yielding high satisfaction with nursing services.

Disclosure statement

The authors declare no conflict of interest.

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