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Analysis of the Effectiveness of Precision Nursing Based on the KANO Model in Improving Health Outcomes for Patients with Threatened Abortion

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Abstract: *Objective:* To explore the application effect of a continuous precision nursing model based on the KANO model in patients with threatened abortion and evaluate its improvement on patients' clinical symptoms, psychological state, and sleep quality. *Methods:* A total of 100 patients with early threatened abortion admitted to the hospital from January 2023 to December 2024 were randomly divided into a control group and an intervention group, with 50 cases in each group. The control group received routine nursing, while the intervention group received continuous precision nursing under the guidance of the KANO model. The improvement time of clinical symptoms, changes in the Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), and Pittsburgh Sleep Quality Index (PSQI) scores were compared between the two groups. *Results:* The intervention group had significantly shorter times for cessation of vaginal bleeding, relief of abdominal pain and low back pain, and total hospital stay compared to the control group ($P<0.05$). After the intervention, the SAS, SDS, and PSQI scores in the intervention group were significantly lower than those in the control group ($P<0.05$). *Conclusion:* Continuous precision nursing based on the KANO model can effectively promote symptom relief, improve psychological state, and enhance sleep quality in patients with threatened abortion, demonstrating its value for promotion.

Keywords: KANO model; Continuous nursing; Precision intervention; Threatened abortion; Psychological state; Sleep quality

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1. Introduction

Threatened abortion, a common obstetric and gynecological pregnancy complication, is characterized by symptoms such as a small amount of vaginal bleeding, paroxysmal abdominal pain, or lumbago before 28 weeks of gestation. Gynecological examinations reveal that the cervix remains closed, the fetal membranes are intact, no products of conception have been expelled, and the size of the uterus corresponds to the gestational age based on the last menstrual period. With the advancement of requirements for fertility-friendly hospital construction, the

traditional, singular mode of tocolytic nursing care has found it difficult to meet patients' demands for specialized and personalized care. Consequently, improving patient health outcomes through precise nursing interventions has become a focal point of clinical research [1–2]. The KANO model, proposed by Japanese quality management expert Noriaki Kano, has gradually been applied in the field of medical care in recent years. However, systematic research on its application in threatened abortion nursing remains scarce. This study constructed a precise nursing plan based on the KANO model, aiming to explore its impact on patients' clinical symptoms, psychological state, and sleep quality by analyzing their core nursing needs and implementing targeted interventions. The findings provide a reference for optimizing nursing strategies for threatened abortion.

2. Objects and methods

2.1. Objects

A total of 100 patients diagnosed with early threatened abortion who met the criteria and were treated in the outpatient and inpatient gynecology departments of the hospital from January 2023 to December 2024 were selected. Inclusion criteria were as follows: (1) meeting the diagnostic criteria for threatened abortion outlined in "Obstetrics and Gynecology (Ninth Edition)": a small amount of vaginal bleeding after amenorrhea, accompanied by mild lower abdominal pain; (2) B-mode ultrasound examination showing a viable gestational sac in the uterine cavity, with serum human chorionic gonadotropin (hCG) and progesterone levels consistent with the corresponding gestational age; (3) gestational age between 6 and 12 weeks; (4) female patients aged between 20 and 35 years; (5) patients with full civil capacity and autonomous consciousness, able to understand the trial content, voluntarily participate in this study, and having signed a written informed consent form. Exclusion criteria were: (1) threatened abortion clearly caused by embryonic chromosomal abnormalities, abnormal uterine morphology or structure, cervical incompetence, etc.; (2) concurrent severe primary heart disease, hypertension, diabetes, or functional failure of other vital organs. (3) A history of mental illness or neurological and psychological developmental delay caused by brain injury. (4) Those who withdrew from the clinical trial for some reason. Patients were randomly assigned to a control group (n = 50) and an intervention group (n = 50) using a random number table method. The mean age of the control group was 27.84 ± 3.56 years, with a ratio of primiparas to multiparas of 17:33; the mean age of the intervention group was 27.88 ± 3.56 years, with a ratio of primiparas to multiparas of 18:32. The general data of the two groups were comparable ($P > 0.05$).

2.2. Methods

2.2.1. Routine nursing care

The control group received routine nursing measures, which included strengthening the monitoring of patients' vital signs, observing for the presence of vaginal bleeding, and instructing patients to contact healthcare personnel promptly when experiencing uterine contractions. Patients were advised to avoid spicy and irritating foods and to consume a diet primarily consisting of stewed or steamed dishes. Patients were also instructed to reduce unnecessary activities and to take precautions against cold and ensure warmth.

2.2.2. KANO model-based precision nursing

The intervention group received a clinical nursing needs analysis for patients with threatened abortion based on the KANO model. Based on the analysis results of the KANO model, continuous precision nursing was developed and implemented as follows:

2.2.3. KANO model nursing needs survey

A nursing team consisting of one obstetrician and gynecologist, one head nurse, two senior nurses, and one physiotherapist was formed. A questionnaire containing 20 nursing needs was designed based on the characteristics of threatened abortion and nursing standards. The questionnaire covered dimensions such as condition monitoring, pain management, psychological support, health guidance, and environmental care, and was divided into five options using the KANO evaluation criteria: satisfied, expected, indifferent, acceptable, and dissatisfied. A pre-survey was conducted on 100 patients, and 98 valid questionnaires were collected. Through data analysis, the needs were classified as follows: (1) Essential needs: dynamic condition monitoring, standardized drug use, and emergency handling; (2) Expected needs: pain relief interventions, psychological and emotional counseling, and personalized dietary guidance; (3) Attractive needs: family-participatory care, prenatal health salons, and post-discharge continuous care.

2.2.4. Continuation of precision nursing

Physiological continuation nursing: Ensure that patients have sufficient rest and avoid strenuous exercise and heavy physical labor to reduce the exacerbation of symptoms. Based on syndrome differentiation and the theory of the circadian flow, select the melodies of Yu mode Yang rhyme and Gong mode Yang rhyme to be played at the Si (9–11 AM) and You (5–7 PM) hours, respectively. For auricular acupressure, select the points Shenmen, Subcortex, Sympathetic Nerve, Endocrine, Spleen, and Kidney, and apply pressure alternately to both ears, changing the pressure every other day. Instruct patients to press at 9:00 AM, 3:00 PM, and 9:00 PM daily, for 1–2 minutes each time. Dietary continuation nursing: Different types of threatened abortion should be treated with different foods. Patients should consume foods with high nutritional value and that are easy to digest to avoid indigestion caused by spleen and stomach damage. Regardless of the deficiency or excess pattern, patients with threatened abortion should avoid job's tears, cinnamon, dried ginger, peach kernels, crabs, rabbit meat, hawthorn, winter melon seeds, and water chestnuts. Those with blood heat should avoid spicy, stimulating, greasy, and damp-heat foods, as well as cold and raw foods. Social support continuation nursing: Leveraging network platforms, establishing electronic medical records for patients, facilitating timely updates, and providing access to relevant members of the nursing team. Utilize WeChat mini-programs to encourage patients to actively engage in self-management, thereby enhancing their self-management effectiveness. Inform patients about the correlations between negative emotions, sleep disorders, and abortion, deepening their understanding of negative emotions and sleep disorders, enhancing their self-care abilities, and promoting a conscious shift towards behaviors beneficial to their health, thereby improving their compliance with medical advice. Establish QQ and WeChat groups to regularly send links to threatened abortion prevention manuals and health knowledge, guiding patients to view them in their spare time. Psychological support nursing: Strengthen communication with patients, introduce knowledge about threatened abortion to them, assess their psychological states, analyze the causes of their psychological issues, and take effective measures to address them. Share successful treatment cases from the past with patients to boost their confidence in recovery.

2.3. Observation indicators

Compare the improvement time of clinical symptoms and psychological states between the two groups of patients (using the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) to evaluate psychological stress levels) [3]. Both SAS and SDS comprise 20 items, each scored from 1 to 4, resulting in a total score range

of 20 to 80, with higher scores indicating greater psychological stress, as well as sleep quality (assessed using the Pittsburgh Sleep Quality Index (PSQI), with a maximum score of 21 points, where the score is inversely proportional to sleep quality) [4].

2.4. Statistical analysis

Data analysis was performed using SPSS 20.0 software. Measurement data were expressed using t-tests and "Mean ± SD", with $P < 0.05$ indicating statistically significant differences in the data.

3. Results

3.1. Comparison of time required for clinical symptom improvement between the two groups

The intervention group had significantly lower times for all items compared to the control group ($P < 0.05$) (**Table 1**).

Table 1. Comparison of time required for clinical symptom improvement between the two groups (d, Mean ± SD)

Group	Number of Cases	Vaginal Bleeding Cessation (days, Mean ± SD)	Abdominal Pain Relief (days, Mean ± SD)	Lower Back Pain Relief (days, Mean ± SD)	Total Hospital Stay (days, Mean ± SD)
Intervention Group	50	5.41 ± 1.79	3.22 ± 1.59	3.72 ± 1.08	5.34 ± 1.35
Control Group	50	7.98 ± 2.06	8.84 ± 2.13	6.28 ± 1.62	6.11 ± 1.36
t-value	-	6.659	14.951	9.297	2.841
P-value	-	0.001	0.001	0.001	0.006

3.2. Comparison of emotional and sleep quality scores between the two groups

The intervention group had lower SAS and SDS scores, as well as a lower PSQI score, compared to the control group ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of emotional and sleep quality scores between the two groups (Mean ± SD)

Group	Number of Cases	SAS (Pre)	SAS (Post)	SDS (Pre)	SDS (Post)	PSQI (Pre)	PSQI (Post)
Intervention Group	50	62.43 ± 3.51	27.72 ± 3.51	60.33 ± 4.25	30.47 ± 2.24	14.35 ± 4.31	7.36 ± 2.37
Control Group	50	61.72 ± 3.12	32.66 ± 3.29	60.31 ± 5.21	36.25 ± 3.14	14.29 ± 4.37	10.32 ± 2.67
t-value	-	1.069	7.261	0.021	10.596	0.069	5.863
P-value	-	0.288	0.001	0.983	0.001	0.945	0.001

4. Discussion

The advantage of the KANO model primarily lies in breaking away from the traditional "one-size-fits-all" approach to nursing services and providing care "on demand" based on patients' needs, making nursing work more targeted. Patients with threatened abortion are filled with concerns about their pregnancy outcomes and have a variety of complex and changing needs. However, current routine care can only meet their basic needs and fails to adequately address their special needs. After conducting a survey and analysis using the KANO model, this study concluded that disease observation and management, as well as medication guidance, are must-have needs;

emotional comfort and selection of pain relief methods are expected needs; and family companionship, continuous health education, and follow-up are attractive needs that can significantly enhance nursing satisfaction [5].

The results of this study showed that the intervention group outperformed the control group in terms of the time taken for clinical improvement, emotional scores, and sleep quality scores ($P < 0.05$). Analyzing the reasons, the KANO model is a quality management tool that, in the clinical care of patients with threatened abortion, categorizes their needs into three core types: basic needs, attractive needs, and expected needs [6]. In this study, through the KANO model, the nursing needs of patients with threatened abortion were divided into three aspects: physiological, psychological, and social support. Understanding and applying these need categories of the KANO model can help medical institutions better design services by identifying and prioritizing the fulfillment of basic, expected, and attractive needs, thereby enhancing the overall medical experience of patients [7]. Continuous precision nursing focuses on multi-dimensional interventions encompassing patients' physiological, psychological, dietary, and social support needs, which contribute to a comprehensive improvement in their physical and mental health, reduction of anxiety and depression, enhancement of sleep quality, and strengthening of self-management abilities and quality of life. Targeted nursing measures can promptly respond to changes in patients' symptoms, effectively control abdominal pain, low back pain, and vaginal bleeding, shorten the total hospital stay, and reduce unnecessary consumption of medical resources [8].

Psychological factors play a significant role in the prognosis of threatened abortion, as anxiety and depression can affect progesterone secretion through the neuroendocrine system, exacerbating the condition. In this study, the scores of the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) in the observation group were significantly lower than those in the control group after intervention. Unlike the general education provided in routine care, the "assessment-counseling-consolidation" three-step approach adopted by the observation group was more targeted: it identified the root causes of psychological issues through scale screening, boosted confidence with successful case studies, and utilized cognitive-behavioral therapy to correct negative cognitions, effectively alleviating patients' anxiety and depression [9]. The improvement in psychological state directly contributed to enhanced sleep quality, as evidenced by a significant reduction in the Pittsburgh Sleep Quality Index (PSQI) scores in the observation group, indicating good sleep quality. This is because emotional stability reduced nocturnal rumination, while interventions such as a comfortable hospital room environment and relaxation training further optimized sleep structure [10].

5. Conclusion

In conclusion, precision nursing based on the KANO model achieves stratified intervention in the care of patients with threatened abortion through need categorization, significantly shortening the time for clinical symptom improvement, alleviating anxiety and depression, and enhancing sleep quality, thus demonstrating its value for widespread implementation.

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Disclosure statement

The authors declare no conflict of interest.

References

[1] Nie J, Gao M, Zhong Y, 2022, Clinical Study on the Effect of Traditional Chinese Medicine Decoction Combined with Emotional Nursing Intervention on Pregnancy Outcomes in Patients with Threatened Abortion. Modern Distance Education of Chinese Medicine, 20(18): 145–148.

[2] Ma AJ, 2024, Application Effect of Precise Case-based Continuous Nursing in Patients with Threatened Abortion in Early Pregnancy. Journal of Practical Gynecological Endocrinology (Electronic Edition), 11(7): 149–151.

[3] Miao XL, Han XP, Shen J, 2024, The Impact of Continuous Precise Nursing Intervention on Self-efficacy, Anxiety, and Depression in Patients with Threatened Abortion. Qilu Nursing Journal, 30(6): 154–156.

[4] Chen XM, 2024, Analysis of Sleep Quality and its Related Influencing Factors during Tocolytic Treatment in Patients with Threatened Abortion. Journal of Rare and Uncommon Diseases, 31(6): 120–121.

[5] Han TF, Yang JL, Luo JM, et al., 2023, Application Effect of Precise Case-based Continuous Nursing in Patients with Threatened Abortion in Early Pregnancy. Contemporary Nurse, 30(10): 121–124.

[6] Du YB, Huang Y, 2018, Demand Analysis of Post-abortion Care Counseling Services Based on the Kano Model. Chinese Journal of Family Planning, 26(4): 326–328.

[7] Ling HF, 2023, Application of Continuous Precise Nursing Combined with Psychological Intervention in Patients with Threatened Abortion. Chinese Modern Doctor, 61(19): 97–100.

[8] Zhou HY, 2022, Analysis of the Effect of Continuous Precise Nursing on Patients with Threatened Abortion and its Impact on Self-efficacy. Modern Diagnosis and Treatment, 33(15): 2368–2370.

[9] Li HM, Sun F, 2017, Application of Continuous Precise Nursing in Patients with Threatened Abortion in Early Pregnancy. Qilu Nursing Journal, 23(20): 85–87.

[10] Li JY, Zhou JP, 2022, The Impact of Auricular Point Pressing with Beans at Selected Times According to the Midnight-noon Ebb-flow Theory on Improving the Yang-deficiency Constitution and Clinical Efficacy in Patients with Kidney-deficiency Type Early Threatened Abortion. Chinese Journal of General Practice, 20(3): 478–481.