Original Article
Nursing interventions for perioperative infections in obstetric and gynecological diseases

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Abstract: Objective: To investigate the effects of nursing interventions on perioperative infections in gynecological and obstetric surgery patients. Methods: A retrospective study was performed on 110 gynecological and obstetric surgery patients. In the control group, 55 patients underwent routine nursing. In the experimental group, 55 patients underwent holistic nursing care. Perioperative infections, anxious and depressive moods, the quality of sleep, the plasma albumin and transferrin levels, postoperative body temperatures, hospital stay durations, and the satisfaction rates were compared in the two groups. Results: The perioperative infection rate in the observation group after the nursing intervention was significantly lower than it was in the control group (*P*<0.05). The patients in the observation group had significantly shorter hospital stays and lower postoperative body temperatures than the patients in the control group (all *P*<0.001). In addition, the Hamilton Anxiety Scale (HAMA) and the Hamilton Depression Scale (HAMD) scores in the observation group were all significantly lower than the corresponding scores in the control group (all P<0.001), and the Pittsburgh Sleep Quality Index (PSQI), the plasma albumin and transferrin levels, and the nursing satisfaction rate in the observation group were significantly higher than they were in the control group (all P<0.05). Conclusion: Holistic nursing intervention can effectively decrease the perioperative infection rate, reduce the postoperative body temperature, promote patients' recovery, and improve their sleep quality, nutritional status, and nursing satisfaction rate after obstetric and gynecological surgery.

Keywords: Perioperative infections, effect, obstetric and gynecological surgery, holistic nursing care

Introduction

At present, gynecological and obstetric diseases have become common diseases with an increasing incidence [1], seriously affecting the patients' physical and psychological health and exerting a heavy burden on patients and their families [2, 3]. Some patients have indications for operations. And surgery, as the common method, can effectively improve patients' clinical outcomes. However, previous studies reported that operations can lead to poor nutritional status, poor sleep quality, increased incidences of perioperative infections and trauma in patients [4, 5]. It was reported that perioperative infections can significantly influence the prognoses of patients undergoing gynecological and obstetric surgery and is a central problem that medical workers need to solve [6, 7].

Many studies also revealed that perioperative infections are associated with negative moods, poor sleep quality, and poor nutritional status [8, 9]. Thus, targeted measures are required to prevent perioperative infections and reduce the risk of getting them.

In clinical practice, regular nursing interventions are applied for patients with gynecological and obstetric surgery during the perioperative period and the outcomes are not satisfactory [10]. There are some problems such as insufficient attention being paid to the effects of environmental intervention and sleep quality, insufficient health guidance, incomplete surgical knowledge concerning gynecological and obstetric diseases, indifference to the psychological conditions, and the role of comprehensive care in patients and the like

[11]. All of these factors can lead to poor outcomes. Holistic nursing care, a brand-new nursing interventional model, strengthens integrated and comprehensive services as an add-on to conventional nursing, and establishes a good relationship between patients and nurses [12]. Some studies showed that holistic nursing care can provide a high degree of high-quality nursing in the management of tumor surgery patients [13, 14]. However, the effect of holistic nursing care on perioperative infections in obstetric and gynecological surgery patients is unclear. In this study, the impacts of holistic nursing care on perioperative infections and the related risk factors were explored. The results of this study will provide clinical guidelines for better nursing care in gynecological and obstetric surgery patients during the perioperative period.

Materials and methods

Subjects

In this study, 110 patients with gynecological and obstetric diseases admitted to People's Hospital of Deyang City from July 2018 to October 2019 were enrolled as the study cohort. These patients were divided into two groups: the control group (n=53) and the observation group (n=53). The patients in the control group underwent routine nursing care, and the patients in the observation group underwent holistic nursing care. The inclusion criteria were as follows: (1) Patients diagnosed with gynecological and obstetric diseases according to the established diagnostic criteria and for whom surgery was indicated. (2) Patients who were over 18-years old and who would be undergoing their firstly gynecological and obstetric surgery. (3) Patients classified in the American Society of Anesthesiologists (ASA) groups I or II. (4) Patients who had no history of surgery for any other organs. (5) Patients whose complete clinical data was available. The exclusion criteria were as follows: (1) Patients with severe liver and kidney dysfunction, cardiovascular and cerebrovascular diseases, and mental illness. (2) Patients with contraindications to gynecological and obstetric surgery. (3) Patients who were unable to cooperate with this study. (4) Patients who, before the surgery, had infectious diseases such as oral fungal infections, or urinary system and pulmonary infections. (5) Patients whose medical records were

incomplete. This research was approved by the Hospital Ethics Committee, and all the patients included in this study provided written informed consent.

Methods

The Patients from the control group were provided with the following conventional nursing: The vital signs of the patients were regularly recorded. The regular perioperative health guidelines, including possible side effects and infections, were given to the patients. A disinfection of their vulvas and anuses was conducted once per day. The anti-infective treatment was performed in the patients according the doctor's instructions. The patients in the observation group received the following holistic nursing care: (1) Health guidance: The patients admitted to this hospital were informed of the relevant knowledge regarding gynecological and obstetric diseases and the operative treatment schemes. In order to relieve the patients' fears, the patients were told of previous successful surgeries. In addition, their abnormal indexes were corrected promptly. After the surgery, the patients were encouraged to engage in physical activity like getting out of bed early in the morning, depending on the patients' conditions. (2) Prevention of infection: To prevent of pulmonary infections, the patients were encouraged to effectively cough and keep their respiratory tracts unobstructed, and nursing care such as back slapping to help their respiratory systems was strengthened. The surgical sites were kept clean and dry. The nursing of the urinary system in patients was strengthened. The monitoring of infections for the postoperative patients was performed. And the medical staff prevented the spread of germs by washing their hands frequently. The application of antibiotics was conducted according to the principle of appropriate amount and proper duration. (3) Diet care: To enhance the resistibility and immunity of patients, the high calorie diets with high-quality proteins, rich in vitamins were given. Hot or spicy foods were not provided, and the food was usually easy to chew and digest. (4) Environmental intervention: a healthy, quiet, warm and comfortable environment for the patients was established in the ward. To ensure enough rest for the patients, the visiting hours was restricted and sleep guidance, including foot baths, watching vid-

eos, and playing music were arranged. (5) Psychological intervention: The nurse promptly noted any changes in the patients' psychological conditions during the perioperative period. To reduce the psychological discomfort, anxiety, and tension, psychological counseling was provided for the patients. The patients were helped to believe in their ability to overcome their perioperative infections and encouraged to participate in activities concerning perioperative treatment and nursing.

Outcome measures

A comparison of the perioperative infection rates was made between the two groups. The perioperative infections included incisional wound infections, digestive system infections, urinary system infections, and respiratory system infections. The total incidence of perioperative infections was obtained using the following formula: Total incidence of perioperative infection = infective cases/Total cases ×100%.

The negative emotions were compared between the two groups. The Hamilton Anxiety Scale (HAMA) and the Hamilton Depression Scale (HAMD) were applied to evaluate the negative emotions of the patients during the perioperative period [15, 16]. HAMA scores below 7 points indicated no anxiety, and HAMA scores equal to or more than 7 indicated anxiousness. The HAMA scores included 14 items which were assessed using a 5-point scoring method. HAMD scores below 7 points indicated no depression, but HAMA scores equal to or more than 7 indicated depression. The HAMD scores included 17 items, and most of them were assessed using a 5-point scoring method.

The sleep quality was compared between two groups. The Pittsburgh sleep quality index (PSQI) was used to evaluate the patients' sleep quality during the perioperative period [17]. The total possible scores is 21. The PSQI scores are composed of 7 items assessing subjective sleep quality, sleep duration, sleep latency, habitual sleep efficiency, sleep disturbances, the use of sleeping medication, and daytime dysfunction. Higher PSQI scores indicate poorer sleep quality.

The plasma albumin and transferrin levels were used to assess the patients' nutritional status during the perioperative period. Venous blood was drawn from the elbow vein of each patient after fasting. The plasma albumin and transferrin levels were measured using an AU1000 type automatic biochemical analyzer (Olympus, Japan).

The postoperative body temperatures and lengths of the hospital stays were compared between the two groups. After undergoing the holistic nursing care, the postoperative body temperature and hospital stay indexes were assessed and compared between the control group and the observation group.

The nursing satisfaction rates were evaluated subjectively according to the health education, the ward environment, the working attitudes, the nursing professionalism, and the nursing outcomes [18]. The total possible score was 100 points. The satisfaction was classified as very satisfied (over 90 points), satisfied (between 70 and 90 points) and unsatisfied (below 70 points).

Statistical analysis

The clinical data were recorded and analyzed using SPSS software (IBM, USA), version 22.0. The measurement data were presented as the mean ± standard deviation (SD). The data comparisons between groups were conducted with independent samples t-tests, and the comparisons between the pre-and post-nursing care were performed using paired t-tests. The count data were presented as case/percentage (n (%)). The comparisons were conducted using chi square tests. $P<0.05$ indicated a significant difference.

Results

Comparison of the general patient data

No statistically significant differences were found between the two groups in terms of the patients' ages, body mass indexes (BMI), underlying disease, or type of operation, as shown in **Table 1**.

The perioperative infections compared between the two groups

As seen in **Table 2**, compared with the control group, the total number of perioperative infections in the observation group was significantly lower, and the difference was significant (7.3% vs 25.5%, P=0.010).

Table 1. Comparison of the general information

Index	Control group (n=55)	Observation group (n=55)	χ^2/t value	P value
Age (years)	43.5±3.6	42.9±3.3	0.911	0.364
BMI (kg/m^2)	21.2±0.9	21.0±0.7	1.301	0.196
Hyperlipemia (case)	6	8	0.327	0.567
Hypertension (case)	9	7	0.293	0.589
Diabetes (case)	10	12	0.227	0.634
Type of diseases				
Metrocarcinoma	30	28	0.389	0.823
Uterine fibroids	20	23		
Ectopic pregnancy	5	4		
Type of operation				
Radical operation of ovarian cancer	24	22	0.953	0.917
Hysteromyomectomy	15	16		
Total hysterectomy	6	9		
Vaginal hysterectomy	6	5		
Tubal operation	4	3		

Note: BMI: body mass index.

Table 2. Comparison of the perioperative infections in the two groups [n (%)]

Group	Incisional wound	Digestive system	Urinary system	Respiratory system	Total infection rate
Control group	5 (9.1%)	2 (3.6%)	4 (10.9%)	3 (5.5%)	14 (25.5)
Observation group	1 (1.8%)	0 (0%)	2 (3.6%)	1 (1.8%)	4 (7.3)
χ^2 value					6.643
P value					0.010

Comparison of the HAMA and HAMD scores in the two groups

As shown in **Figure 1**, there was no significant differences between the two groups before the nursing care started in terms of their HAMA (15.3±3.2 vs 15.6±3.7) or HAMD scores (15.9± 4.5 vs 15.7±4.2). Compared with the scores recorded before the nursing care started in both groups, the HAMA and HAMD scores after the nursing care were significantly reduced (all P<0.001). The HAMA (11.3±1.6 vs 8.2±1.2) and HAMD scores (11.6±1.4 vs 7.8±1.0) after the nursing care in the observation group were significantly lower than they were in the control group, and the differences were significant (all P<0.001).

Comparison of the PSQI scores between the two groups

As shown in **Figure 2**, there was no significant difference between the two groups before the nursing care in their PSQI scores (59.5±2.8 vs 58.7±2.5). Compared with the scores before the nursing care in both groups, the PSQI scores recorded after the nursing care were significantly increased (all P<0.001). The PSQI scores (79.1±3.4 vs 87.2±4.1) recorded after the nursing care in the observation group were significantly higher than they were in the control group, and the differences were significant (all P<0.001).
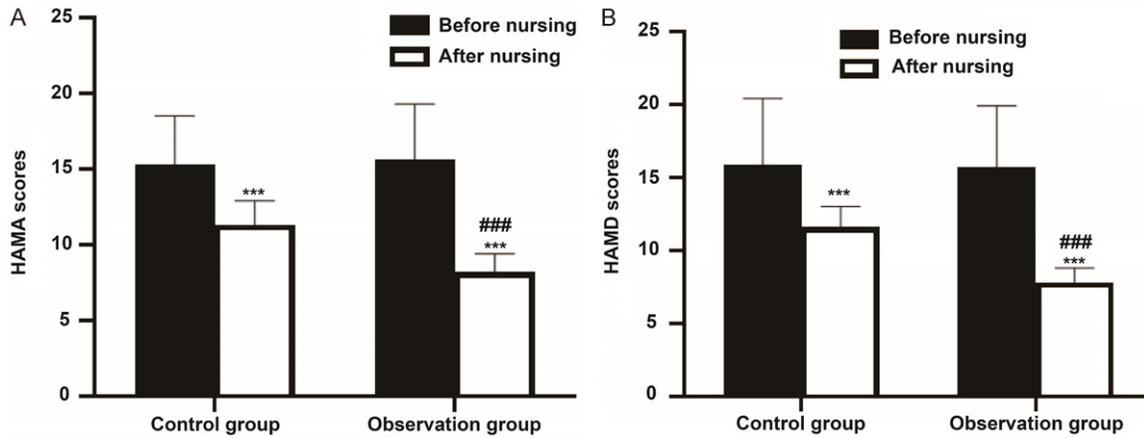
Comparison of the postoperative body temperatures and lengths of stay between the two groups

As seen in **Table 3**, the postoperative body temperatures and lengths of stay in the observation group were significantly lower than they were in the control group, and the differences were significant (all P<0.001).

Comparison of the plasma albumin and transferrin levels in two groups

As shown in **Table 4**, there was no significant difference between the two groups before the

Figure 1. Comparison of the HAMA and HAMD scores in the control group and the observation group. Note: HAMA: Hamilton Anxiety Scale; HAMD: Hamilton Depression Scale. A: HAMA scores; B: HAMD scores. Compared with the same group before the nursing, ***P<0.001; Compared with the control group after the nursing, ###P<0.001.
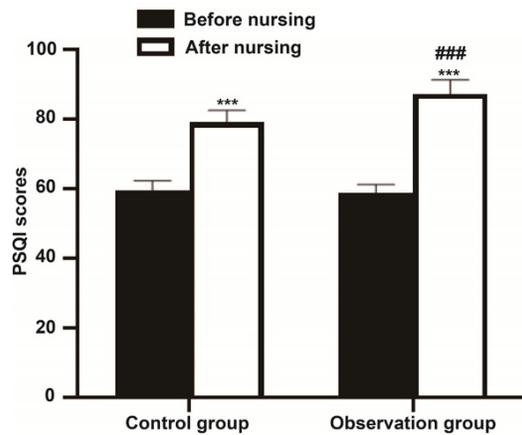
Figure 2. Comparison of the PSQI scores between the control group and the observation group. Note: PSQI: Pittsburgh Sleep Quality Index. Compared with the same group before the nursing, ***P<0.001; Compared with the control group after the nursing, ###P<0.001.

Table 3. Comparison of the postoperative body temperatures and lengths of stay between two groups

Groups	Postoperative body temperature (°C)	Length of stay (d)
Control group	37.7±0.26	7.1±1.7
Observation group	37.2±0.19	4.9±1.2
t/χ^2 value	11.510	7.841
P value	<0.001	<0.001

nursing care started in terms of their plasma albumin and transferrin levels (31.2±1.8 g/L vs 30.8±1.6 g/L; 1.6±0.4 g/L vs 1.7±0.5 g/L).

Compared with the levels before the nursing care started in both groups, of the plasma albumin and transferrin levels after the nursing care were significantly increased (all P<0.001). The plasma albumin and transferrin levels (33.2±1.7 vs 35.6±2.0 g/L, 1.9±0.3 g/L vs 2.3±0.5 g/L, all P<0.001) after the nursing care in the observation group were significantly higher than they were in the control group, and the differences were significant (all P<0.001).

Comparison of the nursing satisfaction rates in the two groups

As shown in **Table 5**, the patient satisfaction rate with the nursing care in the observation group was significantly higher than it was in the control group, and the difference was significant (χ^2=9.565, P=0.002).

Discussion

Surgery is one of most common methods for the treatment of gynecological and obstetric diseases [19]. During the perioperative period, patients often suffer from infections, negative emotions, poor sleep quality, and poor nutrition, which seriously affects the therapeutic effect. It was reported that nursing care in coordination with clinical treatment can significantly improve patient outcomes [20]. With the changes in nursing care concepts and the increasing renewal of the nursing care modes, nursing care is considered to play an important role in improving patient prognosis [21]. Holistic nursing care is described as a comprehen-

Table 4. Comparison of the plasma albumin and transferrin levels between the control group and observation group

Group	plasma albumin (g/L)		t value	P value	Transferrin (g/L)		t value	P value
	Before nursing	After nursing			Before nursing	After nursing		
Control group	31.2±1.8	33.2±1.7	5.991	<0.001	1.6±0.4	1.9±0.3	4.450	<0.001
Observation group	30.8±1.6	35.6±2.0	13.900	<0.001	1.7±0.5	2.3±0.5	6.293	<0.001
t value	1.232	6.781			1.158	5.087		
P value	0.221	<0.001			0.249	<0.001		

Table 5. Comparison of the nursing satisfaction rate between the two groups [n(%)]

Group	Very satisfied	Satisfied	Unsatisfied	satisfaction rate
Control group	25	18	12	43 (78.2%)
Observation group	31	20	4	51 (92.7%)
χ^2 value				4.681
P value				0.031

sive nursing program based on high-quality nursing, and it is mainly focused on the improvement of clinical outcomes. Some studies have reported that in patients undergoing cancer operations, holistic nursing care can significantly improve negative emotions, treatment compliance and clinical symptoms, ultimately achieving patient satisfaction with the clinical prognosis.

In this study, holistic nursing care, a new nursing intervention program, was carried out with patients undergoing gynecological and obstetric surgery. The holistic nursing care included health guidance, the prevention of infections, psychological intervention, diet care, and environmental intervention. The present study revealed that, compared with the control group, the perioperative infection rate in the observation group was significantly lower, which suggested that the holistic nursing care provided patients with high-quality and integrated nursing and the aim of fewer perioperative infections was achieved. In addition, the postoperative body temperature and length of stay in the observation group were significantly lower than they were in the control group. This suggests that holistic nursing care is able to enhance patients' recovery. As we can see, holistic nursing care has a good effect on perioperative infections in patients who undergo gynecological and obstetric surgery.

Nutritional status is an important indicator for assessing the clinical outcomes of patients during the perioperative period. The plasma albumin and transferrin levels are considered common markers for evaluating patients' nutritional statuses. In this study, the results showed that compared with the control group, the plasma albumin and transferrin levels in the observation group after the holistic nursing care were higher, indicating holistic nursing care can significantly improve patients' nutritional status and it helps enhance their immunity. The main reason is diet control. This is similar to the results reported by Gholizadeh et al. [22]. The present study also showed that the PSQI scores in the observation group were significantly higher than they were in the control group, indicating that holistic nursing care can achieve the purpose of improving sleep quality based on comprehensive and high-quality nursing care in patients undergoing gynecological and obstetric surgery. This is consistent with the result reported by Sun et al. [23].

Anxious and depressive conditions induced by gynecological and obstetric surgery can severely affect patient recovery [24]. The HAMA and HAMD scores are considered an authoritative measure for quantitatively evaluating psychological conditions. In this study, we showed that the HAMA and HAMD scores after the nursing in the observation group were significantly lower than the scores in the control group. This indicated that the patients presented with anxious and depressive conditions during the perioperative period and the holistic nursing care improved the patients' negative moods, which is consistent with the result reported by Rancour et al. [25].

In terms of patient satisfaction with the nursing intervention, holistic nursing care can improve the professional abilities of the nursing staff, enabling them to better understand patient nursing interventions, and achieving more meticulous nursing [26]. Some studies reported that good nursing interventions can increase patient satisfaction [27]. This study also shows that the patient satisfaction rate in the observation group was significantly higher than it was in the control group, which basically agrees with the results reported by previous studies [28].

In conclusion, holistic nursing care can effectively decrease perioperative infections, reduce the length of hospital stays, improve patients' negative emotions, enhance patients' nutritional statuses, and increase sleep quality and the nursing satisfaction rate, so it conforms to the requirements of nursing care in patients undergoing gynecological and obstetric surgery during the perioperative period. However, there were certain problems, such as the small sample size, the fact that this was a single-center study, the lack of classification comparisons, and the lack of long-term follow-up results. In the future, a multi-center, randomized, controlled study with a large sample size and long-term follow-ups are required to validate this study.

Disclosure of conflict of interest

None.

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