Effect of quality control circle nursing mode on postoperative pain and anxiety of patients with cervical cancer

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Running title: QCC nursing mode for patients with cervical cancer

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Abstract: Objective: To investigate the effect of quality control circle (QCC) nursing mode on postoperative pain and anxiety of patients with cervical cancer. **Methods:** Patients (n=324) with cervical cancer who were hospitalized in our hospital and needed surgical treatment were selected as the objects. They were randomly divided into an observation group (n=162) and a control group (n=162). The control group was given routine nursing care, and the observation group was given a QCC nursing mode. The knowledge of pain, pain degree, anxiety, depression, anal exhaust time, defecation time, hospitalization time, hospitalization expenses, the total incidence of complications and patient satisfaction were compared between the two groups. **Results:** Compared with the control group, the knowledge of pain such as self-assessment, pain treatment after discharge, pain medication knowledge, adverse reaction prevention, and pain correct nursing in the observation group were significantly higher (all $P<0.05$); The pain scores at 6h, 24h, 48h and 72h in the observation group were significantly lower than those in the control group (all $P<0.001$). The SAS and SDS scores of the observation group were significantly lower than those of the control group (all $P<0.001$). The anal exhaust time, defecation time and hospitalization time of the observation group were shorter than those of the control group, and the hospitalization expenses were less than those of the control group (all $P<0.001$). The total incidence of adverse reactions in the observation group was significantly lower than that in the control group ($P<0.001$). The nursing satisfaction of the observation group during hospitalization was significantly higher

than that of the control group (P<0.001). **Conclusion:** The effect of QCC nursing mode in improving postoperative pain and anxiety of patients with cervical cancer is significant. QCC nursing mode can significantly reduce the incidence of complications, shorten anal exhaust time, defecation time and hospitalization time, save treatment costs and improve patient satisfaction, which is worthy of clinical promotion and application.

Keywords: quality control circle nursing mode, cervical cancer, pain, anxiety

Introduction

Cervical cancer is a primary malignant tumor in women's cervix. The main cause of thisis a persistent infection of high-risk HPV virus [1]. The incidence rate of cervical cancer in the world is about 13 per 100,000 people. The mortality rate is about 7 of every 100,000 people. In recent years, the age of disease has become younger, and it has brought enormous financial burden to society [2, 3]. The disease is often asymptomatic in the early stage. With the progression of the disease, the patient will suffer from severe symptoms such as contact bleeding and abnormal vaginal bleeding. In the late stage of the disease, patients will have a ureteral obstruction, renal dysfunction, extreme emaciation, fatigue, vaginal bleeding and other manifestations of an advanced malignant tumors. Because of the pelvic long-term tumor compression, it may result in lower extremity venous thrombosis, even pulmonary embolism, which seriously threatens the safety of patients [4]. Surgical treatment is an effective treatment method for cervical cancer. Postoperative pain is a common adverse reaction. Besides, patients lose their unique female reproductive organs after surgery. They are faced with multiple problems such as loss of reproductive function, loss of sexual characteristics, premature menopause, and changes of sexual function, which lead to negative emotions such as anxiety, fear and loss. The psychological stress may increase patients' pain and affect the prognosis of patients [5]. Eliminating or relieving postoperative pain and anxiety has become the focus of surgical nursing. Quality control circle (QCC) nursing is a work mode in which all medical staff engaged in similar or the same work spontaneously and forms activity groups to solve key problems in nursing work [6]. At present, there is no report in the world about the effect of the nursing mode QCC on postoperative pain and anxiety of patients with cervical cancer. Therefore, this study mainly discusses the application effect of QCC nursing mode in improving postoperative pain and anxiety of patients with cervical cancer and focuses on the analysis of the impact of the nursing intervention mode on depression, postoperative recovery, complications and satisfaction, to provide theoretical guidance for clinical nursing.

Materials and methods

General data

In this study, we adopted a prospective research method. A total of 324 patients with cervical cancer who have conducted surgery in Fujian Maternity and Child Health Hospital, Affiliated Hospital of Fujian Medical University from June 30, 2018 to June 30, 2019 were selected as the objects. They were divided into the observation group (n=162) and the control group (n=162) by a random number table method. The general information of the two groups as shown below. This study was approved by the Medical Ethics Committee of Fujian Maternity and Child Health Hospital, Affiliated Hospital of Fujian Medical University.

Inclusion criteria: (1) patients who meet the diagnostic criteria for cervical cancer [7]; (2) patients who require surgical treatment; (3) patients who were not transferred to ICU after surgery; (4) patients with normal cognitive function; (5) patients who agreed to participate in this study and signed informed consent.

Exclusion criteria: (1) patients with cancer spread; (2) patients with a mental history or cognitive impairment; (3) patients who are allergic to painkillers or are drug abusers; (4) patients with discomfort in other parts of the body; (5) patients who have surgery on other parts of the body at the same time; (6) patients who are lost after surgery

Methods

Routine nursing was performed in the control group, including preoperative health education, psychological nursing, routine preparation, postoperative vital signs monitoring, condition observation, basic nursing, etc.

QCC nursing mode was carried out in the observation group [8-10]. (1) Establish the group and determine the theme: An 8-person quality control circle composed of the department director, head nurse, nursing team leader with rich working experience and senior nursing staff was established. The theme of QCC is to reduce the pain of patients with cervical cancer surgery. (2) Draw up the activity plan: The whole QCC is planned to be completed in 12 months. The activity schedule is drawn up. The specific implementation time and the person in charge of each stage are determined. Conferences discussing the topics of the quality control circle are held regularly (within 1 hour) and the contents of the meeting are publicized by the WeChat group. (3) Implementation strategy: 1) Pain-related training was carried out for nursing staff, including pain evaluation criteria, cancer pain psychology, pain anatomy, drug and non-drug intervention for physical cancer pain, family care, etc. 2) Health education on pain-related knowledge was carried out using a bulletin board, family visit, telephone interview, hospital multimedia, outpatient follow-up and WeChat group. Health education is composed of the significance of pain treatment, three-step cancer pain treatment, the importance of medication compliance, the types, efficacy and using methods of commonly used analgesic drugs. 3) Psychological intervention was used to improve the pain threshold, such as relaxation therapy, music therapy and

massage therapy.

Outcome measures

The knowledge of pain was compared between the two groups: self-evaluation, pain treatment after discharge, knowledge of pain killers, adverse reaction prevention and correct pain care were evaluated by self-developed health education knowledge assessment scale (The content validity of the scale was 0.89. Cronbach's α coefficient was 0.91). The full score is 100 points. The score that is no less than 95 points indicates that the patient knows. The awareness rate = the number of awareness cases / the total number of cases * 100%.

The degree of postoperative pain was compared between the two groups: visual analog scale (VAS) was used to assess the degree of postoperative pain. Patients were asked to draw lines on the straight line marked with 10 scales according to their subjectivity. 0 score was painless and 10 score was severe pain. Four- time points were selected for statistical analysis, including 6h, 24h, 48h and 72h after operation [11].

The anxiety status of the two groups was compared: Self Rating Anxiety Scale (SAS) was used to evaluate the anxiety state of patients. SAS score ≥50 points indicated that there were anxiety symptoms, and the degree increased with the score [12].

The depression status of the two groups was compared: Self Rating Depression Scale (SDS) was used to evaluate the depression status of patients (mild depression: 53-62 points, moderate depression: 63-72 points, severe depression: >72 points), and the degree of depression increased with the score [13].

The anal exhaust time, defecation time, hospitalization time and hospitalization expenses were compared between the two groups.

The incidence of complications, such as nausea, abdominal pain, wound infection, intestinal obstruction and other complications, were compared between the two groups. If multiple complications occurred in the same patient, multiple complications were included in the calculation of the total incidence rate, that is the total incidence = number of complications / total cases * 100%

When being discharged, patients were asked to fill in the self-made satisfaction survey scale (the content validity of the scale was 0.88, Cronbach's α coefficient was 0.90) to evaluate nursing satisfaction, which was divided into satisfaction (90-100 points), basic satisfaction (60-89 points), dissatisfaction (<60 points), Satisfaction = (satisfaction + basic satisfaction) cases / total cases * 100%

Statistical analysis

SPSS 20.0 was used for statistical analysis. The count data was expressed as (n/%) by chi- square test. The measurement data under normal distribution was represented by the mean ± standard deviation ($\bar{x} \pm sd$). The comparison between groups was conducted by independent t-test. The measurement data that did not conform to the normal distribution was expressed by the median and quartile distance and the comparison between groups was conducted by rank-sum test. The difference was statistically significant with $P<0.05$.

Results

Comparison of the general baseline data between the two groups

There was no significant difference in age, pathological type, stage, education level, occupation, fertility mode, abortion frequency, number of childbearing, menopause years and operation mode between the two groups ($P>0.05$). See **Table 1**.

Comparison of the knowledge of pain between the two groups

Compared with the control group, the knowledge of pain such as self-assessment, pain treatment after discharge, pain medication knowledge, adverse reaction prevention, and correct nursing of the pain in the observation group were significantly higher than those in the control group (all $P<0.05$). See **Table 2**.

Comparison of postoperative pain between the two groups

The pain scores at 6h, 24h, 48h and 72h in the observation group were lower than those in the control group (all $P<0.001$). See **Table 3**

Comparison of anxiety between the two groups

The SAS score of the observation group was lower than that of the control group (47.17 ± 5.42 vs. 50.11 ± 5.07), and the difference was statistically significant ($t=4.447$, $P<0.001$). See **Figure 1**.

Comparison of depression between the two groups

The SDS score of the observation group was lower than that of the control group (47.13 ± 5.37 vs. 52.76 ± 6.72; $t=8.330$, $P<0.001$). See **Figure 2**.

Comparison of postoperative recovery between the two groups

The anal exhaust time, defecation time and hospitalization time of the observation group were shorter than those of the control group, and the hospitalization expenses

were less than those of the control group (all P<0.001). See **Table 4**

Comparison of postoperative adverse reactions between the two groups

In the observation group, there were 10 cases of nausea and 4 cases of abdominal pain with a total complication rate of 8.64%. In the control group, there were 21 cases of nausea, 9 cases of abdominal pain, 9 cases of wound infection and 2 cases of intestinal obstruction with the total complication rate of 25.31%. The total complication rate of the observation group was significantly lower than that of the control group (P<0.001). See **Table 5**.

Comparison of nursing satisfaction between the two groups

In the observation group, there are 85 cases of nursing satisfaction, 67 cases of basic satisfaction, and 10 cases ofdissatisfaction. The satisfaction rate was 93.83%. In the control group, 66 cases were satisfied with nursing. A total of 65 cases were satisfied while 31 cases were dissatisfied. The satisfaction rate was 80.86%. The satisfaction degree of the core family members of the observation group was significantly higher than that of the control group (P<0.001). See **Table 6**.

Discussion

About 1/3 of cancer patients have pain symptoms and the proportion of patients with advanced cancer pain even reaches 60%-90% [14, 15]. The feeling of pain is the subjective experience of patients. Different people will have a different degree of pain experienced with the same injury. Studies have shown that the intensity of pain is closely related to individual psychological state [16]. Cervical cancer postoperative pain is a process of self-healing of tissue damage, which has different degrees of impact on patients' psychology, physiology, society, spirit and so on. It is a problem that every postoperative patient must face. If the pain cannot be controlled in time, it may bring physiological and psychological problems to the patients, and even cause the occurrence of postoperative adverse reactions, which will affect the recovery of patients and prolong the hospital stay. How to effectively reduce the pain degree of patients with cervical cancer surgery to ensure the effectiveness of treatment, has been the problem that the clinical front-line medical staff has been exploring.

QCC was first proposed by Japanese scholars. Its original idea was to promote mutual inspiration among working members, focus on problems, synthesize various ideas, and work together to solve corresponding problems, to continuously improve the quality of work [17]. In recent years, the QCC model has been gradually applied in the medical field, combined with clinical nursing work, which is conducive to finding and solving problems, to continuously improve the quality of nursing [18]. QCC nursing mode has the advantages of encouraging nursing staff to work actively, strengthening the sense of responsibility, stimulating the potential of medical staff,

promoting nursing staff to improve professional skills, to enhance the strength of the nursing team. Chang et al. took 136 patients with colon cancer surgery as the research objects and randomly divided them into the observation group (68 cases) and the control group (68 cases) [19]. Patients in the control group received routine nursing. In the observation group, the QCC nursing mode was implemented to reduce the pain degree of patients with colon cancer surgery. The results showed that the knowledge of pain in the observation group was higher than that in the control group. The pain score was significantly lower than that in the control group. The study suggested that the QCC nursing mode could effectively reduce the pain degree of patients. QCC nursing model was used in the observation group in this study. The results showed that the VAS scores at 6h, 24h, 48 h and 72h after operation were lower than those in the control group, indicating that QCC nursing mode can effectively relieve the pain of patients.

Anxiety is the most common and prominent psychological stress reaction of surgical patients. There is a very close relationship between anxiety and pain. The more serious the anxiety is, the lower the pain threshold is [20]. Wan et al. took 98 cases of non-small cell lung cancer patients as the research objects and randomly divided them into the observation group (49 cases) and control group (49 cases) [21]. The control group was given routine nursing mode, while the observation group was given a QCC nursing mode. The results showed that the SAS and SDS scores of the observation group were significantly lower than those of the control group. In this study, QCC nursing mode was used in the observation group, and compared with the conventional nursing mode in the control group. The results showed that the SAS and SDS scores of the observation group were lower than those of the control group, indicating that QCC nursing model can reduce the anxiety and depression of patients after operation, which may be due to the reduction of anxiety and depression after pain relief.

The occurrence of complications is inevitable after surgery, which will bring about a greater negative impact on the prognosis of the disease. Reducing the incidence of postoperative complications is of great value for the treatment of diseases. Early postoperative exhaust and defecation showed that the stomach and intestines returned to normal position and were unobstructed. In this study, the anal exhaust time, defecation time and hospitalization time of the observation group were shorter than those of the control group, and the incidence of total complications was lower than that of the control group. It shows that QCC nursing mode can not only relieve pain, but also reduce the incidence of nausea, abdominal pain, wound infection, intestinal obstruction and other adverse reactions after cervical cancer surgery, which has positive significance for early rehabilitation of patients.

Finally, this study also investigated the nursing satisfaction of the two groups of patients during hospitalization. The results showed that the nursing satisfaction of the observation group was significantly higher than that of the control group. This may be due to the QCC nursing mode which can reduce the pain, anxiety and depression of

patients, reduce the incidence of complications, improve the clinical prognosis of patients, and give patients better subjective experience of medical treatment. However, this study did not observe the status of the anxiety, depression, sexual pain, vaginal dryness and sexual life satisfaction of patients with cervical cancer after discharge. A large sample of long-term nursing effect study should be carried out in the later stage to confirm the feasibility and importance of QCC nursing mode in patients with cervical cancer after surgery.

In conclusion, QCC nursing mode can significantly improve postoperative pain and anxiety of patients with cervical cancer, reduce the incidence of complications, shorten anal exhaust time, defecation time and hospitalization time, save treatment costs and improve patient satisfaction, which is worthy of clinical promotion and application.

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Table 1 Comparison of general baseline data (n/%, $\bar{x} \pm sd$)

Indicators	Observation group (n=162)	Control group (n=162)	χ^2/t	P

Age(years)	44.4±8.1	45.6±7.8	1.358	0.173
Pathological classification			0.911	0.822
Squamous cell cancer	138	134		
Adenocarcinoma	15	18		
Squamous adenocarcinoma	7	9		
Other types of cancer	2	1		
FIGO 2009 staging			0.832	0.842
Ia stage	29	32		
Ib stage	15	17		
IIa stage	113	106		
IIb stage	5	7		
Degree of education			0.581	0.748
Illiteracy	97	103		
Below high school	48	42		
High school and above	17	17		
Occupation			2.182	0.337
Self-employers	5	6		
Clerk	16	9		
No occupation	141	147		
Fertility pattern			0.420	0.516
Natural birth	152	149		
Cesarean section	10	13		
The number of abortions			0.533	0.767
0-1	103	109		
2-3	47	43		
≥3	12	10		
Number of births			0.290	0.962
1	47	45		
2	72	73		
3	35	34		
≥3	8	10		
Years of menopause			0.352	0.840
1-3 years (including 3)	16	19		
3-10 years (including 10)	128	124		
>10 years	18	19		
Operation pattern			0.519	0.914
Conization and circumcision of lower cervix	28	25		
Hysterectomy	22	25		
Hysterectomy and adnexectomy	3	4		
Extensive hysterectomy	109	108		

Table 2. Comparison of the knowledge of the pain (n (%))

Groups	**Self-assessment of the**	**Pain treatment**	**Knowledge of**	**Prevention of adverse**	**Correct nursing of**

	pain	after discharge	pain-killers	reaction	the pain
Observation group (n=162)	149 (91.98)	140 (86.42)	143 (88.27)	144 (88.89)	148 (91.36)
Control group (n=162)	120 (74.07)	122 (75.31)	128 (79.01)	123 (75.93)	124 (76.54)
χ^2	18.421	6.460	5.081	9.390	13.192
P	<0.001	0.011	0.024	0.002	<0.001

Table 3. Comparison of VAS scores ($\bar{x} \pm sd$, points)

Pain after the surgery	Observation group (n=162)	Control group (n=162)	t	P
6h	2.52±0.31	2.78±0.29	7.796	<0.001
24h	1.61±0.20	2.50±0.26	34.534	<0.001
48h	1.32±0.27	2.48±0.30	36.581	<0.001
72h	0.85±0.22	1.95±0.23	43.989	<0.001

Table 4. Comparison of postoperative recovery

Groups	Anal exhaust time (h)	Defecation time (h)	Length of stay (d)	Hospitalization expenses (*10,000 yuan)
Observation group (n=162)	46.27±4.59	97.31±6.73	8.1±1.3	2.56±0.51
Control group (n=162)	68.17±5.30	122.73±7.70	14.7±2.0	2.83±0.41
t	39.756	31.638	35.216	5.252
P	<0.001	<0.001	<0.001	<0.001

Table 5. Incidence of postoperative complications in two groups (n (%))

Groups	Nausea	Abdominal pain	Wound infection	Intestinal obstruction	Incidence of complications
Observation group (n=162)	10 (6.17)	4 (2.47)	0 (0.00)	0 (0.00)	14 (8.64)
Control group (n=162)	21 (12.96)	9 (5.56)	9 (5.56)	2 (1.23)	41 (25.31)
χ^2					15.961
P					<0.001

Table 6. Comparison of nursing satisfaction (n (%))

Groups	Satisfied	Basically satisfied	Dissatisfied	Satisfaction
Observation group (n=162)	85 (52.47)	67 (41.36)	10 (6.17)	152 (93.83)
Control group	66 (40.74)	65 (40.12)	31 (19.14)	131 (80.86)

(n=162)		
χ^2	13.180	12.311
P	0.001	<0.001

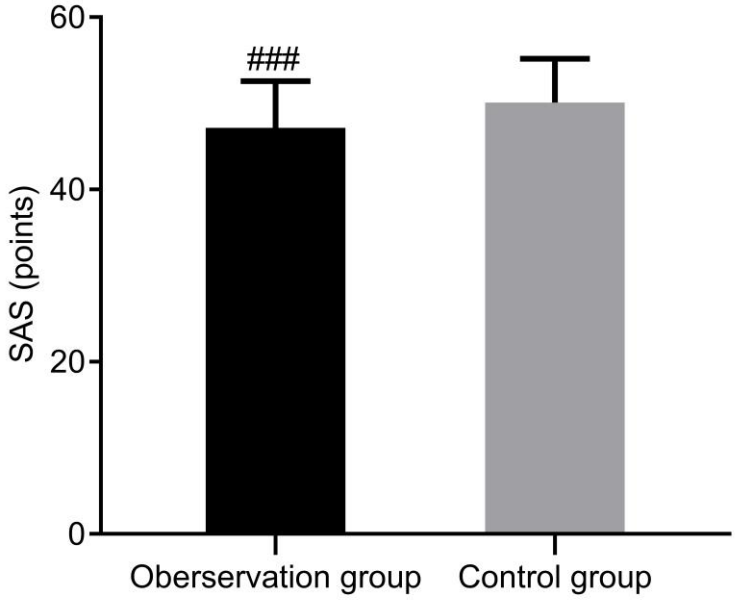

Figure 1. Comparison of SAS scores between the two groups
Compared with the control group, ###P<0.001.

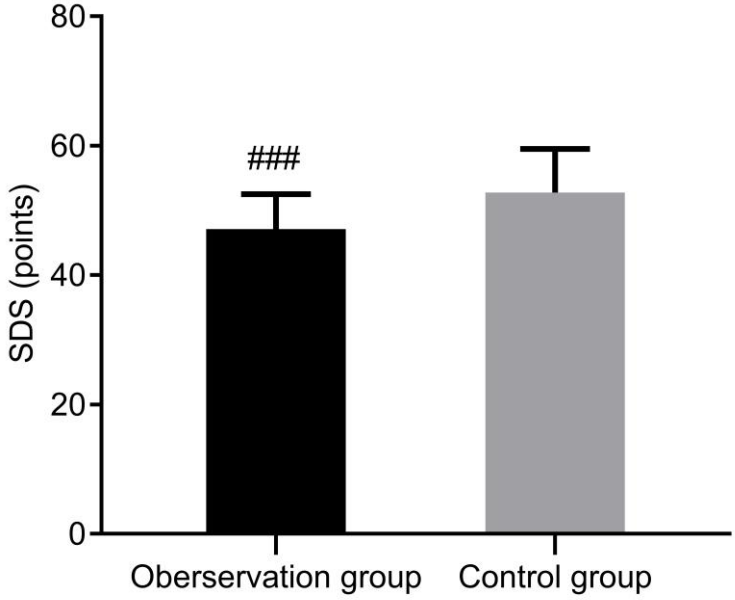

Figure 2. Comparison of SDS scores between the two groups
Compared with the control group, ###P<0.001.