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Original Article

Effect of high quality nursing on relieving postoperative pain and promoting postpartum lactation and postpartum recovery after cesarean section

Yanling Chen[1*], Shuixi Fu[2*], Lin Luo[3], Meizhu Chen[3], Haiyan Qiu[4]

[1]Operating Room, [2]CT Room, [3]Department of Anesthesiology, Affiliated Haikou Hospital of Xiangya Medical College, Central South University, Haikou 570208, Hainan Province, China; [4]Department of Gastroenterology, Danzhou People's Hospital, Danzhou 571700, Hainan Province, China. [*]Equal contributors and co-first authors.

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Abstract: Objective: This study aimed to explore the effect of high quality nursing on relieving postoperative pain and promoting postpartum lactation and postpartum recovery after cesarean section (CS). Methods: The clinical data of 105 puerperae who received CS in our hospital were collected retrospectively. These puerperae were divided into Group A (GA) and Group B (GB) by random number table method. GA received routine nursing and GB received high quality nursing based on the nursing provided for GA. The two groups were compared in visual analogue scale (VAS) scores, lactation yield and application of analgesics at different postoperative time points; self-rating anxiety scale (SAS) scores and self-rating depression scale (SDS) scores before and after intervention; and postoperative recovery indicators and maternal satisfaction. Results: The VAS scores of GB were much lower than those of GA immediately after operation, at 24 h, 48 h and 72 h after operation ($P < 0.05$). The lactation yield of GB was much lower than that of GA at 2 d, 3 d and 7 d after childbirth ($P < 0.05$). After operation, the application rates of Flurbiprofen axetil, analgesics and patient-controlled analgesia (PCA) pump were respectively 3.77%, 50.94% and 47.17% in GB, which was lower than 19.23%, 86.54% and 75.00% in GA ($P < 0.05$). SAS and SDS scores of GB were lower than those of GA after intervention ($P < 0.05$). The postoperative urination time, postoperative exhaust time, leaving bed time and length of hospitalization (LOH) in GB were much shorter than those in GA ($P < 0.05$). The nursing satisfaction of puerperae was 96.23% in GB, higher than 71.5% in GA ($P < 0.05$). Conclusion: High quality nursing is conducive to relieving postoperative pain, promoting postpartum lactation and enhancing postpartum recovery effect and maternal satisfaction after CS.

Keywords: Cesarean section, high quality nursing, relief, postoperative pain, postpartum lactation, postpartum recovery

Introduction

Cesarean section (CS) is an important method to deal with abnormal delivery and high risk pregnancy and rescue perinatal infants and pregnant and lying-in women by opening the uterus through the abdomen and removing the fetus during the 28th week of pregnancy or later [1]. With continuous improvement of anesthetic and surgical techniques in recent years, the safety rate of CS has also been enhanced significantly [2]. CS is one of the effective modes of childbirth, but for patients, this mode is also a great stressor, which brings different degrees of physiological and psychological stress responses to patients and also poses a serious threat to fetus and puerperae [3, 4].

Postoperative pain is a kind of acute pain, that is, the aching feeling after operation. It is usually caused by damage to visceral organs, acute incisions and stimulation of the drainage tube after operation [5]. A study has shown that the postoperative pain generally followed the disappearance of anesthetic action after CS which lasts for 24-72 h [6]. The postoperative pain that is not relieved effectively will result in a series of pathological changes and eventually develop into chronic pain or hyperpathia, so

puerperae will feel so fearful and anxious that they cannot leave the bed and turn over themselves freely. Besides, the postoperative recovery of uterus and gastrointestinal function may also be delayed [7, 8].

Breast milk is an ideal food for infants. It contains a variety of immune globulins and nutriments that can meet the demands of infants for growth and development, which will effectively promote the growth and development of infants [9]. Due to the influence of anesthetics and aching feelings after CS, puerperae may suffer from obstruction of lactifeous duts, breast pain, mammary swelling and breast milk secretion insufficiency so that the normal breastfeeding will be affected and the growth and development of newborns will be inhibited [10].

In order to alleviate the postoperative pain, promote postpartum lactation and improve the breastfeeding rate and postpartum recovery rate, high quality nursing was performed in addition to routine nursing in this study to achieve an ideal effect of intervention.

Materials and methods

Materials

The clinical data of 105 puerperae who received CS in our hospital were collected retrospectively. These puerperae were divided into Group A (GA, n = 52) and Group B (GB, n = 53) by random number table method. GA received routine nursing and GB received high quality nursing on the basis of GA. (1) Inclusion criteria: puerperae who were primiparae; who delivered through caesarean section; who had a clear sense of consciousness; those with full-term single pregnancy; and those without any obstetric complications were included. Informed consent was obtained from puerperae and their families. This study was approved by Medical Ethics Committee of our hospital. (2) Exclusion criteria: puerperae with hepatic and renal insufficiency; those with hearing and communication disorders; those with cognitive or mental disorders; those with multiple pregnancies; those with severe postpartum complications; those with postpartum hemorrhage; and those with congenital hypoplasia of papillae were excluded.

Methods

GA: The vital signs, surgical incision and conscious state of puerperae were observed closely. Puerperae were instructed to keep supine position within 6 h after operation and then a semi-reclining position after 6 h so as to promote lochia discharge. Puerperae moved their upper limbs in the bed to promote intestinal tract movement. They were informed to pass gas within 48 h after operation. Moxibustion and hot compress were used for obvious abdominal distension. Puerperae were advised to drink some boiled water and keep a fasted state for 6 h. The urinary catheter was unobstructed and the volume, color and nature of urine were closely observed.

GB received high quality nursing in addition to treatment given to GA.

Full-course accompanying

Medical staff actively communicated with the puerperae every day in different stages before, during and after CS. Doctors and nurses offered targeted health education based on the characteristics of each stage, and explained relevant knowledge of CS and relevant measures of postoperative analgesia. In order to avoid increased tension, puerperae were advised to express their pain correctly and informed that the postoperative pain was normal.

High quality pain intervention

Medical staff patiently explained the specific reasons for postoperative pain to puerperae and advised them to gently press both sides of abdomen while coughing so as to alleviate the pain. Doctors and nurses demonstrated the right way of deep breathing to puerperae and instructed them to choose a comfortable position after operation so as to relieve the postoperative pain. Massage was performed 24 h after operation. Medical staff massaged the puerperae with their finger pulps of both thumbs according to combing technique. The massage started from the hypochondria on both sides towards the anterior armpit point along the intercostal space. At the same time, the massaging and twisting manipulation was performed on neck and shoulders for 15 min each time. Musicotherapy and meditation

training were used to relieve the pain by providing the puerperae with soothing light music and Chinese and foreign classical music, such as *Ave Maria*, *Swan Lake Suite* and *Rhapsody in Blue* at abroad, and *Colorful Clouds Chasing the Moon* and *High Mountain and Flowing Water* in China. The classification was made based on the clinical function of music. For example, relaxing music, analgesic and sedative music, and antianxiety and anti-depressive music were suitable for anxious and depressed puerperae. During the music, the medical staff helped the puerperae with meditation training and instructed them to close their eyes while breathing deeply. In order to relieve the pain, medical staff guided the puerperae to imagine some beautiful pictures or recall some happy memories with sound. Auricular-plaster therapy was also an effective massage to relieve the pain, including Xin Acupoint, Zigong Acupoint, Pizhixia Acupoint, Jiaogan Acupoint, Shenmen Acupoint and other acupoints. Before pressing acupoints, the auricle was cleaned and sterilized thoroughly. The massage started from the earlobe towards the tip of ear in the order from bottom to top and then from top to bottom so as to improve the ventilation and collateral circulation and relieve the pain.

High quality lactation intervention

With the permission of puerperae, the breast massage was performed 12 h after childbirth. This massage was performed twice daily for 30 min each time, with a total of 4 times. During the massage process, the massager fully communicated with the puerperae, listened carefully, and evaluated their understanding and confidence in breastfeeding. Massage methods: Puerperae were kept in supine position. After dripping 3-5 drops of essential oil in palms of both hands, the massager massaged the breast gently by holding one side of breast with one hand and pressing and kneading the other side of breast through muscle of thenar with the other hand. The massage started from the root of papilla towards the papilla and then from Danzhong Acupoint towards the papilla by means of forked pushing with both thumbs. The massager held one side of breast with one hand and pressed and kneaded the breast through muscle of hypothenar with the other hand. The massage started from the root of papilla towards the papilla. The massager gently pressed Quepen Acupoint, Rugen Acupoint, Zhongfu Acupoint, Hegu Acupoint and Danzhong Acupoint. Then, the pressing strength was increased gradually according to the feelings of puerperae, such as aching pain, swelling pain, numbing pain and vague aching. Each acupoint was massaged for 40-50 s. The other side of breast was massaged in the same way.

High quality mental nursing

A warm ward environment was provided for puerperae according to their own requirements, such as animated cartoons and adornments, etc., so as to regulate their emotions and avoid postpartum depression and anxiety. Medical staff actively communicated with the puerperae, praised their performance during childbirth, and carefully listened to their expression of postoperative pain so as to stabilize their emotions. Families of puerperae were advised to provide full care and love for puerperae to satiate their psychological demands after childbirth so that the puerperae could get warmth and support from families.

Observation targets

(1) Postoperative pain [11]: Visual analogue scale (VAS) was used to evaluate the pain degree of both groups immediately after operation, at 24 h, 48 h and 72 h after operation. There were 10 points in total, with 0 representing no pain and 10 for intense pain.

(2) Lactation yield [12, 13]: The lactation yield of two groups was recorded at 1 d, 2 d, 3 d and 7 d after delivery. Lactation yield (mL) = (V1-V2+V3) × d. Hereinto, V1 represents for the breast volume before lactation; V2 for the breast volume after lactation; V3 for the lactation yield after each lactation; and d for ratio. It was about 1.03.

(3) Application of analgesics: The two groups were compared in the application of Flurbiprofen axetil, analgesics and PCA pump after operation.

(4) Unhealthy emotions [14]: Self-rating anxiety scale (SAS) and self-rating depression scale

Table 1. Comparison of general data between the two groups [n (%)]/(mean ± SD)

Data	GA (n = 52)	GB (n = 53)	t/X^2	*P*
Age (years)	30.25±2.18	30.28±2.12	0.071	0.943
Gestational age (weeks)	39.15±1.68	39.19±1.65	0.123	0.902
BMI (kg/m^2)	26.15±2.36	26.18±2.32	0.066	0.948
Educational level (case)				
Junior high school or below	15 (28.85)	16 (30.19)	0.025	0.858
Senior high school or technical secondary school	28 (53.85)	27 (50.94)		
Junior college or above	9 (17.31)	10 (18.87)		

Table 2. Comparison of postoperative pain between the two groups (mean ± SD, scores)

Group	Immediately after operation	24 h after operation	48 h after operation	72 h after operation
GA (n = 52)	3.98±0.58	5.12±0.88	5.42±0.96	5.52±0.82
GB (n = 53)	3.02±0.15*	4.52±0.15*	4.58±0.18*	4.61±0.19*
t	11.659	4.892	6.259	7.867
P	0.000	0.000	0.000	0.000

Note: *meant $P < 0.05$ in comparison with GA.

(SDS) were used to evaluate the anxious and depressive emotions of two groups before and after intervention. Hereinto, the critical values of SAS and SDS were respectively 50 scores and 53 scores. The higher scores indicate more sever anxious and depressive emotions.

(5) Postoperative recovery indicators: These indicators included postoperative urination time, postoperative exhaust time, leaving bed time and length of hospitalization (LOH).

(6) Maternal satisfaction [15]: The satisfaction of two groups was surveyed after intervention, including sleep, improvement of negative emotions, calmness, relaxation and other subjective feelings, as well as the satisfaction with recommendation rate, nursing necessity and nursing service. There were 100 points in total, with < 60 representing for dissatisfaction, 60-89 for basic satisfaction and > 89 for complete satisfaction. Total satisfaction = (basic satisfaction + complete satisfaction)/total number of patients × 100%.

Statistical analysis

SPSS 22.0 was used for data analysis. Measurement data were expressed as mean ± standard deviation (mean ± SD). *t* test was used for the data in conformity with normal distribution and Mann-Whitney U test was used for data not in conformity with a normal distribution. Enumeration data were expressed as [n (%)] and compared between groups through chi-squared test. $P < 0.05$ implied statistical significance.

Results

Comparison of general data between the two groups

There was no statistical difference in age, gestational age and body mass index (BMI) between the two groups ($P > 0.05$). In GA, 15 puerperae graduated from junior high school or below, 28 from senior high school or technical secondary school, and 9 from junior college or above. The educational level of puerperae in GB was 16, 27 and 10, respectively. There was no statistical difference in educational level between the two groups ($P > 0.05$) (**Table 1**).

Comparison of postoperative pain between the two groups

The VAS scores of two groups were much higher at 24 h, 48 h and 72 h after operation in comparison with those immediately after operation ($P < 0.05$). However, the VAS scores in GB were much lower than those in GA at 6 h, 24 h, 48 h and 72 h after operation ($P < 0.05$) (**Table 2**).

Comparison of postpartum lactation yield between the two groups

The two groups showed no statistical difference in lactation yield at 1 d after childbirth

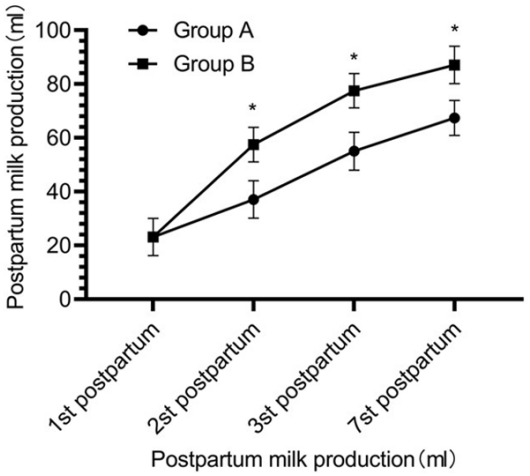

Figure 1. Comparison of postpartum lactation yield between the two groups. There was no significant difference in lactation yield between the two groups at 1 d after childbirth ($P > 0.05$). The lactation yield of GB was much higher than that of GA at 2 d, 3 d and 7 d after childbirth ($P < 0.05$). * meant $P < 0.05$ in comparison with GA.

($P > 0.05$). The lactation yield of GB was much higher than that of GA at 2 d, 3 d and 7 d after childbirth ($P < 0.05$) (**Figure 1**).

Comparison on application of analgesics between the two groups

After operation, the application rates of Flurbiprofen axetil, analgesics and PCA pump were respectively 3.77%, 50.94% and 47.17% in GB, lower than 19.23%, 86.54% and 75.00% in GA ($P < 0.05$) (**Table 3**).

Comparison of unhealthy emotions between the two groups

The two groups showed no statistical difference in SAS and SDS scores before intervention ($P > 0.05$). Both SAS and SDS scores were reduced after intervention in the two groups ($P < 0.05$), and those of GB were lower than those of GA after intervention ($P < 0.05$) (**Figure 2**).

Comparison of postoperative recovery indicators between the two groups

The postoperative urination time, postoperative exhaust time, leaving bed time and LOH in GB were much shorter than those in GA ($P < 0.05$) (**Figure 3**).

Comparison of maternal satisfaction between the two groups

In GA, 18 patients were completely satisfied, 19 were basically satisfied and 15 were dissatisfied, with a total satisfaction of 71.15%. In GB, 28 patients were completely satisfied, 23 were basically satisfied and 2 were dissatisfied, with a total satisfaction of 96.23%. The nursing satisfaction of GB was higher than that of GA ($P < 0.05$) (**Table 4**).

Discussion

Childbirth is a physiological process that almost all women will experience. It is also a stress event with great impact on the safety and life of women [16]. Natural childbirth is intensely advocated for in clinical practice, but with the continuous improvement and maturity of CS technique, more and more pregnant women are inclined to choose CS [17]. In particular for primiparae, due to the lack of experience in childbirth, they are afraid of labor pain and worry about childbirth process, so they choose CS [18].

CS is a kind of traumatic delivery mode, and the puerperae will feel pain after operation, which has a great impact on postpartum lactation, rehabilitation and sleep [19, 20]. As for CS, the postoperative pain is mainly caused by incision pain and uterine contraction. If the puerperae are more sensitive to pain, they may experience severe pain from intense uterine contraction [21]. Meanwhile, the operation itself can lead to local tissue trauma. This brings noxious stimulation to puerperae, promotes the release of inflammatory algesic substances, thereby causing an aching feeling [22]. With the continuous development of clinical medicine and the enhancement of cognition degree in pain in recent years, puerperae have had a higher painless requirement after CS. Therefore scientific and reasonable intervention methods are sought in clinical practice to relieve the pain of puerperae after CS and improve the postpartum recovery effect [23]. In this study, the VAS scores of GB were lower than those of GA at different postoperative time points. In addition, the application rates of Flurbiprofen axetil, analgesics and PCA pump in GB were lower than those in GA. This implied that high quality nursing could relieve the post-

Table 3. Comparison on application of analgesics between the two groups [n (%)]

Group	Number of cases	Flurbiprofen axetil	Analgesics	PCA pump
GA	52	10 (19.23)	45 (86.54)	39 (75.00)
GB	53	2 (3.77)*	27 (50.94)*	25 (47.17)*
X^2		6.195	15.431	8.542
P		0.013	0.018	0.003

*meant $P < 0.05$ in comparison with GA.

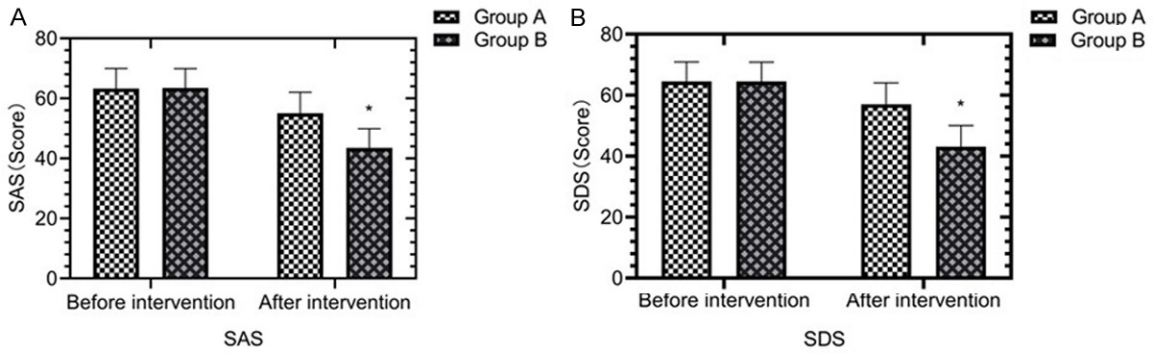

Figure 2. Comparison of SAS and SDS scores between the two groups. As shown in (A), the two groups showed no statistical difference in SAS scores before intervention ($P > 0.05$); the SAS scores of GB were lower than those of GA after intervention ($P < 0.05$). As shown in (B), the two groups showed no statistical difference in SDS scores before intervention ($P > 0.05$); the SDS scores of GB were lower than those of GA after intervention ($P < 0.05$). * meant $P < 0.05$ in comparison with GA.

operative pain and reduce the application rate of analgesics after CS. With regard to the mechanism of action, the reason may be that high quality nursing is not only an improved nursing mode compared to routine nursing, but also a nursing service for patients based on the principle of being "people oriented". This study was conducted to improve the cognition of puerperae about pain. Analgesic measures were taken in an active manner after comprehensively considering the environmental, cognitive, behavioral, physiological and psychological factors of puerperae. Technical and regular massage is conducive to delivering a mild and good stimulus signal to central nervous system. The feeling of comfort and sense of safety of puerperae can be enhanced by promoting their emotions positively from psychological and physiological aspects. Furthermore, auricular-plaster therapy can effectively regulate the nerves and relieve the nervous tension by stimulating specific acupoints of the ears. Meanwhile, it can improve the internal secretion and accelerate the body recovery, so as to achieve the analgesic effect [24]. A comfortable and pleasant feeling can be delivered to central nervous system through musicotherapy. Different sound waves can awaken the perception of central nervous system to different emotions. Therefore, the bad mental state of puerperae is regulated and their emotions are stabilized [25]. What's more, musicotherapy combined with meditation training can help the puerperae relax. The state of meditation also acts as a positive stimulation to the puerperae, which effectively relieves the pain.

Due to the influence of postoperative pain and fatigue, most of the puerperae will suffer from insufficient lactation after CS. This has a great impact on the growth and development of newborns. Therefore, high quality lactation nursing was combined with routine nursing in this study to promote postpartum lactation. This study showed that the lactation yield of GB was higher than that of GA at 2 d, 3 d and 7 d after childbirth. This implied that the high quality nursing could promote postpartum lactation after CS. Considering the mechanism of action, professional massage manipulations combined with breast massage with essential oil can increase the lactation yield by affecting the hypothalamus and promoting the anterior pituitary to secrete prolactin [26]. Besides, breast mas-

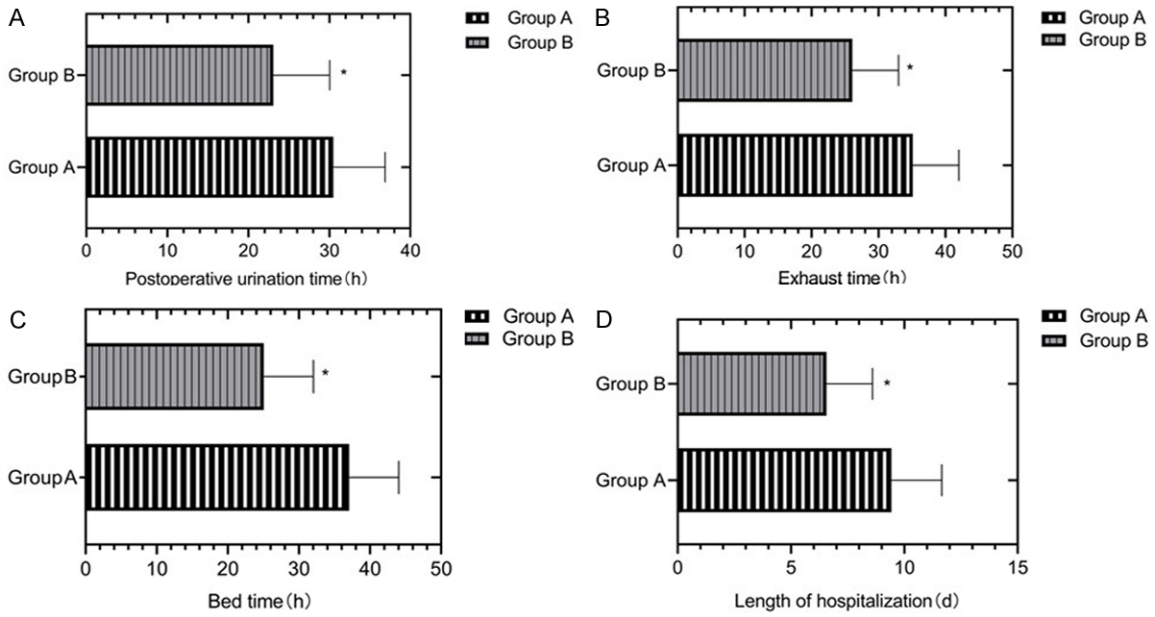

Figure 3. Comparison of postoperative recovery indicators between the two groups. A. Showed that the postoperative urination time of GB was shorter than that of GA ($P < 0.05$). B. Showed that the postoperative exhaust time of GB was shorter than that of GA ($P < 0.05$). C. Showed that the leaving bed time of GB was shorter than that of GA ($P < 0.05$). D. Showed that the LOH of GB was shorter than that of GA ($P < 0.05$). * meant $P < 0.05$ in comparison with GA.

Table 4. Comparison of maternal satisfaction between the two groups [n (%)]

Group	Number of cases	Complete satisfaction	Basic satisfaction	Dissatisfaction	Total satisfaction
GA	52	18 (34.62)	19 (36.54)	15 (28.85)	37 (71.15)
GB	53	28 (52.83)	23 (43.40)	2 (3.77)	51 (96.23)*
X^2					12.160
P					0.000

*meant $P < 0.05$ in comparison with GA.

sage can also stimulate the breast locally, thereby improving the local blood circulation. The lactation yield is increased by eliminating galactostasis and clearing lactiferous ducts [27]. As a great stressor, CS can easily cause negative emotions such as fear, tension and anxiety. This is not conducive to postpartum recovery and maternal health. Therefore, high quality mental nursing was carried out on the basis of routine nursing in this study. Results showed that the SAS and SDS scores of GB were lower than those of GA; all postoperative recovery indicators of GB were better than those of GA; and the maternal satisfaction of GB was higher than that of GA. This further proved the effectiveness of high quality nursing mode in CS. With regard to the mechanism of action of high quality mental nursing, some targeted measures of psychological intervention can be taken according to the psychological state of puerperae. The ward environment is warm. Families of puerperae are advised to give sufficient care and love to puerperae to make them feel the love and warmth of the families, and build up a confidence in recovery. In this way, the degree of anxiety and depression is reduced, postpartum recovery is improved, and the maternal satisfaction is enhanced [28].

In conclusion, the high quality nursing can relieve postoperative pain, promote postpartum lactation and enhance postpartum recovery effect and maternal satisfaction after CS.

In spite of some results achieved in this study, there was a limitation of small sample size. Therefore, it is necessary to carry out a longer

and more comprehensive study and analyses with larger sample size in the future.

Disclosure of conflict of interest

None.

Address correspondence to: Haiyan Qiu, Department of Gastroenterology, Danzhou People's Hospital, No. 21-1 Datong Road, Nada Town, Danzhou 571700, Hainan Province, China. Tel: +86-186-89853866; E-mail: qiu7hyan@163.com

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