Int J Clin Exp Med 2020;13(6):4300-4307
www.ijcem.com /ISSN:1940-5901/IJCEM0107918

Original Article

Responsible system nursing intervention reduces anxiety and complications in high-risk pregnancies

Zhenhua Cui[1*], Mei Li[2*], Jing Wang[3], Weifeng Duan[3]

[1]Surgical Ward, [2]Hemodialysis Department, [3]Interventional CathetErization Room, Yantai Hospital of Traditional Chinese Medicine, Yantai, Shandong Provine, China. [*]Equal contributors and co-first authors.

Received January 15, 2020; Accepted March 3, 2020; Epub June 15, 2020; Published June 30, 2020

Abstract: Objective: This study set out to explore the effects of responsible system nursing on the negative psychology and complications in high-risk pregnancy patients during the perinatal period. Methods: A total of 168 patients with high-risk pregnancies and in the perinatal period who were admitted to Yantai Hospital of traditional Chinese medicine from June 2018 to June 2019 were selected. Among them, 88 patients given responsible system nursing were selected as the research group (RG) and 80 patients with conventional nursing were regarded as the control group (CG). The adverse pregnancy outcomes, postpartum complications, trait anxiety (T-AI), state anxiety (S-AI), Edinburgh Postpartum Depression (EPDS), Breastfeeding Self-Efficacy Scale (BSES), social function (SSRS, SCSQ) score, postoperative quality of life (SF-36) and nursing satisfaction were observed and compared between the two groups. Results: The adverse pregnancy outcomes, incidence of postpartum complications, T-AI score, S-AI score and EPDS score of intervention group (IG) were lower than those of CG; while the BSES score, SSRS and SCSQ scores and SF-36 score were higher than those of CG, and nursing satisfaction score was also remarkably higher than that of CG. Conclusion: Responsible system nursing effectively improves pregnancy outcomes, psychological state and self-efficacy of patients, and raises their postpartum social functions and quality of life.

Keywords: Responsible system nursing, high-risk pregnancy patients, perinatal period, psychology, complications

Introduction

High-risk pregnancy affects the health of 3%-10% of pregnant women and their fetus [1], and increases perinatal and neonatal mortality [2]. Clinical studies have revealed that there are many risk factors leading to high-risk pregnancy, such as hypertension, asthma, gestational diabetes and elderly parturients, which increase its prevalence rate [3]. Besides, more than 1 million pregnant women suffer from high-risk pregnancies every year [4]. Some studies have shown that perinatal and neonatal mortality have led to an increase of 60-70% in the mortality of children under the age of 5 [5].

With the increasing demand for medical care for pregnant and lying-in women and their families, the conventional medical care for high-risk pregnancies can no longer meet their needs, and the conventional nursing mode is also facing new challenges [6]. Although the nursing mode during pregnancy is becoming more and more sophisticated, the effect brought by the routine intervention for high-risk pregnancy is no longer clear. Some studies have revealed that routine nursing intervention cannot improve breast-feeding difficulty during the first six months [7]. Shao H H and others [8] studied conventional nursing showing it could not prevent the health impact of excessive weight gain during pregnancy. Responsible system nursing takes patients as the center of nursing, and the nurses carry out planned and purposeful health management for them to ensure the smooth implementation of the treatment process [9]. In the past, there have been many studies on perinatal nursing intervention for high-risk pregnancies. For example, Majella M G [10] and others verified that the use of high-quality prenatal nursing intervention for high-risk pregnant women improved the pregnancy outcomes and reduced the occurrence of maternal and infant complications.

At present, there is little research on responsible nursing interventions for high-risk pregnancy patients in the perinatal period. We will implement responsible nursing for them, and explore the influence of this nursing mode on the self-efficacy, mental health status, complications and so on. The aim was to provide feasible nursing intervention measures for high-risk pregnancies during the delivery process.

Materials and methods

General information

From June 2018 to June 2019, 168 patients with high-risk pregnancies and during the perinatal period in Yantai Hospital of traditional Chinese medicine were selected and given responsible system nursing as the IG (88 cases), with an age range of (22-37) years and an average age of (28.12±4.69) years. Eighty patients who received conventional nursing were taken as the CG, with an age range of (21-34) years and an average age of (27.75±5.13) years. This study was approved by the ethics committee of Yantai Hospital of traditional Chinese medicine. The subjects and their guardians were informed, and they all signed a fully informed consent form. Inclusion criteria were as follows: those who met the diagnostic criteria for high-risk pregnancy [11]; all the parturients were singletons; communication was barrier-free and there was no mental illness; and those with complete general clinical data. Exclusion criteria were as follows: those who quit the experiment midway; those complicated with malignant tumors or serious organ dysfunction; those complicated with infectious diseases; poor treatment compliance; and those who were lost to followup. The inclusion criteria were applicable to the IG and the control group.

Nursing mode

The CG was given conventional nursing: The guidance of routine obstetric nursing knowledge for patients included what the newborn needed after pregnancy, matters needing attention during pregnancy, knowledge guidance during the perinatal period, diet guidance for mothers, and basic nursing knowledge guidance after delivery.

The IG was given responsibility system nursing: (1) Nursing service: The nursing staff use questionnaires to record the needs of each parturient before giving birth and understand their family members and situation. After admission, they were given comfortable wards, such as adjusting indoor temperature and humidity and playing soothing light music. (2) Psychological guidance: The nursing staff attempts to understand their cultural level and personality and give them guidance on different delivery methods and other knowledge. They let them know more about high-risk pregnancy and inform them about the matters needing attention, invite and guide the family members to participate in the communication with the parturients, and inform them to pay more attention and care the mothers. They also strengthen communication with patients, listen patiently and carefully to their complaints, encourage them to express their existing feelings and give them more psychological support. (3) Self-monitoring guidance: The nursing staff gives care to the parturients, but also strengthens the self-monitoring guidance of their family. For instance, they teach family members how to listen to the fetal heart beat and record the frequency of fetal movements. Abnormal fetal movement and heart rate during pregnancy should be notified to the doctor during examination right away. (4) Diet nursing: The nursing staff instructs the parturients to take in more protein, vitamins and minerals and reduce the intake of salt and animal fats, and instruct them to get 8-10 h sleep every day, and advise the sleep posture to be mainly the left lateral position. (5) Intrapartum nursing: The nursing staff closely observes the contraction of the uterus in patients, the condition of the fetus and fetal heartbeat, and carefully observes the examination chart during labor. The caesarean section patients are guided to do a good job of hemostasis measures when bleeding after surgery. However, if their bleeding volume was more than >200 mL in the delivery process, they need find out the cause of bleeding and carry out effective hemostasis treatment right away. After the operation, their complexion, physical state, feelings and vital signs should be carefully observed. (6) Postpartum nursing: breast feeding for the parturients on the 1st day after delivery: The breast was hot compressed and massaged with a hot and humid towel to reduce breast swelling and pain, and they were encouraged to breast-feed actively. Uterine care: Uterine massage is given to postpartum patients to help excrete accumulated blood, and prevent and reduce the possibility of

postpartum uterine hemorrhage. Vaginal nursing: The nursing staff helps them clean up the blood in the external pudendum and indwelling catheter according to aseptic operations to avoid the occurrence of bacteria and cross infection.

Outcome measures

(1) The pregnancy outcome and delivery mode of patients in the two groups were recorded. (2) State-Trait Anxiety Scale Score (T-AI, S-AI) [12]. The score range was 20-80 points. The higher the score, the higher the degree of postpartum anxiety. (3) Edinburgh Postnatal Depression Scale (EPDS) [13]. There were 10 items in the scoring content, and each item had a score of (0-1-2-3) and a total score of 0-30. A score ≥13 indicated that the patients suffered from postpartum depression. (4) Breastfeeding self-efficacy scale (BSES) score [14]. There were 2 dimensions, divided into 30 items, with a total score range of 30-150. The higher the score, the higher the self-efficacy of breast feeding. (5) Social Support Rate Score (SSRS): There were three dimensions. The higher the score, the better the social function. Simplified coping style questionnaire (SCSQ): There were two dimensions and 20 items. Higher score meant positive coping [15]. (6) Quality of Life (SF-36) Score [16]. It was divided into 8 dimensions, with a total score of 100. The higher the score, the higher the quality of life after childbirth. (7) The self-made "Nursing Satisfaction Questionnaire" was given a score of 20 items, with a total score of 100. The higher the score was, the higher the satisfaction of patients with nursing services.

Statistical analysis

SPSS 22.0 (Beijing Bioeasy Technology Co., Ltd., China) was used for statistical analysis, and the figures were drawn by GraphPad Prism 7. The counting data were expressed by [n (%)], and comparison of those data between groups was under Chi-square test. When the theoretical frequency in Chi-square test was less than 5, continuous correction Chi-square test was used, and the measurement data were expressed by mean ± standard deviation (x ± sd). Comparison of the measurement data between groups was under Independent-samples T test, and comparison before and after the group was under paired T test. Observation and comparison of multiple time points were under repeated measures analysis of variance. A *p* value lower than 0.05 was statistically significant.

Results

General information

There was no significant difference between the two groups in general clinical baseline data such as age, body mass index, abdominal circumference, gestational week, place of residence, dietary preference, systolic pressure, diastolic pressure, hypertension history, drinking history, and smoking history ($P > 0.05$). More details were shown in **Table 1**.

Comparison of adverse pregnancy outcomes of patients between the two groups

Statistics of the total adverse pregnancy outcomes of the two groups revealed that the outcomes of patients in the IG were significantly lower than those in the CG ($P < 0.05$). More details were shown in **Table 2**.

Complications in the nursing process of patients in the two groups

Complications occurred in the nursing process of patients in both groups. The total incidence of complications in the IG was 6.82%, while that in the CG was 18.75%. Statistically, the total incidence of patients in both groups was clearly lower than that in the CG ($P < 0.05$). More details were shown in **Table 3**.

Comparison of T-AI and S-AI scores of patients between the two groups

There was no significant difference in the T-AI and S-AI scores before nursing between the two groups ($P > 0.05$). We found that the two scores in the 1st and 6th weeks after nursing decreased markedly, while the scores in the IG were significantly lower than those in the CG ($P < 0.05$). More details were shown **Figure 1**.

Comparison of EPDS scores between patients in the two groups

There was no significant difference in EPDS scores between the two groups before nursing ($P > 0.05$). We discovered that the EPDS scores

Table 1. Comparison of general data of patients between the two groups [n (%)] ($\bar{x} \pm sd$)

Classification	Intervention group (IG) (n=88)	Control group (CG) (n=80)	t/χ^2 value	*P* value
Age (years)	28.12±4.69	27.75±5.13	0.488	0.626
BMI (kg/m^2)	20.35±1.58	20.12±1.07	1.094	0.276
Abdominal circumference (cm)	100.03±6.21	101.72±6.50	1.723	0.087
Gestational week	24.32±1.49	24.06±1.57	1.101	0.273
Place of residence			1.647	0.199
Countryside	45 (51.14)	33 (41.25)		
Cities and towns	43 (48.86)	47 (58.75)		
Dietary preference			0.149	0.670
Light	51 (57.95)	44 (55.00)		
Spicy	37 (42.05)	36 (45.00)		
Systolic pressure (mmHg)	114.58±8.37	115.43±8.49	0.653	0.515
Diastolic pressure (mmHg)	73.89±6.94	75.16±6.81	1.195	0.234
History of hypertension			1.874	0.171
Yes	38 (43.18)	43 (53.75)		
No	50 (56.82)	37 (46.25)		
Drinking history			0.485	0.486
Yes	41 (46.59)	33 (41.25)		
No	47 (53.41)	47 (58.75)		
Smoking history			0.001	0.977
Yes	46 (55.27)	42 (52.50)		
No	42 (47.73)	38 (47.50)		

Table 2. Comparison of adverse pregnancy outcomes between patients in the two groups [n (%)]

Category	Intervention group (IG) (n=88)	Control group (CG) (n=80)	χ^2 value	*P* value
Premature delivery	3 (3.41)	7 (8.75)	-	-
Abnormal weight	2 (2.27)	5 (6.25)	-	-
Postpartum hemorrhage	2 (2.27)	6 (7.50)	-	-
Fetal distress	1 (1.14)	5 (6.25)	-	-
Asphyxia neonatorum	0 (0.00)	2 (2.50)	-	-
Total	8 (9.09)	25 (31.25)	13.041	0.001

Table 3. Complications occurred in nursing process of patients in the two groups [n (%)]

Category	Intervention group (IG) (n=88)	Control group (CG) (n=80)	χ^2 value	*P* value
Anemia	1 (1.14)	5 (6.25)	-	-
Serious hair loss	2 (2.27)	4 (5.00)	-	-
Wound infection	1 (1.14)	3 (3.75)	-	-
Constipation	2 (2.27)	3 (3.75)	-	-
Total incidence	6 (6.82)	15 (18.75)	5.455	0.020

in the first and the sixth week after nursing decreased substantially, while those in the IG were significantly lower than those in the CG ($P < 0.05$). More details were shown **Figure 2**.

Comparison of BSES scores of patients between the two groups

There was no significant difference in BSES scores between the two groups before nursing ($P > 0.05$). We found that the scores increased after nursing, and those in the IG were significantly higher than those in the CG ($P < 0.05$). More details were shown in **Table 4**.

Comparison of social function scores between patients in the two groups

There was no significant difference in SSRS and SCSQ scores between the two groups before nursing ($P > 0.05$). We found that the two scores of both groups after nursing increased markedly,

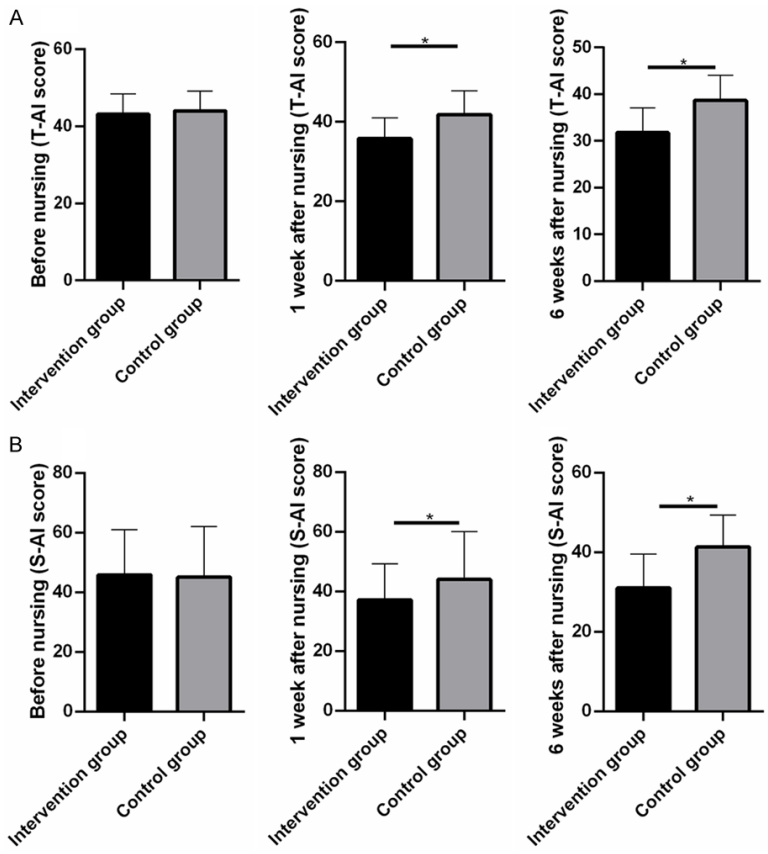

Figure 1. Depression before and after nursing of patients in two groups. A: The T-AI scores of patients in the IG reduced after nursing, and were lower than those in the CG. B: The S-AI scores of patients in the IG reduced after nursing, and were lower than that in the CG. Note: * means < 0.05.

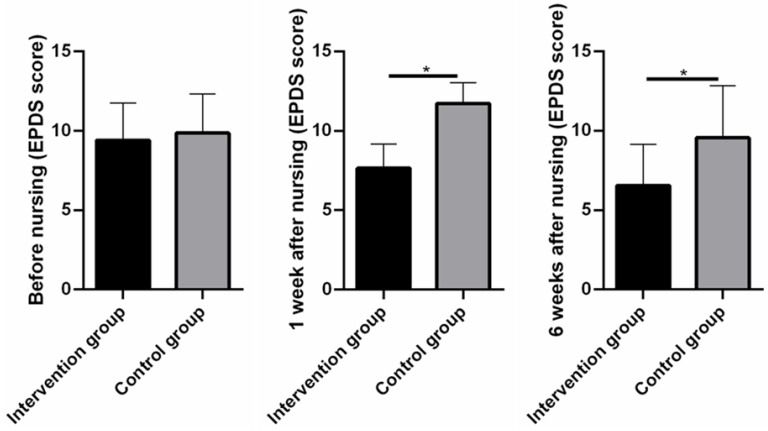

Figure 2. Anxiety status of patients in both groups before and after nursing. The EPDS score of patients in the IG reduced dramatically after nursing, and was lower than that of the CG. Note: * means < 0.05.

while the scores of the IG were markedly higher than those of the CG ($P < 0.05$). More details were shown in **Table 5**.

Comparison of SF-36 scores after nursing between patients in the two groups

The patients' quality of life was evaluated by SF-36. The scores of physical function, role physical, vitality, mental health, role emotional, body pain, social function and other aspects in the SF-36 score after nursing in the IG were significantly higher than those in the CG ($P < 0.05$). More details were shown in **Table 6**.

Comparison of nursing satisfaction

The nursing satisfaction of the IG was markedly better than that of the CG ($P < 0.05$). More details were shown in **Table 7**.

Discussion

Morbidity and mortality due to high-risk pregnancies are still increasing, which not only threatens the health of parturients and their fetus, but also increases the psychological status of parents' depression and anxiety before and after childbirth [17, 18]. Therefore, determining the maternal mental health status during pregnancy can effectively prevent the occurrence of high-risk pregnancy or alleviate the illness [19].

In this research, we adopted a responsibility system of nursing intervention for high-risk pregnant patients in the perinatal period, and found that their self-efficacy, mental health and quality of life after nursing intervention improved remarkably, and the occurrence of postpartum complications reduced. This study showed that the total adverse pregnancy rate in the IG was clearly lower than that

Table 4. Comparison of BSES scores between patients in the two groups (x ± sd)

Group	n	BSES score	
		Before nursing	After nursing
Intervention group (IG)	88	84.45±8.43	125.43±7.57
Control group (CG)	80	85.71±8.21	101.23±6.13
T	-	0.980	22.630
P	-	0.329	<0.001

in the CG, which indicated that responsible system nursing effectively improved the adverse pregnancy outcomes of patients. In addition, postpartum complications such as anemia, severe alopecia, wound infection, constipation and so on also appeared. We also analyzed the incidence of these complications of patients in both groups. The results revealed that the incidence of postpartum complications in the IG was significantly lower than that in the CG, indicating that under the intervention of responsible system nursing, the occurrence of postpartum complications could be effectively prevented and reduced. Vaziri F and others [20] studied that nursing intervention for puerpera after delivery reduced the pain of their body, relieve fatigue and improve their mood. Probandari A and others [21] verified that nursing intervention for postpartum patients reduced the occurrence of postpartum hemorrhage and complications, and also improved the quality of life of mothers and infants. This was also similar to this study, and nursing intervention for pregnant women was essential.

According to clinical statistics, about 37.1% of women suffered from depression during pregnancy, while the incidence of depression after childbirth was even higher [22]. Moreover, some studies showed that [23] the psychological status of pregnant women had a certain connection with the pregnancy outcome of unhealthy mothers and infants, and was tied to the poor prognosis of obstetrics. In this study, we included T-AI and S-AI scores to evaluate the anxiety state and EPDS scores of patients before and after nursing and the first and sixth weeks after nursing to evaluate their depression state before and after nursing. We found that the T-AI, S-AI and EPDS scores of the IG in the first and sixth week after nursing were lower than those of the CG, indicating that responsible system nursing for high-risk pregnant patients during pregnancy usefully improved the psychological status of patients and reduced their depression and anxiety. Some studies have shown that [24], maternal depression during pregnancy means that postpartum breastfeeding time will be shortened. Other studies have shown that [25], poor postpartum care will bring long-term physiological and behavioral effects to the parturients, and aggravate the chronic social pressure, thus aggravating the dysphoria of pregnant women and parturients and lowering the immune system. In this study, the self-efficacy of patients in the two groups was evaluated by BSES score. It was found that the BSES score of the IG was remarkably higher than that of the CG, indicating that the responsible system nursing intervention improved the psychological state of the women while also improving the self-efficacy of postpartum breast feeding. The SSRS and SCSQ scores included in the assessment of the social function of patients in the two groups also revealed that the two scores in the IG were higher than those in the CG, indicating that responsible system nursing improved the social function of postpartum patients and their ability to responde. Bień A and others proved that [26] quality of life was a significant indicator of the effectiveness of clinical treatment. In this study, SF-36 score was included to evaluate the postpartum quality of life of patients from the two groups. The results showed that the SF-36 score of the IG was remarkably higher than that of the CG, which indicated that the intervention of responsible system nursing improved their postpartum quality of life effectively. Finally, we compared the nursing satisfaction of patients in both groups. The results revealed that the nursing satisfaction score given by those in the IG was dramatically higher than that of the CG, which also showed that responsible system nursing brought a better childbirth experience to the parturients.

In summary, responsible system nursing usefully improves pregnancy outcome, psychological state and self-efficacy of patients, and improves their social function and quality of life after delivery. Nevertheless, there is still room for improvement. For example, we can analyze the risk factors that affect adverse pregnancy outcomes or neonatal complications of high-risk pregnancy patients, which will help nurses to identify which risk factors require

Table 5. Comparison of social function scores between patients in the two groups ($\bar{x}$ ± sd)

Group	n	SSRS score		SCSQ score	
		Before nursing	After nursing	Before nursing	After nursing
Intervention group (IG)	88	33.45±5.43	45.43±7.57	1.36±1.53	12.65±3.04
Control group (CG)	80	34.79±5.71	38.23±6.13	1.44±1.55	8.46±2.43
T	-	1.559	6.733	0.336	9.804
P	-	0.121	< 0.001	0.737	< 0.001

Table 6. Comparison of SF-36 scores after nursing between patients in the two groups ($\bar{x}$ ± sd)

Group	Physical function	Role physical	Vitality	Mental health	Role emotional	Body pain	Social function
Intervention group (IG) (n=88)	59.87±8.01	63.77±7.52	65.07±8.23	57.58±8.14	54.02±7.02	62.89±8.11	69.24±6.87
Control group (CG) (n=80)	54.48±7.66	57.14±7.25	60.11±6.35	51.12±7.23	51.11±7.07	59.74±8.25	66.43±6.57
T	4.447	5.806	4.342	5.417	2.674	2.494	2.703
P	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.014	0.008

Table 7. Comparison of nursing satisfaction between the two groups [n (%)]

Group	n	Satisfaction	More satisfied	Dissatisfied	Satisfaction (%)
Intervention group (IG)	88	53 (60.23)	29 (32.95)	6 (6.82)	82 (93.18)
Control group (CG)	80	30 (37.50)	32 (40.00)	18 (22.50)	62 (77.50)
T	-	8.659	0.899	8.416	8.416
P	-	0.003	0.343	0.004	0.004

additional attention. In the future, supplementary research will be carried out gradually from the above perspective.

Disclosure of conflict of interest

None.

Address correspondence to: Weifeng Duan, Interventional CathetErization Room, Yantai Hospital of Traditional Chinese Medicine, No. 39, Happy Road, Zhifu District, Yantai, Shandong Province, China. E-mail: zhushi11420@163.com

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