Int J Clin Exp Med 2020;13(9):6344-6351
www.ijcem.com /ISSN:1940-5901/IJCEM0113079

Review Article

High-quality nursing care relives stress responses and depression following cesarean section

Fang Zhao, Jiewen Yu, Ling Sun

Department of Obstetric Nursing, Qinhuangdao Maternal and Child Health Hospital, No.452 Hongqi Road, Haigang District, Qinhuangdao, Hebei Province, China

Received April 22, 2020; Accepted June 23, 2020; Epub September 15, 2020; Published September 30, 2020

Abstract: To explore the role of high-quality nursing care in relieving stress responses and depression in puerperas undergoing caesarean section (CS). Seventy-two CS patients admitted to our hospital from February 2018 to March 2019 were randomly allocated into a control group (conventional nursing care, n=35) and a research group (high-quality nursing care, n=37). Visual analogue scale (VAS) was adopted for pain scoring, self-rating anxiety scale (SAS) and self-rating depression scale (SDS) for mental health scoring, Pittsburgh sleep quality index (PSQI) for sleep scoring, and generic quality of life inventory-74 (GQOL-74) for QOL scoring. Complications were recorded, and patient satisfaction was assessed by a self-made questionnaire. VAS score in the research group was remarkably lower than that in the control group at 8 h, 24 h and 72 h after delivery (P<0.05). After nursing, SAS, SDS, and PSQI scores in the research group were lower than those in the control group (P<0.05); GQOL-74 score in the research group was higher than that in the control group (P<0.05); the incidence of complications in the research group was lower than that in the control group (P<0.05); patient satisfaction in the research group was higher than that in the control group (P<0.05). High-quality nursing care relives depression, stress response and pain following CS, with fewer postpartum complications, higher quality of sleep and QOL.

Keywords: High-quality nursing care, cesarean section, stress response, postpartum depression, psychology, quality of life

Introduction

Caesarean sections (CSs) are over-utilized worldwide, the application in most parts of the world is far higher than the provisional threshold of 10%, even as high as 40%, and the maternal and neonatal mortality have not improved [1, 2]. The high prevalence of CS is the result of medical progress, which has made it a safe and convenient choice, especially in middle- and high-income countries. Moreover, CSs impose no heavy burden on maternal health and medical expenses in terms of risks, costs, and complications [3-5].

With the development of society, puerperas and their families have higher requirements and expectations for delivery and postpartum nursing care [6], while conventional nursing modes with delayed information transmission and poor nursing quality can no longer meet those expectations [7] and as a result, nursing modalities need to be upgraded urgently [8]. After CS, puerperas are in a state of physical and mental weakness, anxiety, and depression, making humanistic nursing measures important [9]. High-quality nursing care is to provide professional guidance on the psychological and physiological changes during pregnancy and postpartum, and to effectively reduce maternal stress responses and depression [10, 11]. Puerperas who do not receive high-quality nursing interventions are faced with an increased risk of complications after delivery, and timely care in the case of obstetric complications reduces maternal deaths [12]. This study explored the role of high-quality nursing care in relieving stress responses and depression following CS, as well as the degree of maternal pain and postpartum complications, to provide a reference for future clinical practice.

Data and methods

Clinical data

Seventy-two CS patients admitted to Qinhuangdao Maternal and Child Health Hospital

from February 2018 to March 2019 were randomly allocated into a control group (conventional nursing care, n=35, aged 22-35 years, average 27.1±4.6 years) and a research group (high-quality nursing care, n=27, aged 23-36 years, average 27.8±4.7 years). Our study was performed with approval from the Qinhuangdao Maternal and Child Health Hospital's Medical Ethics Committee, and was in accordance with the Helsinki Declaration. All participants and their families signed informed consent forms.

Inclusion and exclusion criteria

Inclusion criteria: puerperas aged 22-38 years with good health and normal breast development after CS, as well as those with complete general clinical data and no communication barriers or mental diseases.

Exclusion criteria: puerperas who quit or were transferred, as well as those with malignant tumors, serious organ dysfunction, infectious diseases, poor treatment compliance, physical disability, or language dysfunction.

Nursing methods

Conventional nursing care in the control group: 1. Diet care and daily living care. 2. Monitoring of vital signs. 3. Transfusion and medication support and postpartum guidance of basic nursing knowledge.

High-quality nursing care in the research group: 1. Preoperative care: The process and important indications of CS were introduced to hospitalized puerperas. At the same time, nurses ventilated and disinfected delivery wards, maintaining a temperature of ~24 degrees Celsius and a humidity of ~45%, accompanied by soothing light and music. In addition, visitors were strictly limited to allow the puerperas to rest in a quiet and comfortable environment. 2. Intraoperative care: Puerperas were anesthetized in a comfortable position with the support of the anesthesiologist and nurses. Puerperas were instructed to talk as little as possible to avoid excessive accumulation of gas in the body, thus reducing the probability of anus exhaust. 3. Postoperative care: After CS, puerperas rested for a few days in a proper position in bed, and those with side incisions were instructed to be placed in a lateral position to keep the wound dry. Wound recovery was monitored to avoid unnecessary infections. Puerperas fasted for 8 hours to avoid nausea and vomiting. Eight hours after CS, puerperas were guided to take in more protein, vitamins and minerals, with less salt and animal fats. Nurses encouraged them to breathe with their abdomen to relieve the pain. For those with severe pain, painkillers were given according to the doctor's advice. 4. Postoperative psychological care: Medical staff and family members paid close attention to the psychological changes of patients suffering from physical pain and showed more patience to make them feel cheerful and well accompanied. In addition, caregivers helped them identify with her role as a mother and eliminate negative emotions. Anxious and depressed patients were treated by professional psychologists to build up confidence, which was conducive to the health of both the mother and baby. 5. Breast care: Keep hands and nipples clean before breast feeding. Puerperas were guided to properly massage the breasts to increase milk secretion. For those with flat and inverted nipples, medical personnel gave professional guidance. To urge the newborn to suck the nipples, puerperas made more skin-to-skin contact with their babies, and sucking the nipples is a good stimulus to milk secretion. After each breast feeding, babies were encouraged to fully empty the breast so as to facilitate the reproduction of milk.

Scoring criteria

Visual analogue scale (VAS) evaluated the pain of puerperas, with a full score of 10. The higher the score, the more severe the pain, and the worse the pain control. Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) were adopted to assess mental health of puerperas. The SAS had a total score of 100, a score of 50-70 indicated mild anxiety, 71-90 indicated moderate anxiety, and >90 indicated severe anxiety. The SDS had a total score of 100, a score of 50-70 indicated mild depression, 71-90 indicated moderate depression, and >90 indicated severe depression. Pittsburgh sleep quality index (PSQI) assessed sleep quality before and after nursing. The score consisted of 19 self-evaluations and 5 evaluations made by others, with a total score of 21. Higher score suggested lower sleep

Table 1. Clinical data [n (%)]

	Research group (n=37)	Control group (n=35)	x^2 or t	P
Age (years)	27.8±4.7	27.1±4.6	0.638	0.525
History of hypertension			0.172	0.679
Yes	11 (29.73)	12 (34.29)		
No	26 (70.27)	23 (65.71)		
BMI	21.05±1.24	21.02±1.17	0.106	0.916
Smoking history			0.002	0.963
Yes	15 (40.56)	14 (40.00)		
No	22 (59.46)	21 (60.00)		
Drinking history			0.007	0.995
Yes	18 (48.65)	17 (48.57)		
No	19 (51.35)	18 (51.43)		
Residence			0.695	0.405
Urban	23 (62.16)	25 (71.43)		
Rural	14 (37.84)	10 (28.57)		
Diet preference			0.008	0.927
Light	12 (32.43)	11 (31.43)		
Spicy	25 (67.57)	24 (68.57)		
Average gestational age (weeks)	37.96±1.38	38.02±1.28	0.223	0.824

Table 2. VAS score comparison

Group	Number of cases	8 h postpartum pain score	24 h postpartum pain score	72 h postpartum pain score
Research group	37	4.93±0.61	3.81±0.34	1.63±0.32
Control group	35	6.97±0.72	6.45±0.65	3.95±0.37
F		13.000	21.760	28.500
P		0.001	0.001	0.001

quality after delivery. Generic quality of life inventory-74 (GQOL-74) was comprised of 4 dimensions, with a total score of 100. The higher the score, the better the quality of life (QOL). The patients' satisfaction was scored with a self-made "nursing satisfaction questionnaire" of our hospital, with a total of 20 questions, 5 points for each question. A total score of <70 points was considered as unsatisfactory, 70-89 points as satisfactory, and ≥90 points as highly satisfactory. Satisfaction rate = (highly satisfactory+satisfactory)/Total Cases × 100%.

Detection methods

Fasting venous blood (5 mL) was sampled from puerperas before and after delivery. After storage at 4°C for 30 minutes, the blood was centrifuged at 1500 × g at 25°C for 10 min and detected by double antibody sandwich enzyme-linked immunosorbent assay (ELISA). The serum cortisol (CORT) ELISA kit was purchased from Joe Feather Biotechnology Co., Ltd., 1536135233.

Outcome measures

Main outcome measures: pain degree; postpartum maternal mental health score; sleep quality score; score of QOL; prenatal and postnatal stress response indexes such as mean arterial pressure (MAP), heart rate (HR), CORT.

Secondary outcome measures: complications in the nursing process; score of "Nursing Satisfaction Questionnaire" made by our hospital.

Statistical methods

In this study, SPSS 20.0 (IBM Corp, Armonk, NY, USA) and GraphPad 7 were employed to

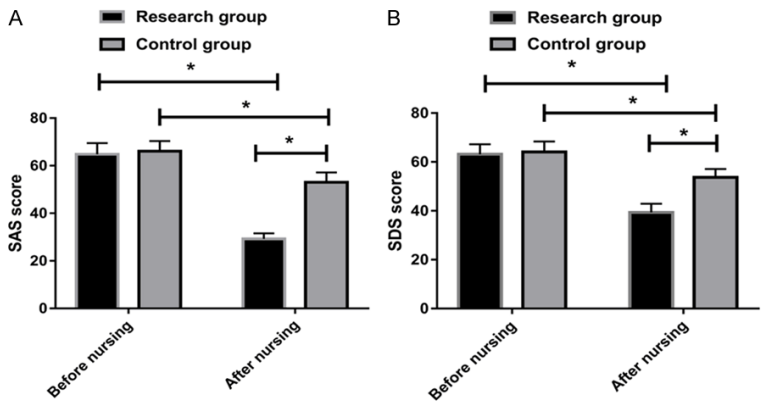

Figure 1. Depression score. A. SAS score in the research group is remarkably lower than that in the control group after nursing. B. SDS score in the research group is remarkably lower than that in control group after nursing. Note: *indicates the difference between the two groups was statistically significant (P<0.05).

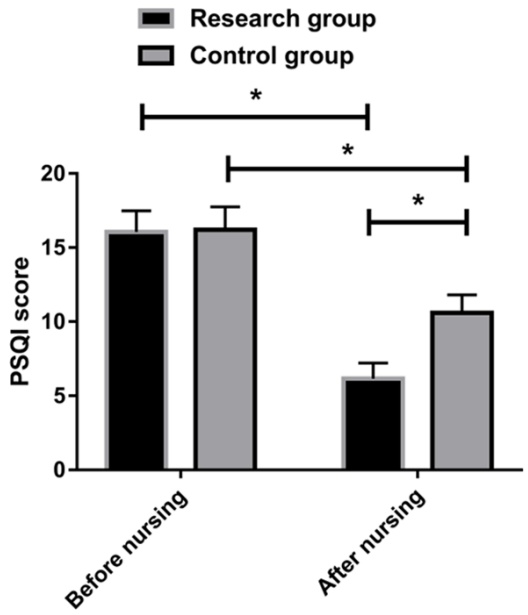

Figure 2. PSQI score. The PSQI score in the research group is remarkably lower than that in the control group after nursing. Note: *indicates the difference between the two groups was statistically significant (P<0.05).

carry out statistical analysis and create illustrations. Kolmogorov-Smirnov test analyzed the distribution of data, and normally distributed data were expressed by mean ± standard deviation (sd). Inter-group comparisons were carried out by independent samples t test, and intra-group comparisons by paired t test. Counting data expressed by percentage (%) were analyzed by chi-square test (denoted by x^2). Repeated measures analysis of variance was used for the comparison at multiple time points (denoted F), and Bonferroni was used for post-hoc test. Values of $P<0.05$ were considered to be statistically significant.

Results

Clinical data

There was no significant difference between the research group and the control group in the clinical data regarding age, hypertension history, body mass index (BMI), smoking history, drinking history, residence, diet preference, as well as average gestational age, indicating comparability between groups (P>0.05), see **Table 1**.

Comparison of postpartum VAS

The VAS score in the research group was significantly lower than that in the control group at 8 h, 24 h and 72 h after delivery (P<0.05), as shown in **Table 2**.

Postpartum mental health score

SAS and SDS scores that showed no difference between the two groups before nursing care (P>0.05) decreased remarkably in the research group after nursing (P<0.05). See **Figure 1**.

Postpartum sleep quality score

There was no significant difference in PSQI score between the two groups before nursing (P>0.05), which were significantly decreased in the research group after nursing (P<0.05). See **Figure 2**.

Prenatal and postpartum stress response indexes

There was no significant difference in prenatal MAP, HR, CORT between the two groups (P>0.05). The postpartum CORT was remarkably increased in the two groups (P<0.05), and postpartum MAP and HR in the research group showed no differences compared with prenatal ones (P>0.05). Postpartum CORT in the

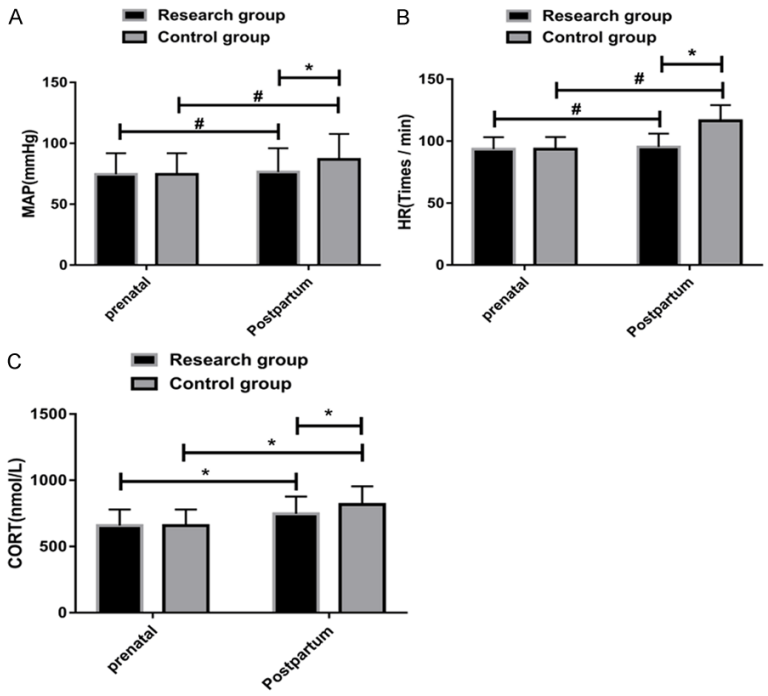

Figure 3. PreNATAL and postpartum stress response indexes. A. There is no significant difference in prenatal and postpartum MAP in the research group, but postpartum MAP is lower than that in the control group. B. There was no significant difference in prenatal and postpartum HR in the research group, but postpartum HR is lower than that in the control group. C. Postpartum CORT remarkably increased in the research group, but was lower than that in the control group. Note: #indicates that there is no difference between the two groups (P>0.05), and *indicates the difference between the two groups was statistically significant (P<0.05).

Table 3. Complications of two groups of maternity nursing process [n (%)]

Category	Research group (n=37)	Control group (n=35)	x^2	P
Incision complications	1 (2.70)	2 (5.71)		
Abnormal uterine bleeding	0 (0.00)	1 (2.86)		
Endometritis	0 (0.00)	1 (2.86)		
Gastrointestinal syndrome	0 (0.00)	3 (8.57)		
Urinary complications	1 (2.70)	2 (5.71)		
Total incidence	2 (5.40)	9 (25.71)	5.731	0.017

research group was remarkably lower than that in the control group (P<0.05). See **Figure 3**.

Comparison of complications

Complications occurred in the two groups. The total incidence in the research group was 5.40%, remarkably lower than that in the control group (25.71%), as shown in **Table 3**.

Postpartum QOL

There was a difference in GQOL-74 scores between the two groups (P<0.05). After nursing, the GQOL-74 score in the research group was remarkably higher than that in the control group (P<0.05), as shown in **Table 4**.

Comparison of patient satisfaction

The nursing satisfaction in the research group was 97.30%, remarkably higher than that in the control group (77.14%) (P<0.05). As shown in **Table 5**.

Discussion

CS is the most common surgical procedure in the United States [13], the prevalence increased from 20.7% in 1996 to 32.9% in 2009 and is still on the rise [14, 15]. There were approximately 1.3 million American women who underwent CS in 2011 [16]. CSs, while protecting mothers and infants from the threat of potential adverse events, also poses additional risks compared to vaginal births [17]; for example, more severe infection rates, pain, breast feeding difficulties, stress response, depression, and complications [18, 19]. High-quality nursing care has been reported to improve maternal mental health and QOL [20, 21]. Pallangyo et al. [22] pointed out that obstetric care during childbirth effectively reduces maternal mortality.

In this study, high-quality nursing care was adopted for CS mothers. We first compared the VAS pain score between the two groups, and it turned out that the score in the research group was remarkably lower than that in the control

Table 4. GQOL-74 score

Group	Number of cases	Physical function	Heart function	Social function	Material condition
Research group	37	62.18±3.05	44.81±4.21	60.98±4.06	58.69±3.61
Control group	35	51.82±4.62	38.33±5.10	52.72±4.89	52.21±4.12
F		11.290	5.893	7.815	7.108
P		0.001	0.001	0.001	0.001

Table 5. Nursing satisfaction [n (%)]

Group	Number of cases	Highly satisfactory	Satisfactory	unsatisfactory	Satisfaction rate (%)
Research group	37	29 (78.38)	7 (18.92)	1 (2.70)	36 (97.30)
Control group	35	10 (28.57)	17 (48.57)	8 (22.86)	27 (77.14)
T					6.680
P					0.010

group at 8 h, 24 h and 72 h after delivery, revealing the plain-reliving effect of high-quality nursing care on puerperas after CS. A study shows that [23] careful nursing before and after delivery can reduce the incidence of maternal pain, which is consistent with our findings. SAS and SDS that were employed in this study demonstrated that puerperas receiving high-quality care were mentally healthier than those receiving conventional care, indicating that high-quality nursing care helps puerperas relax and reduces postpartum depression. According to Reed et al., depression is a common phenomenon in pregnant women after delivery, which can be effectively relieved by cooperative nursing care [24]. The PSQI score in the research group was found to be significantly lower than that in the control group after nursing, suggesting the effect of high-quality nursing care on the improvement of sleep quality and stress relief. In our study, complications occurred in both groups during nursing, but the total incidence in the research group was remarkably lower than that in the control group, so high-quality nursing care can reduce postpartum complications of puerperas. GQOL-74 score was adopted to assess physical recovery after treatment because the QOL of most puerperas are generally affected after giving birth [25, 26]. We found that the GQOL-74 score in the research group was higher than that in the control group after nursing, indicating that QOL can be improved by high-quality nursing care before discharge. Next, we observed the stress response indexes (MAP, HR, CORT) before and after delivery, and it was revealed that the levels of MAP and HR in the two groups showed no significant difference before delivery, but those in the research group were significantly lower than in the control group after delivery. This suggests that high-quality nursing care is able to stabilize the stress response indexes, while conventional care is slightly inferior. High-quality care plays a vital role in facilitating the delivery experiences of puerperas, thereby increasing their satisfaction [27], so we scored patient satisfaction and noticed that the research group had significantly higher satisfaction than the control group, suggesting the high recognition of patients. Through the above findings, we have preliminarily proved that high-quality nursing care is effective in reliving post-operative stress responses, depression, pain of pregnant women undergoing CS, as well as increasing sleep quality. However, there are still several limitations. First of all, we have only adopted conventional nursing as the control group among numerous clinical nursing modes, leading to a simplification of this study. Secondly, we have failed to conduct a long-term follow-up investigation on the prognosis of puerperas. Therefore, we hope to include more nursing modes and to conduct random follow-up visits in future research to supplement our findings.

To sum up, high-quality nursing care relives depression, stress responses, and pain of pregnant women undergoing CS, with fewer postpartum complications, higher quality of sleep and better QOL.

Disclosure of conflict of interest

None.

Address correspondence to: Ling Sun, Department of Obstetric Nursing, Qinhuangdao Maternal and Child Health Hospital, No.452 Hongqi Road, Haigang District, Qinhuangdao, Hebei Province, China. E-mail: sunao4@126.com

References

[1] Betran AP, Torloni MR, Zhang JJ and Gülmezoglu AM; WHO Working Group on Caesarean Section. WHO statement on caesarean section rates. BJOG 2016; 123: 667-670.

[2] Betran AP, Ye J, Moller AB, Zhang J, Gulmezoglu AM and Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014. PLoS One 2016; 11: e0148343.

[3] Gregory KD, Jackson S, Korst L and Fridman M. Cesarean versus vaginal delivery: whose risks? Whose benefits? Am J Perinatol 2012; 29: 7-18.

[4] Molina G, Weiser TG, Lipsitz SR, Esquivel MM, Uribe-Leitz T, Azad T, Shah N, Semrau K, Berry WR, Gawande AA and Haynes AB. Relationship between cesarean delivery rate and maternal and neonatal mortality. JAMA 2015; 314: 2263-2270.

[5] Zupancic JA. The economics of elective cesarean section. Clin Perinatol 2008; 35: 591-599, xii.

[6] Perdok H, Jans S, Verhoeven C, Henneman L, Wiegers T, Mol BW, Schellevis F and de Jonge A. Opinions of maternity care professionals and other stakeholders about integration of maternity care: a qualitative study in the Netherlands. BMC Pregnancy Childbirth 2016; 16: 188.

[7] Wesson J, Hamunime N, Viadro C, Carlough M, Katjiuanjo P, McQuide P and Kalimugogo P. Provider and client perspectives on maternity care in Namibia: results from two cross-sectional studies. BMC Pregnancy Childbirth 2018; 18: 363.

[8] Munabi-Babigumira S, Glenton C, Willcox M and Nabudere H. Ugandan health workers' and mothers' views and experiences of the quality of maternity care and the use of informal solutions: a qualitative study. PLoS One 2019; 14: e0213511.

[9] Lima JV, Guedes MV, Silva LF, Freitas MC and Fialho AV. Usefulness of the comfort theory in the clinical nursing care of new mothers: critical analysis. Rev Gaucha Enferm 2017; 37: e65022.

[10] James A, Cooper S, Stenhouse E and Endacott R. What factors influence midwives to provide obstetric high dependency care on the delivery suite or request care be escalated away from the obstetric unit? Findings of a focus group study. BMC Pregnancy Childbirth 2019; 19: 331.

[11] Guzha BT, Magwali TL, Mateveke B, Chirehwa M, Nyandoro G and Munjanja SP. Assessment of quality of obstetric care in Zimbabwe using the standard primipara. BMC Pregnancy Childbirth 2018; 18: 205.

[12] Portela MC, Lima SML, da Costa Reis LG, Martins M and Aveling EL. Challenges to the improvement of obstetric care in maternity hospitals of a large Brazilian city: an exploratory qualitative approach on contextual issues. BMC Pregnancy Childbirth 2018; 18: 459.

[13] Agarwal S. Trends and burden of firearm-related hospitalizations in the United States across 2001-2011. Am J Med 2015; 128: 484-492, e481.

[14] Menacker F and Hamilton BE. Recent trends in cesarean delivery in the United States. NCHS Data Brief 2010; 1-8.

[15] Osterman MJ and Martin JA. Changes in cesarean delivery rates by gestational age: United States, 1996-2011. NCHS Data Brief 2013; 1-8.

[16] Hamilton BE, Martin JA and Ventura SJ. Births: preliminary data for 2011. Natl Vital Stat Rep 2012; 61: 1-18.

[17] Ecker JL and Frigoletto FD Jr. Cesarean delivery and the risk-benefit calculus. N Engl J Med 2007; 356: 885-888.

[18] Prior E, Santhakumaran S, Gale C, Philipps LH, Modi N and Hyde MJ. Breastfeeding after cesarean delivery: a systematic review and meta-analysis of world literature. Am J Clin Nutr 2012; 95: 1113-1135.

[19] Lewis RM, McKoy JN, Andrews JC, Jerome RN, Likis FE, Surawicz TS, Walker SH and Hartmann KE. In: editors. Future research needs for strategies to reduce cesarean birth in low-risk women: identification of future research needs from comparative effectiveness review No. 80. Rockville (MD): 2012.

[20] Afaya A, Yakong VN, Afaya RA, Salia SM, Adatara P, Kuug AK and Nyande FK. A qualitative study on women's experiences of intrapartum nursing care at Tamale Teaching Hospital (TTH), Ghana. J Caring Sci 2017; 6: 303-314.

[21] Johantgen M, Fountain L, Zangaro G, Newhouse R, Stanik-Hutt J and White K. Comparison of labor and delivery care provided by certified nurse-midwives and physicians: a systematic review, 1990 to 2008. Womens Health Issues 2012; 22: e73-81.

[22] Pallangyo E, Mbekenga C, Olsson P, Eriksson L and Bergstrom A. Implementation of a facilitation intervention to improve postpartum care in a low-resource suburb of Dar es Salaam, Tanzania. Implement Sci 2018; 13: 102.

[23] Thomas KA and Burr RL. Melatonin level and pattern in postpartum versus nonpregnant

nulliparous women. J Obstet Gynecol Neonatal Nurs 2006; 35: 608-615.
[24] Bhat A, Reed S, Mao J, Vredevoogd M, Russo J, Unger J, Rowles R and Unutzer J. Delivering perinatal depression care in a rural obstetric setting: a mixed methods study of feasibility, acceptability and effectiveness. J Psychosom Obstet Gynaecol 2018; 39: 273-280.
[25] van den Bosch AAS, Goossens M, Bonouvrie K, Winkens B, Nijhuis JG, Roumen F and Wassen M. Maternal quality of life in routine labor epidural analgesia versus labor analgesia on request: results of a randomized trial. Qual Life Res 2018; 27: 2027-2033.
[26] Tsai SY, Lee PL, Lin JW and Lee CN. Cross-sectional and longitudinal associations between sleep and health-related quality of life in pregnant women: a prospective observational study. Int J Nurs Stud 2016; 56: 45-53.
[27] Cy Chan Z, Wong KS, Lam WM, Wong KY and Kwok YC. An exploration of postpartum women's perspective on desired obstetric nursing qualities. J Clin Nurs 2014; 23: 103-112.