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The Effect of "Nurse Companionship" on Anxiety and Vital Sign Changes of Cesarean Section Candidates: A Randomized Control Trial

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Abstract

Objectives: Cesarean section (C-section) is one of the most common surgeries for women, which has numerous complications including anxiety and vital sign changes. Various non-drug methods exist for controlling these complications. Although nurse companionship is one of such methods, there is little information about the accompaniment of mothers by trained nurses during the C-section surgery. This study aimed to determine the effect of "nurse companionship" on the level of anxiety and vital sign changes of C-section candidates.

Materials and Methods: Using a random allocation method, this randomized control trial was performed on 128 C-section candidates in Al-Zahra teaching hospital of Tabriz in 2017. In addition to routine cares, intervention group mothers were accompanied and supported by a nurse 1 hour before to after the C-section surgery while mothers in the control group only received routine cares for the C-section. Data collection tools were demographic information form, visual analogue scale (VAS), digital blood pressure monitor, and chronometer. The anxiety level and vital sign changes were measured one hour before, during, and one hour after the C-section surgery. Finally, data were analyzed by SPSS 24 using the mixed repeated measures ANOVA.

Results: The comparison of the results of the two groups showed that the accompaniment of the mothers had a significant effect on reducing anxiety during ($P<0.001$) and 1 hour after ($P=0.011$) C-section surgery while it had no significant effect on vital sign changes.

Conclusions: The results revealed the positive effect of nurse companionship on reducing mothers' anxiety during and after the C-section surgery. Therefore, this method can be used as non-invasive nursing care during C-section surgeries and in operating rooms. However, cost-effectiveness assessment is recommended before the implementation of this method.

Keywords: Cesarean section, Anxiety, Vital signs, Nurse companionship

Introduction

Cesarean section (C-section) is the delivery of a baby through a surgical incision made in the mother's abdomen and uterus. It is one of the most common women's surgeries (1-3). In addition, C-section is performed when the normal vaginal childbirth is not proper for the mother or when childbirth must be done sooner for some reasons, namely, there is an indication for C-section (2). Over the last decades, performing C-section has become increasingly prevalent in the world. In 2014, the prevalence of C-section was 42% in the United States that was higher than that of the other developed countries (4). C-section also has increased from 35% to 48% in Iran over the last two decades (5). Despite medical advances, C-section is accompanied by many complications during and after the surgery, including hemorrhage, uterine rupture, as well as the increased risk of intestinal adhesion and damage to the urinary system (2).

Other complications include anxiety and vital sign changes during the childbirth process (6, 7). Anxiety is a state of fear and panic in patients that results from anticipating a threatening event. The incidence of anxiety in surgery candidates is prevalent such that Bansal and Joon estimated it to be 11% to 80%. Compared to patients ready for the surgery, C-section candidates experience higher levels of anxiety (8). Anxiety causes disorders in the blood pressure, heart rate, and respiration of the mother through the stimulation of the autonomic nervous system (7). Anxiolytics are usually used to control these complications. The routine administration of these drugs delays the recovery of the mother after the C-section because of sedative and nauseating effects. Therefore, these factors inhibit the early mother-infant relationship. They also reduce the mother's ability for beginning effective feeding (9).

Nowadays, there are various non-drug methods for reducing anxiety and controlling the vital sign changes of mothers during delivery. For example, music therapy

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(10) and reflexology (11) are among the methods that are used in nursing cares before and after childbirth. Another simple intervention is accompanying and supporting the mother (12). The nurse companionship is the physical and emotional support, which the patient receives during the treatment by a nurse. More precisely, nurses provide emotional support, reassurance, confidence, and comfort during the treatment process (13). It is normally performed by the constant presence of an individual during delivery or even for comforting, communicating with, and providing emotional and physical support for the mother (14,15).

Although accompanying and supporting the mother during the childbirth process is used in different cultures, its effectiveness has yet not been proved in the Iranian culture. For instance, some mothers have been accompanied by their husbands (15,16). This is while the cultural restrictions of Iran do not approve the husband's presence in the delivery room (17). Moreover, most studies examined the accompaniment of mothers in natural childbirth (18,19) while aiming at reducing the number of C-section deliveries (20-22). This is contrary to the fact that the rate of C-section is still going up in Iran (2). Besides, C-section has more complications compared to natural delivery. Therefore, it seems necessary to evaluate the effects of this simple and non-invasive intervention in C-section (2,23). It should be noted that accompaniment and support by a well-trained and experienced person will have positive outcomes for the mother and infant (12,14) Given the existing gap in our body of knowledge about the outcomes of the accompaniment and support of mother in the C-section in Iran, this study aimed to perform "nurse companionship" on C-section candidates in order to determine its effect on anxiety and vital sign changes.

Materials and Methods

This double-blind randomized clinical trial was carried out on C-section candidates in C-section wards and operating rooms of Al-Zahra teaching hospital of Tabriz in 2017. The sample size was calculated in G power software (written by Franz, Universitat Kiel, Germany) considering P1= 50%, Cohen's medium effect size h = 0.50, 80% power, and 0.05 significance level for each group (n-64). To this end, 128 C-section candidates were selected using a random allocation method and them divided into intervention and control groups at the allocation ratio of 1:1. This was performed in Random Allocation Software developed by Saghaei, MD, The Department of Anesthesia, Isfahan University of Medical Sciences, Isfahan, Iran. For hiding the allocation, the names of the groups were written down on a piece of paper and put in opaque envelopes in order of numbering. Next, the allocation sequence was carried out by a person who had no role in including the participants or collecting and analyzing the data. The qualified participant would choose an irreplaceable envelope and the required measures would be taken according to the group.

The inclusion criteria consisted of non-emergency C-section candidates, the lack of being nulliparous, adequate consciousness for participation, the presence of a common language between the nurse and mother for proper communication, the lack of any high-risk condition for the fetus requiring the intensive care, singleton pregnancy, and full-term pregnancy. On the other hand, the exclusion criteria were failed spinal anesthesia and general anesthesia receiving, the need for another surgery like hysterectomy during C-section, history of anxiolytic use, history of mental illness and underlying diseases such as renal and cardiovascular disorders, and a hearing problem. In addition, the other criteria encompassed a high-risk pregnancy including gestational diabetes, polyhydramnios, and preeclampsia in addition to the known history of AIDS and hepatitis, the occurrence of any nonsurgical event before, during, and after the operation and the mother's need for withdrawing from the research.

The researcher visited the C-section ward every day to select the candidates according to the inclusion and exclusion criteria and convenient accessibility. After the selection and random allocation of the samples, mothers in the control group received routine C-section cares by the staff and without the presence of the researcher. The routine care included admitting the patient to the ward, preparing the file, checking routine C-section tests, dressing operating room attire, along with informing and transferring the patient to the operating room. Further, the other processes were transferring the mother to the waiting room and then the operating table, inducing spinal anesthesia and starting the surgery, transferring the mother for post-surgery recovery, attending the recovery, giving routine recovery care, and transferring the mother to the general ward after the return of numbness in the legs.

In addition to routine cares, the intervention group was accompanied and supported by an operating room nurse (the researcher) 1 hour before, during, and 1 hour after the C-section. Nurse companionship was in a way that the nurse introduced herself and explained the goals and then evaluated the condition and the consciousness of the mother 1 hour before the surgery. The nurse held the mother's hand and provided her with support through touching her hand, establishing eye contact, giving necessary instructions, answering her questions and distracting her mind. She was told that the nurse would be beside her through the whole process of surgery and answer her questions as much as possible.

In the operating room, the same nurse transferred the mother from the ward to the waiting room. Once more, the nurse talked about her concerns, inadequate awareness, and fear and anxiety while holding her hand. The mother was then guided by the same nurse toward the operating room and table and introduced to the anesthesiologist group for spinal anesthesia induction.

The nurse helped position the mother for spinal anesthesia and provided the necessary explanations about spinal anesthesia and her consciousness through C-section. After the induction of spinal anesthesia, the nurse answered the mother's questions (e.g., washing, covering the patient, hearing voices through the surgery, feeling of tugging and movement, numbness in the lower extremity, the return of numbness, and the like) while holding and touching her hand and putting the other hand on her forehead. The nurse stood beside the mother through the C-section to childbirth and sedative injection and helped her by holding and caressing her hand, establishing eye contact, answering her questions, providing information, distracting her mind, and accompanying and supporting her.

Immediately after the surgery, the mother was transferred to the recovery room while the nurse was supporting her and answering her questions about the return of numbness in the legs and the like. After the return of numbness in the legs and recovery termination, the mother was transferred to the ward while she was accompanied by the nurse. Having the mother moved to the bed in the C-section ward, the nurse stayed beside the mother for 1 hour until her condition became stable. She also answered all of her questions. The levels of anxiety for both groups were measured 1 hour before the operation and 1 hour after returning to the ward by a person who was unaware of the nurse companionship procedure. The values of the vital signs including blood pressure, heart rate, and respiration rate per one minute were assessed and recorded 1 hour before the operation while the mother was moving to the operating table and 1 hour after returning to the ward.

Moreover, the demographic information form and the visual analogue scale (VAS) were used to measure anxiety, followed by using the vital sign checklist for collecting the data. The VAS scale was 10 cm line numbered from zero to 10 indicating the lack of anxiety and the highest level of anxiety, respectively. Hence, the scores from 0 to 3, 3 to 7, and above 7 showed mild, moderate, and severe anxiety, respectively. The reliability of this scale was confirmed by Irani et al (24) in a similar setting (α=95%). All research units utilized the digital blood pressure monitor (ALPK digital blood pressure monitor, Japan) to measure the blood pressure and heart rate. The number of breathings per minute was measured by observing and touching the chest and using a chronometer. The data were analyzed in SPSS, version 24 by the statistical test of mixed repeated measures ANOVA (Split plot). The significance level was set at $P<0.05$ for the test.

Results

A total of 128 C-section candidates participated in this study. Sixty-four mothers were placed in the intervention group (nurse companionship) and 64 of them were assigned in the control group (routine cares). The mean age of C-section candidates in intervention and control groups was 30.91 and 30.34 years, respectively, showing no statistically significant difference ($P=0.59$). The average number of previous C-section surgeries was 1.21 in both groups. Additionally, the average number of previous deliveries was 1.25 and 1.21 in intervention and control groups, respectively.

Most mothers in intervention and control groups had under diploma education (46.8% and 50%, respectively), were housewife (100% and 98.44%), lived in a city (81.25% and 85.94%), and had no history of stillbirth (100% in both groups) and difficult childbirth (98.44% and 100%). Overall, 50% and 39.6% of the infants were males in intervention and control groups, respectively. In terms of family support, 43.75% and 50% of mothers received great support in the intervention and control groups, respectively, and most of them were of a medium economic level in the intervention (70.32%) and control (59.38) groups. In addition, 45.32% and 48.44% of mothers in intervention and control groups were covered by the Health Insurance and Social Security Insurance, respectively. Further information is summarized in Table 1.

Data analysis about C-section candidates in the intervention and control groups showed no significant difference regarding the scores of the two groups 1 hour before the C-section ($P=0.081$). However, a significant difference was found between the means of the total scores of anxiety in the intervention ($P<0.001$) and control ($P=0.001$) groups during and 1 hour after the surgery. The details are provided in Table 2.

Table 3 presents the results of paired comparisons (two by two) with Bonferroni correction in relation to anxiety before, during, and after C-section surgery in 3 different time periods for intervention and control groups.

Discussion

The aim of this study was to determine the effect of the "nurse companionship" program on the level of anxiety and the vital sign changes of C-section candidates.

Table 1. Contingency Table of Demographic Information of C-section Candidates in Intervention and Control Groups

Variable		Intervention Group, No. (%)	Control Groups, No. (%)
Previous history of surgery	Yes	12 (18.25)	14 (21.87)
	No	52 (81.25)	50 (78.13)
Number of previous pregnancies	1	12 (18.25)	14 (21.87)
	>1	52 (81.25)	50 (78.13)
History of spinal anesthesia	Yes	57 (89.06)	58 (90.63)
	No	7 (10.94)	6 (9.38)
Infant's gender	Male	32 (50)	25 (39.06)
	Female	32 (50)	39 (60.94)
Preferred infant gender	Yes	41 (64.06)	49 (76.56)
	No	23 (35.94)	15 (23.44)

Table 2. Multiple Comparison Table of the Levels of Anxiety With Bonferroni Correction in C-section Candidates in Intervention and Control Groups

Level of Anxiety	Mean ± SE		*P*	95% CI for the Difference Between the Means of Intervention and Control Groups	
	Intervention	Control		Upper Limit	Lower Limit
One hour before C-section surgery	4.641 ± 0.395	5.625 ± 0.395	0.081	0.122	2.091
During C-section surgery	5.813 ± 0.378	7.766 ± 0.378	<0.001	-0.897	-3.010
One hour after C-section surgery	0.594 ± 0.240	1.469 ± 0.240	0.011	-0.204	-1.46

Note. CI: Confidence interval; C-section: Cesarean section; SE, standard error.

Table 3. Comparison of Anxiety Scores Before, During, and After C-section Surgery With Bonferroni Correction in C-section Candidates in Intervention and Control Groups

Variable	Group Type	Time	Mean[a] ± SE_d	*P*	95% CI for the Means of Difference Before, During, and After C-section Surgery	
					Upper Limit	Lower Limit
Level of anxiety	Intervention	1	-1.172±0.377	0.007	-0.257	-2.087
		2	4.047±0.454	<0.001	5.148	2.946
		3	5.219±0.398	<0.001	6.185	4.253
	Control	1	-2.141±0.377	<0.001	-1.226	-3.056
		2	4.156±0.454	<0.001	5.257	3.056
		3	6.297±0.398	<0.001	7.263	5.331

Note. CI: Confidence interval; C-section: Cesarean section; SE, standard error; d: difference.
[a] Mean difference of earlier anxiety scores minus later scores.
1: One hour before C-section – during C-section; 2: One hour before C-section – 1 hour after C-section; 3: One hour after C-section – during C-section.

Table 4. Mean Scores of the Vital Signs of C-section Candidates in Intervention and Control Groups

Vital Sign	Time	Mean ± SE						*P*	95% CI for the Difference Between the Means of Vital Signs in Both Groups	
		Intervention			Control				Upper Limit	Lower Limit
Systolic blood pressure	1	119.531	±	1.319	117.688	±	1.319	0.325	5.535	-1.848
	2	128.609	±	1.621	130.219	±	1.621	0.484	2.927	-6.145
	3	117.516	±	1.355	118.953	±	1.355	0.455	2.356	-5.231
Diastolic blood pressure	1	77.891	±	1.143	74.031	±	1.143	0.018	7.058	0.660
	2	81.891	±	1.158	81.813	±	1.158	0.962	3.320	-3.164
	3	72.125	±	1.098	73.609	±	1.098	0.241	1.588	-4.557
Heart rate	1	95.453	±	1.433	91.328	±	1.433	0.044	8.136	0.114
	2	97.141	±	1.603	94.813	±	1.603	0.306	6.814	-2.157
	3	80.859	±	1.882	85.094	±	1.882	0.114	1.034	-9.503
Respiration	1	20	±	0.227	20.094	±	0.227	0.771	0.541	-0.729
	2	23.156	±	0.328	23.047	±	0.328	0.814	1.028	-0.810
	3	20.156	±	0.425	21.063	±	0.425	0.134	0.283	-2.096

Note. CI: Confidence interval; C-section: Cesarean section; SE, standard error.
1: One hour before C-section; 2: During C-section; 3: One hour after C-section.

The findings showed that the intervention reduced the level of anxiety during and 1 hour after the C-section surgery. Although the lowered level of anxiety might not be very important after the C-section surgery because mother's concerns about mishaps in the operating room and during the surgery would be over (25), controlling anxiety during the surgery and childbirth to prevent fetal damage is of great importance because anxiety will cause the release of epinephrine and norepinephrine thus interrupting the uterine blood flow and causing fetal hypoxia. It is biologically assumed that accompaniment during childbirth reduces the mother's anxiety because of creating a feeling of tranquility and security (16). This could be attributed to fulfilling emotional and supportive needs and respecting the mother's dignity during the process of childbirth (26).

In a study on the husband's accompaniment and support of his wife in natural childbirth, Salehi et al also observed lowered levels of anxiety. However, as mentioned earlier, cultural restrictions in Iran do not approve the husband's presence in the process of childbirth (17). This finding reveals the role of nurse companionship in reducing the

Table 5. Comparison of Vital Signs Before, During, and After C-section Surgery With Bonferroni Correction in C-section Candidates in Intervention and Control Groups

Vital Sign	Group Type	Time	Mean[a] ± SE_d			*p*	95% CI for the Difference Between the Means Before, During, and After C-section Surgery	
							Upper Limit	Lower Limit
Systolic blood pressure	Intervention	1	-9.078	±	1.602	<0.001	-5.190	-12.966
		2	2.016	±	1.550	0.588	5.777	-1.746
		3	11.094	±	1.660	<0.001	15.122	7.065
	Control	1	-12.094	±	1.02	<0.001	-8.643	-16.419
		2	-1.266	±	1.550	1	2.496	-5.027
		3	11.266	±	1.660	<0.001	15.294	7.237
Diastolic blood pressure	Intervention	1	-4	±	1.31	0.008	-0.822	-7.178
		2	5.766	±	1.399	<0.001	9.161	2.371
		3	9.766	±	1.238	<0.001	12.769	6.762
	Control	1	-7.781	±	1.31	<0.001	-4.603	-10.959
		2	0.422	±	1.399	1	3.817	-2.973
		3	8.203	±	1.238	<0.001	11.206	5.2
Heart rate	Intervention	1	-1.688	±	1.712	0.978	2.465	-5.840
		2	14.544	±	2.096	<0.001	19.680	9.507
		3	16.281	±	2.003	<0.001	21.141	11.422
	Control	1	-3.484	±	1.712	0.132	0.699	-7.637
		2	6.234	±	2.096	0.011	11.321	1.148
		3	9.719	±	2.003	<0.001	14.578	4.859
Respiration	Intervention	1	-3.156	±	0.331	<0.001	-2.352	-3.96
		2	-0.156	±	0.444	1	0.922	-1.234
		3	3	±	0.464	<0.001	4.126	1.874
	Control	1	-2.953	±	0.331	<0.001	-2.149	-3.757
		2	-0.969	±	0.444	0.093	0.109	-2.047
		3	1.984	±	0.464	<0.001	3.010	0.858

Note. CI: Confidence interval; C-section: Cesarean section; SE, standard error; d: difference.
[a] Mean difference of earlier anxiety scores minus later scores.
1: One hour before C-section – during C-section; 2: One hour before C-section – 1 hour after C-section; 3: One hour after C-section – during C-section.

mother's anxiety although more research is needed to choose the best companionship for the mothers.

In this study, the accompaniment was conducted by a trained nurse during the C-section procedure. In addition, Fu et al (12) examined accompaniment by a trained nurse during the C-section procedure, the results of whom are consistent with those of the present study. Accordingly, it seems that the accompaniment and support of the mother during childbirth both by a close person such as her husband and a trained nurse will reduce her anxiety. These findings indicate the necessity of further research for selecting the best accompanier for the mothers.

Akbarzadeh et al also observed reduced levels of anxiety during natural childbirth through accompaniment and support by acupuncture (16). This method, however, cannot be applied to C-section surgery. Therefore, the use of an accompaniment and support program is recommended over invasive methods such as acupuncture for C-section candidates.

Our findings are different from those of Langer et al (27), which could be attributed to different methods of accompaniment. Langer et al examined natural delivery while our study focused on C-section candidates, where the unfamiliar setting of the operating room, equipment, and the absence of family members had a positive effect on the increased level of anxiety (12). No evidence of lowered anxiety in Langer and colleagues' study could be a reason for difference in the type of accompaniment and the short period of intervention. Because in the study by Langer et al, mothers who were ready for the birth of the baby accompanied a few hours after admission. But in our study, mothers were accompanied by a nurse from the time of admission to the department and 1 hour before the surgery, which reduced the anxiety of the mothers. In the present study, a trained nurse familiar with the C-section procedure was employed that could be influential in reducing the mother's anxiety during the C-section surgery. Further, Langer et al (27) studied nulliparous women while our study was performed on multiparous women. It seems that previous history of childbirth has a positive effect on increased anxiety.

According to the search in the database, no study was found on the effect of nurse companionship in vital sign changes in C-section. Furthermore, no significant difference was observed in the vital sign changes of C-section candidates. The reason for this could be direct

management of the hemodynamic state of the mothers by the anesthesiologist team during C-section surgeries. Nevertheless, the findings showed some changes in the heart rate such that the average heart rate of mothers in the intervention group was extremely lower than that of the control group 1 hour after the surgery compared to the average heart rate 1 hour before the surgery. Considering that the average heart rate of both groups was not significantly different prior to the intervention, this finding is not noticeable and the observed difference might be due to the initial difference in the heart rate in intervention and control groups before participation in the research. Therefore, further research on matched groups is required to achieve more accurate results.

One of the limitations of this study was the interrupted accompaniment of mothers 1 hour after the surgeries. The participants would usually be accompanied by a close relative, thus making our accompaniment unnecessary. Therefore, multiple-day accompaniment for instructing breastfeeding and caring for the C-section scar is recommended, which was not affordable in the present study.

Conclusions

In general, nurse companionship had a positive effect on reducing anxiety during and after the surgery in C-section candidates. Therefore, future studies are recommended to use this non-drug, non-invasive method in the programs for controlling anxiety during C-section surgeries. However, given the shortage of nursing workforce and the long process of nurse companionship, cost-effectiveness assessment is recommended prior to providing the infrastructures for the implementation of this method for C-section candidates in the hospitals.

Conflict of Interests

No conflict of interest was declared by the authors.

Ethical Issues

The research proposal was approved by the Ethics Committee of Tabriz University of Medical Sciences (Ethics code: IR.TBZMED.REC.1395.68) and registered in the Iranian Registry of Clinical Trials website (identifier: IRCT2016081727561N3). Prior to the participation of mothers in the research, they were provided with a description of the goals, method, and random allocation into intervention and control groups. All research units were completely informed and personally agreed to participate in the research after obtaining written consent. They were also free to withdraw at any stage of the research and were assured of the confidentiality of collected information.

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