Effect of Companion Presence during Skin-to-Skin Contact on Maternal Anxiety: A Randomized Clinical Trial

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ABSTRACT

Objective: To compare the effect of companion presence versus midwife presence during skin-to-skin contact (SSC) at birth on maternal anxiety and satisfaction, and neonatal physiological parameters.

Methods: A randomized controlled trial was conducted on 92 pregnant women who were randomized to provide SSC to their newly borns for one hour postpartum, in the presence of a companion (study group) or a midwife (control group). Maternal anxiety (using the Visual Analogue Scale) and the neonatal physiological parameters (including temperature, heart rate, and oxygen saturation) were assessed in four stages viz., immediately after birth, and at 30, 60 and 90 minutes after birth. Maternal satisfaction was also evaluated after transferring the mother to the postpartum ward.

Results: We analyzed 86 mother-infant dyads (43 per group). Having a companion significantly reduced maternal anxiety after birth as compared to having a midwife at 30, 60, and 90 minutes after birth ($P = 0.04$, $P = 0.01$, and $P = 0.04$, respectively). There was also a small to medium effect size of the presence of companion compared to midwife in terms of maternal anxiety at 30 minutes (Cohen's d = 0.45; 95% CI = 0.02, 0.87), 60 minutes (Cohen's d = 0.52; 95% CI = 0.08, 0.94) and 90 minutes after birth (Cohen's d = 0.45; 95% CI = 0.02, 0.88). However, there was no significant effect of the same on neonatal physiological parameters. Having a companion versus a midwife led to higher maternal satisfaction rates ($P = 0.02$); 65.1% of mothers in the study group and 37.2% of mothers in the control group were desirous of the same care in future ($P = 0.02$).

Conclusion: Companion presence during SSC leads to a significant reduction in maternal anxiety compared to midwife presence.

Keywords: *Kangaroo mother care, Outcome, Oximetry, Satisfaction*

INTRODUCTION

Childbirth is a major life event, and the postpartum period plays a major role in the occurrence of maternal anxiety [1]. Incidence of serious postpartum anxiety is often higher than 17% [2,3]. The first two hours after birth is a critical period for the mother-infant dyadic interaction as it can lead to positive or negative psychological outcomes [4]. Postpartum anxiety can also have negative consequences on the mothering role, and affects the maternal attention to the baby and the successful breastfeeding [1].

Postpartum anxiety is affected by many factors, including the clinical environment surrounding childbirth. Strategies aimed at mitigating postpartum maternal anxiety include social support, psychotherapy, cognitive behavioral interventions, medications and physical exercise [5,6]. Policies like skin-to-skin contact (SSC) and companion support can reduce anxiety. SSC is one of the requirements highly recommended by the World Health Organization (WHO) in promoting the health of both mothers and neonates [7]. Furthermore, it is an important component of care, which starts immediately after birth up to at least one hour or until breastfeeding initiation [8,9]. The positive effect of SSC on maternal stress and anxiety,

physiological stability of the neonate, increasing the breastfeeding duration, the brain growth and development, and also attachment of mother and neonate has been reported in various studies [7,10,11]. Despite the increasingly robust evidence regarding the maternal and neonatal benefits of SSC, it is not implemented universally. In a systematic review, Abdulghani et al [12] found a wide range of SSC prevalence immediately after birth ranging from 1% in Tanzania to 98% in Croatia. There are many facilitators and potential solutions for ensuring implementation of promoting SSC including the use of a companion for the mother during labor or after birth, who does not necessarily have to be a highly skilled person; rather she/he can be a relative or a trusted friend with whom the mother keeps the baby during the SSC implementation [13]. In this study we compared the effect of presence of a companion versus that of a midwife during labor on maternal anxiety and satisfaction and neonatal physiological parameters during SSC.

METHODS

This parallel group, randomized controlled trial was conducted between July and September, 2020 in Amir Al-Momenin Hospital, Zabol University of Medical Science, Sistan and Baluchestan Province, Iran. The study population consisted of mother–baby pairs admitted to the labor ward of the hospital. The study was approved by the Ethics Committee of Iran University of Medical Sciences, and the research protocol was registered in the Iranian Registry of Clinical Trials. Written consent was obtained by the investigator from all the mothers who passed the initial eligibility screening.

Sample size calculation was based on a study by Nobakht and Safdari [14] and on the assumption that the effect size of the presence of companion and midwife in the process of SSC on each of the variables of maternal anxiety, satisfaction and neonatal physiologic parameters is at least 0.5 [15]. Considering a 10% attrition rate, power of 90% and 95% confidence interval, a sample size of 46 mother–baby pairs was estimated for each group.

We included mothers aged 18-45 years with singleton pregnancy delivering at ≥ 37 weeks' gestation. Mothers with unwanted pregnancy, complications of pregnancy/ delivery (e.g., pregnancy induced hypertension, gestational diabetes), maternal illnesses (medical and/or mental), with reports of fetal anomalies in sonography, and presence of COVID-19 infection of the mother or companion were excluded. Mothers needing analgesia during delivery, delivering by cesarean section, with prolonged or arrested labor, fetal distress, grade-3 and grade-4 perineal tears, postpartum hemorrhage, requiring manual removal of placenta, neonatal birth weight less

than 2500 g or more than 4500 g, one- and five-minute Apgar scores less than 7, neonates with medical problems or anomalies, and with any factors leading to discontinuation of SSC were also excluded.

After admission to the labor ward, eligible mothers were randomly assigned to either of the two groups, viz, SSC in the presence of a companion (study group) or a midwife (control group) using quadruple 1:1 web-based block (*http://www.randomization.com*). The randomiza-tion code was generated by the project statistical consultant and allocation concealment was ensured as the assignment sequence remained with this statistician. The researcher determined the group to which the mother was to be assigned through short messaging service or phone call. Although it was not possible to ensure binding of the participants or the researcher, the outcomes were assessed by a a research assistant who was unaware of the research protocol.

At the beginning of the active phase, the mothers of both groups were explained about the purpose of the study, technique of SSC and its advantages in a face-to-face session over 20-30 minutes and in simple language. Mothers were also provided related reading material and shown relevant video clips on a mobile phone. Any questions of the mothers were answered prior to enrollment, following which they were transferred to the labor ward. Additionally, in the companion group, the mother selected a female companion from among her friends or family members. The companions were explained about the danger signs in the neonates like respiratory distress, low pulse rate shown on oximeter, hypothermia (by touching), poor muscle tone, paleness, and cyanosis, need for hand washing before any contact with the neonate, technique of holding the baby during SSC, technique of assessing the neonate in prone position, and preventing fall of the baby. Both groups received usual care throughout the labor and delivery. The infants were delivered on the mothers' bare abdomen, dried, umbilical cord was clamped and cut, and breastfeeding was initiated. The infant's head was covered with a cap and was covered in a warm blanket after placing him/her on the mothers' chest with the head was placed between the mothers' breasts. SSC was started immediately under the supervision of the research team. The mothers were supported to provide uninterrupted SSC for one hour postpartum by the companion (study group) or midwife (control group).

Data collection tool was a three-part researcher-made questionnaire, including maternal demographic and obstetric characteristics and neonatal physiologic parameters.

Face and content validity were used to determine the scientific validity of the tools. To assess the validity, the

questionnaires were given to three senior members of the School of Nursing and Midwifery in order to do the necessary modifications. Anxiety was rated on a visual analog scale (VAS) of 1-10, with 10 being high anxiety and 1 being low anxiety [16]. The neonate's heart rate and oxygen saturation were recorded with a pulse oximeter (Nellcor NBP-295).

The research assistant collected information on maternal anxiety and neonatal physiologic parameters including axillary temperature, oxygen saturation and heart rate immediately, 30, 60 and 90 minutes after birth. Maternal satisfaction with the care provided and desire for the same care in future were rated on a on a scale of 1 to 5 (1: completely dissatisfied to 5: completely satisfied); responses were collected after the mother-infant dyads were transferred to the postpartum unit.

Statistical analysis: Data were analyzed using the SPSS software (version 21). *Chi* square test, Fisher exact test and Mann-Whitney test were used to compare qualitative variables, while independent sample *t* test was used to compare quantitative variables in two groups. Analysis of variance with repeated measures was used for the comparison of mean maternal anxiety and neonatal physiologic parameters over time. Repeated-measures ANOVA was used to compare maternal anxiety score and the neonatal physiological parameters (temperature, heart rate, and oxygen saturation) in the two groups during different times. Bonferroni test was used for making the two-by-two comparisons of means. *P* value less than 0.05 was considered statistically significant. Partial eta-square was used to calculate the effect size. Effect size (standardized mean difference) of intervention was reported based on Cohen's d (null effect = 0, trivial effect = 0 - 0.19, small effect = 0.2 = 0.49, medium effect = 0.5 – 0.79, large effect = 0.8 -1.19, very large effect = 1.2 - 2, and huge effect ≥ 2) [17].

RESULTS

We enrolled 92 prospective mothers, of which six mothers were excluded before completing all stages of the study (**Fig.1**). The final analysis was performed on 43 mother–baby pairs in each study group. The baseline participants' characteristics are given in **Table I**.

Table II shows the changes in the maternal anxiety at different stages after birth. Immediately after birth, the mean score of maternal anxiety was comparable between the two groups. The companion group had lower maternal anxiety scores after birth as compared to midwife presence at 30, 60, and 90 minutes after birth ($P = 0.04$, $P = 0.01$, and $P = 0.04$, respectively). As seen in **Table II**, based on Bonferroni test, maternal anxiety in both groups in each stage had a statistically significant decrease compared to
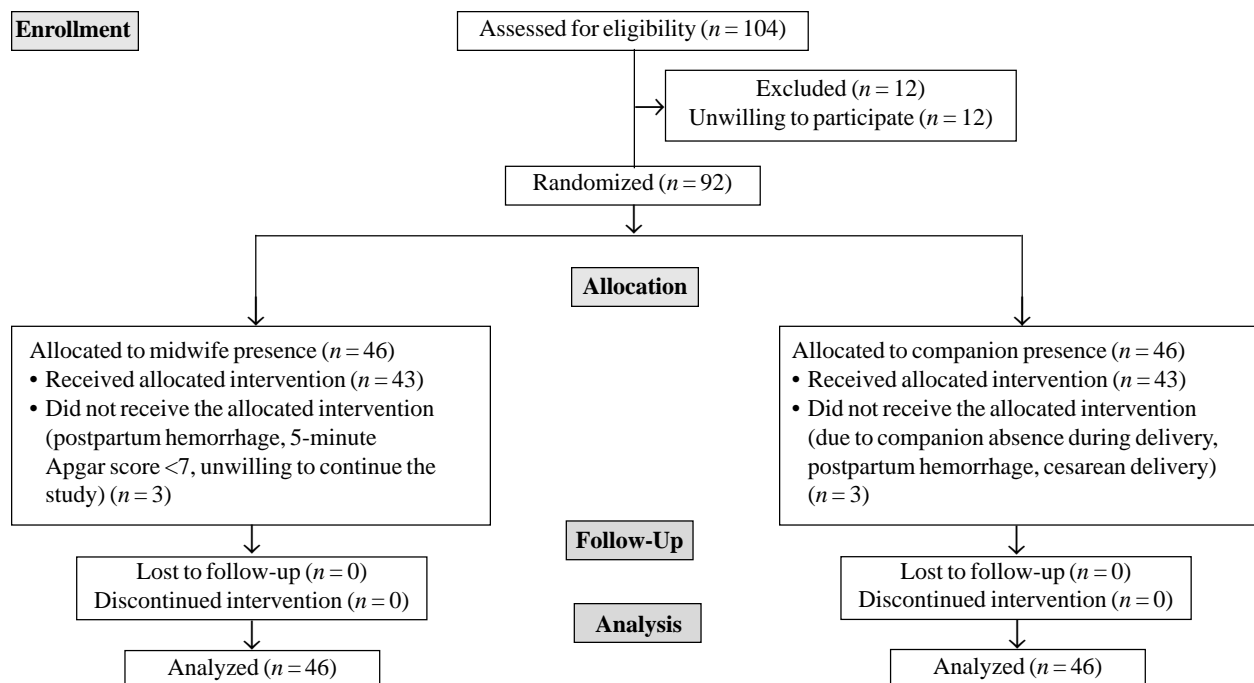
Fig. 1 Flow of participants in the study

Table I Baseline Characteristics of the Study Participants

Characteristic	Companion Presence Group (n = 43)	Midwif Presence Group (n = 43)
Maternal age (y)[a]	28.7 (6.0)	26.8 (6.01)
Paternal age (y)[a]	33.0 (7.72)	31.0 (8.38)
Maternal education		
Illiterate	2 (4.7)	4 (9.3)
High school	21 (48.8)	20 (46.5)
Diploma	15 (34.9)	14 (32.6)
University	5 (11.6)	5 (11.6)
Paternal education		
Illiterate	2 (4.7)	2 (4.7)
High school	20 (46.5)	23 (53.5)
Diploma	13 (30.2)	14 (32.5)
University	8 (18.6)	4 (9.3)
Financial status		
Good	6 (14)	2 (4.6)
Moderate	11 (25.6)	10 (23.3)
Weak	26 (60.4)	31 (72.1)
Housewife	40 (93)	42 (97.7)
Paternal occupation		
Unemployed	4 (9.3)	5 (11.6)
Worker	11 (25.6)	11 (25.6)
Employee	5 (11.6)	6 (14)
Self-employed	23 (53.5)	21 (48.8)
Urban residence	21 (48.8)	21 (48.8)
Ethnicity		
Fars	30 (69.8)	27 (62.8)
Baloch	13 (30.2)	16 (37.2)
Gravida[b]	3 (2-4)	2 (1-4)
Gestational age[a]	38.9 (0.93)	38.9 (1.06)
Completed delivery time of the placenta (min)[a]	7.81 (2.71)	8.39 (2.41)
Birthweight (g)[a]	3094.18 (384.24)	3097.67 (366.92)
No previous abortion	34 (79.1)	36 (83.7)
State of perineum		
Intact perineum	25 (58.1)	18 (41.8)
First-degree tear	12 (27.9)	10 (23.3)
Second degree tear	0	4 (9.3)
Episiotomy	6 (14)	11 (25.6)

Values in n (%) or [a]mean (SD) or [b]Median (IQR)

the previous stage ($P < 0.001$). There was no statistically significant difference between the two groups in terms of mean temperature, heart rate and oxygen saturation of neonates immediately, 30, 60, and 90 minutes after birth as shown in **Table II**.

Table II Maternal Anxiety Scores and Neonatal Physiological Parameters in the Two Study Groups During Different Stages After Birth

Variable	Immediately after birth CP	MP	P value	30 min after birth CP	MP	P value	Cohen's d (95% CI)	60 min after birth CP	MP	P value	Cohen's d; (95% CI)	90 min after birth CP	MP	P value	Cohen's d (95% CI)
Maternal anxiety[a]	2.76 (2.69)	2.65 (2.14)	0.82	0.48 (0.82)	1.04 (1.55)	0.04	0.45 (0.02, 0.87)	0.09 (0.36)	0.48 (1.008)	0.01	0.52 (0.08, 0.94)	0.02 (0.15)	0.23 (0.64)	0.04	0.45 (0.02, 0.88)
Neonate temperature (°C)	36.18 (0.09)	36.17 (0.11)	0.84	36.95 (0.16)	36.91 (0.13)	0.16	0.27 (0.15, 0.7)	37.12 (0.12)	37.09 (0.11)	0.17	0.17 (0.25, 0.6)	37.20 (0.10)	37.16 (0.12)	0.10	0.36 (0.07, 0.78)
Neonatal heart rate (beats per min)	141.19 (5.56)	139.79 (6.28)	0.27	136.60 (4.55)	136.35 (5.52)	0.81	0.05 (0.37, 0.47)	136.14 (4.96)	136.60 (4.78)	0.65	0.09 (0.52, 0.33)	136.28 (4.64)	136.12 (4.40)	0.86	0.05 (0.37, 0.47)
Neonatal oxygen saturation[a] (%)	74.65 (1.67)	74.25 (1.54)	0.25	96.65 (0.68)	96.51 (0.76)	0.37	0.19 (0.23, 0.62)	97.48 (0.59)	97.39 (0.72)	0.51	0.14 (0.29, 0.56)	97.81 (0.39)	97.74 (0.44)	0.44	0.17 (0.26, 0.59)

All values in mean (SD). [a]P < 0.05 for difference between groups at 30 min, 60 min and 90 min after birth. CP Companion presence, MP Midwife presence

There was also a small to medium effect size of the presence of companion compared to midwife in terms of maternal anxiety at 30, 60 and 90 minutes after birth. There was no impact on neonatal temperature, neonatal heart rate and neonatal oxygen saturation at 30, 60 and 90 mins of SSC.

A significant effect of time was noted on maternal anxiety ($\eta2 = 0.547$, $P < 0.001$); however, the effect of group ($\eta2 = 0.015$, $P = 0.266$) and interaction of group $\times$ time ($\eta2 = 0.018$, $P = 0.214$) on maternal anxiety was insignificant. The effect of time, group and interaction of group $\times$ time on neonatal temperature was $\eta2 = 0.94$, $P < 0.001$; $\eta2 = 0.053$, $P = 0.034$; and $\eta2 = 0.0.13$, $P = 0.35$, respectively. The effect of time, group and interaction of group $\times$ time on neonatal heart rate was $\eta2 = 0.152$, $P < 0.001$; $\eta2 = 0.004$, $P = 0.58$; and $\eta2 = 0.006$, $P = 0.66$, respectively. The effect of time, group and interaction of group $\times$ time on neonatal oxygen saturation was $\eta2 = 0.993$, $P < 0.001$; $\eta2 = 0.036$, $P = 0.08$; and $\eta2 = 0.0.006$, $P = 0.68$, respectively.

79.1% of the mothers in the study group were completely satisfied, and 20.9% were satisfied with the provided care compared to 55.8% and 44.2%, respectively in the control group. A significant difference was noted when comparing the maternal satisfaction between the two groups ($P = 0.02$). Regarding the mothers' desire for the same care in the future delivery, 65.1% of the mothers in the study group and 37.2% of the mothers in the control group were completely satisfied ($P = 0.008$).

DISCUSSION

We investigated the effect of companion presence during SSC on maternal anxiety and satisfaction, and neonatal physiological parameters. Compared to a midwife, the presence of a known female companion was more effective in mitigating postpartum maternal anxiety although no significant difference was observed in the neonatal physiological parameters immediately after birth in both groups.

Although previous studies have reported that mothers engaged in SSC have lower anxiety [18,19], there is scant evidence on the impact of presence of a companion on postpartum maternal anxiety. Some researchers have investigated the role of non-specialist support by friends, relatives or spouse during labor and delivery. A study in Iran reported the effect of the presence of a companion in reducing anxiety in the late active phase of labor, although no information was provided about postpartum anxiety [20]. Salehi et al [21] conducted a clinical trial on the effect of the presence of trained husbands during labor on the anxiety level of mothers. Scores of anxiety were compared in the three study groups, viz, without companion

(control), with companion (a friend or a relative), and with a trained husband. During the fourth stage of labor, the level of anxiety in the husband companionship group was significantly lower than in the companion group; it was also significantly lower in the companion group than in the control group. However, in another study, most mothers preferred to have a labor companion rather than her husband [22]. In contrast a study by Rini et al [23] reported that 27% of the mothers got more anxious when they had a companion during labor. It is true that not only the presence of a companion is important but also the manner of companionship can influence the outcome [24].

In Iran, despite the expansion of physiological child-birth, satisfaction with vaginal childbirth is low to moderate; lowest level of satisfaction is in the emotional support area [25]. Congruence between the maternal expectations and the care provided to the mothers is needed. The present study showed the presence of companion (friends or relatives) during SSC considerably improved maternal satisfaction.

The use of a companion during SSC may be limited by misconceptions and cultural or social beliefs. One of the misconceptions is that SSC implementation by a companion may have negative neonatal consequences; our findings affirm that there is no scientific basis for the same as neonatal physiological parameters were comparable between the two groups.

Our study is distinctive for it investigates the effect of companion during SSC on the neonatal physiological parameters. Other studies have focused on the effect of continuous support during labor and childbirth. Bohren et al conducted a Cochrane systematic review reported that continuous support during labor and childbirth may improve neonatal outcomes including a higher fifth-minute Apgar score [4].

One of the limitations of the study was that maternal anxiety assessment was based on VAS. We also did not account for any additive effect on anxiety due to the effect of different degrees of maternal trait anxiety. We attempted to minimize the influence of this effect by random assignment of the mother–baby pairs into groups. We did not assess qualitatively the attitudes and opinions of mothers regarding the presence of companion during SSC In this study, the presence of a companion was limited to one hour after birth; it is suggested that this intervention be repeated with the presence of a companion additionally during the labor. Also, field studies to assess the impact of SSC on hypothermia will be useful.

Given the current barriers to SSC implementation, the results of this study could encourage the use of a

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WHAT THIS STUDY ADDS?

• Presence of a trusted or known companion after childbirth during skin-to–skin contact is effective and safe modality for reducing maternal anxiety and improving maternal satisfaction.

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companion of choice in reducing maternal anxiety and promoting maternal satisfaction. They can be used by policy makers and service providers in evidence-based decision-making in the field of maternal and neonatal health. Our study can generate evidence to facilitate policy change regarding implementation of companionship programs for mothers, especially in centers with shortage of staff and high workload.

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