



## **The impact of Kangaroo Care on Psychological Bonding, Placental Separation, and Maternal Anxiety among primiparas women**

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### **ABSTRACT**

**Background:** Providing maternal affection with kangaroo mother care (KMC) is an efficient method. After birth and when the mother is just starting to nurse, this is a common practise. Women who give birth vaginally or via caesarean section can benefit from this easy technique. **Aim:** Assess the impact of kangaroo care on psychological bonding, placental separation, and maternal anxiety among primiparas women. **Design:** A quasi-experimental research design. **Setting:** It was conducted at normal labor units, obstetrics and Gynecology department, Kafrelsheikh general hospital. **Subjects:** The subjects of this study included 100 mothers divided into a study group (50) & control group (50). **Tools:** Five tools were used to collect data for this study, **Tool I:** Structured interviewing questionnaire. **Tool II:** LATCH breastfeeding assessment tool. **Tool III:** Apgar score. **Tool IV:** Maternal-to-Infant Bonding Scale. **Tool V:** Postpartum Specific Anxiety Scale-Research Short-Form Item (PSAS-RSF). **Results:** There is a high statistically significant difference regarding the duration of the third stage of labor between the study & control groups at  $p = .000^*$ . There was a statistically negative correlation between Mothers' bonding to Infants and mothers' level of Postpartum Anxiety at  $p = .000^*$ . **Conclusion:** Kangaroo care proved benefits for mother and babies, represented in increased level of psychological bonding between mothers and their babies, early successful breastfeeding initiation, easily placental separation, and decreased level of maternal anxiety among primiparas women. **Recommendations:** Dissemination of the KMC applications in all hospitals and raising awareness about KMC between the nurses and physicians.

**Keywords:** Kangaroo Care, Maternal Anxiety, Placental Separation, Psychological Bonding.

### **Introduction:**

Recently, kangaroo care interventions have become more popular and widely used in hospitals all over the world. Kangaroo Mother Care (KMC)

is defined by the WHO as "the care of babies carried skin-to-skin with the mother to provide the desired warmth and security" (WHO 2021). Preterm and full-term newborns can benefit from

this method because it is "an effective and simple strategy for promoting health and well-being" (Moore et al., 2016). KMC includes "early, constant, and prolonged skin-to-skin touching base between mother and baby," exclusive nursing (ideally), and rapid hospital release.

Birth is a vulnerable and monumental event for mothers and their families; it can be a period of excessive joy and keenness, or it can be fraught with anxiety, pain, and even tragedy. It's also a delicate time because that's when healthy breastfeeding habits should be established. Several researchers (Almutairi et al., 2021) have found that. Babies are increasingly being taken away from their mothers shortly after birth due to technological advances (Srivastava et al., 2017). Hospital policies and procedures, such as warming the baby to prevent hypothermia, can force parents to separate from their newborn (Purwaningsih & Widuri, 2019). A decrease in mother-infant connection, maternal confidence, and self-efficacy in breastfeeding have all been linked to prenatal separation (Abdulghani et al., 2018). Supportive measures, such as kangaroo care (also known as "skin to skin contact"), can be taken to promote a safe bond between a mother and her infant (Agudelo et al., 2021).

The World Health Organisation (WHO) has deemed KMC to be the best method of providing warmth, stimulating the senses, and maternal love (WHO 2021). Continuous KMC, which involves skin-to-skin contact around the clock, is one method of application. Intermittent KMC can be used for shorter amounts of time and less

frequently in higher-income areas (Nyqvist et al., 2010). It is performed by mothers soon after birth, when they begin breastfeeding their infants (Ionio et al., 2021). It's a simple intervention that can be used with both vaginal and C-section births (Araujo et al., 2021; Purwaningsih & Widuri, 2019).

Postpartum women can benefit from kangaroo care because it helps with the management of negative emotions such as despair, irritability, anxiety, and stress. It's also used to help moms feel more connected to their newborns, which has been shown to improve everyone's quality of life (Mehrpisheh et al. 2022; Sinha et al. 2021; Cong et al. 2022). The quality of the mother and newborn's bond in the first minutes after birth is associated with both the mother's psychological health and the newborn's well-being and adaption later in life (Abdulghani et al., 2018).

Because it begins as soon as the fetus is born and encompasses the expulsion of the placenta and membranes, the third stage of labor is the greatest crucial for the health and wellbeing of both mother and infant and marks the creation of their lifelong bond (Duman et al., 2019). Active management include early cord clamping and cord pushing to expedite placental separation. The risk of haemorrhage can be reduced by carefully planning a physiological or natural third stage during a spontaneous, unmedicated, uncomplicated birth (Khadivzadeh, 2018).

As soon as the mother lays eyes on her newborn, they engage in a natural interaction pattern that lays the groundwork for secure

attachment, rapid nursing, and confident mothering. Increased levels of oxytocin, endorphins, and other bonding chemicals are produced when breastfeeding with skin-to-skin contact (Tahir, 2021). The contraction of the uterus and the subsequent delivery of the placenta are aided by the elevated amounts of oxytocin produced by the mother. Therefore, oxytocin prevents bleeding and develops the strong bond that assures a mother's care and safety with the other hormones, allowing the newborn to live (Mehrpisheh, 2022).

### Significance of the study:

There are 5 million neonatal deaths annually (death within the first 28 days of life), with 98% of these deaths occurring in developing countries, and preceding studies have noticed that kangaroo care can serve an important function in preserving emotions in postpartum mothers and lowering mortality rates (Nasrullah and Conde-Agudelo et al. 2021). In addition, the neonate's first 28 days of life are the most perilous for the baby's survival, according to research by Parella et al., (2021).

Infants greatly benefit from breastfeeding, especially when started early so they can receive colostrum (Guala et al., 2017). The antibodies and immune cells found in breast milk can protect a baby from illness. With the help of UNICEF (2016). Mothers who receive kangaroo care have higher levels of the hormone oxytocin, which speeds up the separation of the placenta and the third stage of labor (Pratiwi et al. 2021).

There are various benefits for both the mother and the newborn suggested by the evidence for

Kangaroo care after birth. Cochrane's 2016 review concludes that using immediate or Kangaroo care is the most effective way to promote breastfeeding (Moore et al., 2016). Placental ejection occurs sooner, and there is less bleeding, the mother feels more confident in her abilities, and she experiences less stress (Essa, M., & Ismail, 2015). A rise in maternal oxytocin within the first hour after birth has been associated with the development of an attachment between mother and newborn. The newborn experiences fewer negative effects from the "stress of birth (Aghdas et al. 2014).

Maternal and newborn care is one of the most essential sectors that needs significant change and reorganization in Egypt's health systems (Duman et al., 2019). To further understand how kangaroo care influences psychological bonding, placental separation, breastfeeding start, and maternal anxiety in first-time mothers, the present study was conducted.

### Aim of the study

#### The aim of this research was to:

Evaluate the impact of kangaroo care on psychological bonding, placental separation, and maternal anxiety among primiparas women.

**Research hypotheses:** The following hypotheses were examined to meet the study's objectives:

**H.1.** Mothers who engage in early kangaroo care following childbirth may experience a shortened third stage of labour than those who do not.

**H.2.** Mothers who engage in early kangaroo care after birth may initiate lactation earlier and with greater success than those who do not.

**H.3.** Kangaroo care may increase psychological bonding and decrease maternal anxiety after childbirth.

## Subjects and Methods

**Research Design:** A quasi-experimental study was conducted. This type of design lack randomization and include:

- Control – a control group is used to compare with the group receiving the intervention (kangaroo care).
- Manipulation – the researcher manipulates kangaroo care between the mother and newborn within the first two hours after delivery.

## Setting

The study was conducted at normal labor units, obstetrics and Gynecology department, Kafrelsheikh General Hospital Kafrelsheikh governorate, Egypt. The department containing two labour units for normal delivery located on the third floor of the hospital and consists of three sections, each with six beds. It provides women with various conditions with complimentary services.

## Subject

A purposive sample of 100 women was utilized. An arbitrary selection was made. For this research, participants were recruited from the preceding setting. The subjects were assigned to two groups (50 study subjects & 50 control

subjects). Mothers in both groups were similar in terms of age and gravidity. A purposive sample is a non-probability sample selected based on demographic characteristics and the study's objectives. The study comprised study subjects and their newborn babies who met the following criteria:

- a. Primiparous women
- b. Not suffering from any complications during pregnancy
- c. Delivery of normal newborn without complications
- d. Full-term (38 to 42 weeks of gestation)
- e. Expected normal vaginal delivery and desire to breastfeed their babies straightaway after birth
- f. Willing to join the study
- g. Newborns with an Apgar score  $> 7$
- h. Free from any psychiatric disorders

## Tools of data collection:

Data of the study is congregated using five tools: Structured interviewing questionnaire, LATCH breastfeeding assessment tool, Apgar score, Maternal-to-Infant Bonding Scale, and Postpartum Specific Anxiety Scale Research-Short-Form Item (PSAS-RSF)

## Tool I: Structured interviewing questionnaire

The researchers created this instrument after reviewing the relevant literature and it comprises of two sections; **A. personal data:** This section contained inquiries regarding age, residence, education level, and occupation. **B. present obstetrical history:** It is a written form based on McDonald (2007); that incorporates information on

gestational age, duration of third stage of labour, uterine position, and uterine atony. Beginning with the birth of the neonate, the duration of measurement includes the placenta, umbilical cord, and membranes.

#### **Scoring system:**

When the duration of placental separation was less than 5 minutes, the score was 1, between 5 and 10 minutes, the score was 2, and between 11 and 15 minutes, the score was 3. The higher the score, the longer the placental separation from the uterus.

#### **Tool II: The LATCH breastfeeding assessment tool**

This tool is based on (Jensen et al., 1994) & (Lau et al., 2016). LATCH is a sensitive, dependable, and trustworthy instrument for assessing breastfeeding skills based on observations and descriptions of effective breastfeeding.

The letters in the acronym LATCH stand for five distinct assessment parameters: "L" for how well the infant latches onto the breast, "A" for the audible swallowing amount, "T" for the mother's nipple types, "C" for the comfort level of mothers, and "H" for the support given to the mother to breastfeed her infant.

#### **Scoring system:**

Each parameter is assigned a numerical value of 0, 1, or 2. The total score goes from 0 to 10, with higher scores indicating more effective nursing approaches. A total score of greater than 7 indicates successful breastfeeding, whereas less than 7 indicates failed breastfeeding.

#### **Tool III: Apgar score**

The Apgar score tool created by (Virginia 1,952). Each newborn's vitals were captured during the first five minutes of life

#### **.Scoring system:**

Appearance (the degree of pinkness or blueness of the baby's skin), Pulse (the rate at which the baby's heart is beating), Grimace (the baby's reflexes and responses), Activity (the baby's muscle tone), and Respiration are the five factors on which the Apgar score is based. A value between 0 and 2 is assigned to each component. The final grade is broken out as follows:

7-10: Normal

4-6: needs suction & Oxygen

0-3: neonatal resuscitation

#### **Tool IV: Mother-to-Infant Bonding Scale (MIBS)**

This scale is a self-report scale (Taylor et al., 2005) aimed to assess the feelings of mothers regarding their new babies; it is composed of ten items on a four-point Likert scale (from 0, "not at all" to 3, "very much"). Some MIBS items are reversed. A high score indicates worse mother to infant bonding.

#### **Tool v: Postpartum Specific Anxiety Scale- Research Short-Form Item (PSAS-RSF):**

The PSAS-RSF is the first brief research tool (Davies et al 2021) which has been validated to measure postpartum anxiety (PPA) during the first year following birth. It is composed of 16 items that measure the postpartum specific anxiety, it is four Likert scale in which 1= Not at all, 2= Not Very Often, 3= Often, 4= Almost Always.

#### **Scoring system**

The score range of PSAS-RSF is divided as follow:

< 50% = mild maternal anxiety

50% - 75% = moderate maternal anxiety

> 75% = severe maternal anxiety

### **Tools validity**

The tools sheets were reviewed and validated by a Jury committee of 5 experts in Obstetrics, Gynecological, and Psychiatric Nursing professors. The committee looked at the tool to ensure it was clear, relevant, comprehensive, understandable, and applicable, and fulfilling the study's purpose.

### **Tools reliability**

Cronbach's alpha value for the reliability (internal consistency) of the Maternal-to-Infant Bonding Scale was 0.801, and of and Postpartum Specific Anxiety Scale Research Short-Form Item (PSAS-RSF) was 0.887.

### **Pilot Study**

A pilot study was applied on (10 pregnant women) 10% of pregnant women who had normal delivery from the preceding declared setting to evaluate the existing study tools for its clearness, validity and time required to be applied. Conferring to the pilot's results, all required modifications were done, and pilot study involved in the study.

### **Ethical considerations**

Taking ethics into account: ethical approval was taken from Kafrelsheikh University's ethical committee with the code of (MKSU 23-2-21). The director of the Kafrelsheikh General Hospital gave

formal approval and agreement before the pilot study and the real research were conducted. Pregnant women provided oral consent for the research. Pregnant women who had delivery vaginally performed may always opt-out if they did not want to take part. The environment posed no threats to human health. All participants' information is kept strictly secret.

### **Procedure**

Data was collected of 8 months, from early March 2022 to October 2022. Researchers visited the study site twice per week from 10:00 a.m. to 5:00 p.m. The study was conducted in five phases; preparation, interview and evaluation, implementation, and evaluation.

### **Preparation for the study:**

Researchers reviewed related literature develop data collection tools. In addition, official approval to conduct the study was obtained from the relevant authorities (i.e.; the approval of the ethics committee and the directors of Kafrelsheikh Genral Hospital). The researchers assess the study environment before the actual study begins.

**Interview and assessment:** Researchers interviewed each woman to determine demographic information and obstetric history using the structured interview plan. The researchers asked the queries in Arabic and documented the responses. All women in both groups were questioned and evaluated. The interview took approximately 15 to 20 minutes and conducted in the obstetrics department's waiting

room, and the time required was about 15-20 minutes.

**Implementation:** Women in the control group gave birth vaginally in accordance with hospital policy. In addition to routine care, the following were administered to women in the study group:

- Newborns in the study group were deposited in a prone position on their mothers' bare chests between the breasts before placental delivery, suturing, episiotomy, or separation of the placenta in vaginal delivery. Beginning to determine the duration of the third phase of labour.

- The infant's Apgar score was determined, his or her nose and mouth were suctioned and dried while the infant was lying on the mother's bosom, and the mother and infant were wrapped in a preheated blanket.

- The cranium of the infant was covered with a drying hood, which was replaced when it became wet to prevent heat loss.

- The baby will not be dressed or measured until two hours after birth.

- The researchers observed the neonates biting, licking, sucking, and suckling by standing behind or to the side of the bed and approaching the infants to observe their movements.

The time of onset of lactation and the first feeding were recorded, and the LATCH scale was used to evaluate the efficacy of the first feeding in the two groups.

- As some mothers in both groups requested breastfeeding assistance from the researcher, the level of support provided by the researcher was evaluated alongside other LATCH factors (holding, audible ingestion, nipple type, and comfort).

**Evaluation:** Using the study tools, the researchers assessed the women as follows:

**Before delivery in the waiting room:** Structured interview questionnaire; A. personal information, B. recent obstetric history. In the delivery room; LATCH Lactation Assessment Tool, Apgar Score. Postpartum,

**On the Ward, after delivery:** Mother-Infant Bonding Scale and Postpartum Specific Anxiety Scale, Research Short-Form Item (PSAS-RSF)

#### **Statistical methods:**

IBM's Statistical Package for the Social Sciences (SPSS, Chicago, IL) Version 20.0 was used to categorise, code, tabulate, and analyse the obtained data. Means and standard deviations were calculated in order to characterise the central tendency of the observations and the dispersion of the data around the mean, respectively, for the quantitative variables. Frequencies and percentages were used to describe categorical variables. Comparisons of means were analysed using Student's t-test, and comparisons of categorical variables were made using chi-square ( $\chi^2$ ). A p-value of less than 0.05 was judged statistically significant, while a p-value of less than 0.001 was considered extremely significant.

## Result

**Table (1)** demonstrates the socio-demographic characteristics of the subjects (study and control groups) that were examined. It indicates that there were no sociodemographic differences between the study and control groups that were statistically significant. The study group had a mean age of  $26.82 \pm 3.76$  years, while the control group had a mean age of  $25.34 \pm 2.32$  years. 74% and 78% of the study group and control group, respectively, resided in rural areas. Additionally, greater than three-quarters of both the study and control groups were employed (76% and 78%, respectively). There was a highly statistically significant difference in educational level between the studied samples, with nearly two-thirds of the study group being highly educated (64%) and nearly half of the control group being secondary educated (46%).

**Table (2)** reveals obstetric history of the studied samples. Regarding duration of third stage of labor, there was a highly statistically significant difference at p value (.000). While more than half of the control group (54%), their duration of third stage was from 11 to 15 minutes. Meanwhile, more than 62% of the study group's duration of third stage was less than 5 minutes. There was a statistically significant difference between the study & control groups regarding position of the uterus, after using methergine uterus contracted immediately, uterine atony, mean amount of blood loss immediately after delivery at (P value 0.004, 0.0065, 0.021, 0.041). More than half of the study group (52%) & nearly three quarters of the control group (72%), the position of their uterus was

below level of umbilicus. Meanwhile, more than three quarters of the study group (78%) & more than two thirds of the control group (68%), uterus contracted immediately after using methergine. In addition to, most of the study group (94%) & more than three quarters of the control group, the condition of the uterus was not atonic.

**Figure (1)** clarifies total score level regarding breastfeeding initiation between study & control groups. Nearly the majority of study group (88%) & less than three quarters of control group (72%), had rapid initiation of breast-feeding.

**Table (3)** reveals distribution of neonatal assessment at birth between the study & control groups. There was no statistically significant difference between study & control regarding the Apgar score at 1<sup>st</sup> & 5<sup>th</sup> minutes, gender of present baby & successful breast feeding at (P-Value 0.092, 0.157, 0.035 & 0.841) respectively.

**Table (4)** shows the total score of Postpartum Specific Anxiety for study and control group. The results revealed that 52% of the study group had moderate anxiety while 48% of the control group had severe anxiety. In addition, there is a high statistically significant difference between study & control at  $p=.000$ .

**Figure (2)** shows the total score of Total score of studied mothers feeling regarding infant bonding. The results revealed that 88% of the study group mothers had good bonding with their infants while 72% of the control group had good bonding with their infants.

**Table (5)** reveals Correlation between studied mothers' level of Postpartum Anxiety and



their feelings to Infant Bonding. The results showed a high statistically significant negative

correlation between study group & control group at  $p=.000$ .

**Table (1): Distribution of socio-demographic characteristics of the studied mothers (study and control group)**

The studied mothers (n=100)							
		Study group (n=50)		Control group (n=50)		c <sup>2</sup>	P
Sociodemographic data		N	%	N	%		
Age	Less than 20years	5	10	11	22	2.683	.261
	From 20 to 35 years	17	34	15	30		
	More than 35	28	56	24	48		
	Mean $\pm$ SD	26.82 $\pm$ 3.76		25.34 $\pm$ 2.32			
Residence	Urban	13	26	11	22	.060	.806
	Rural	37	74	39	78		
Occupation	Un Employed	12	24	11	22	.060	.806
	Employed	38	76	39	78		
Educational level	Read and write	3	6	11	22	19.071	.000*
	Primary education	7	14	9	18		
	Secondary education	8	16	23	46		
	University education	32	64	7	14		
Income	Inept	10	20	10	20	4.114	.128
	Just meet life expenses	8	16	2	4		
	Insufficient	32	64	38	76		

**Table (2): Distribution of Obstetric History of the studied mothers (Study and Control Group)**

Obstetric history		Study		Control		c <sup>2</sup>	P
		N	%	N	%		
Duration of Third Stage of Labor	Less than 5 minutes	31	62	11	22	.476	.000*
	From 5 to 10 minutes	13	26	12	24		
	From 11 to 15 minutes	6	12	27	54		
Position of The Uterus	At the level of umbilicus	10	20	11	22	10.968	.004*
	Below level of umbilicus	26	52	37	72		
	Above level of umbilicus	14	28	2	4		
After using Methergine uterus contracted immediately	Yes	39	78	34	68	6.443	.0065*
	No	11	22	16	32		
Uterine atony	Yes	3	6	11	22	5.316	.021*
	No	47	94	39	78		

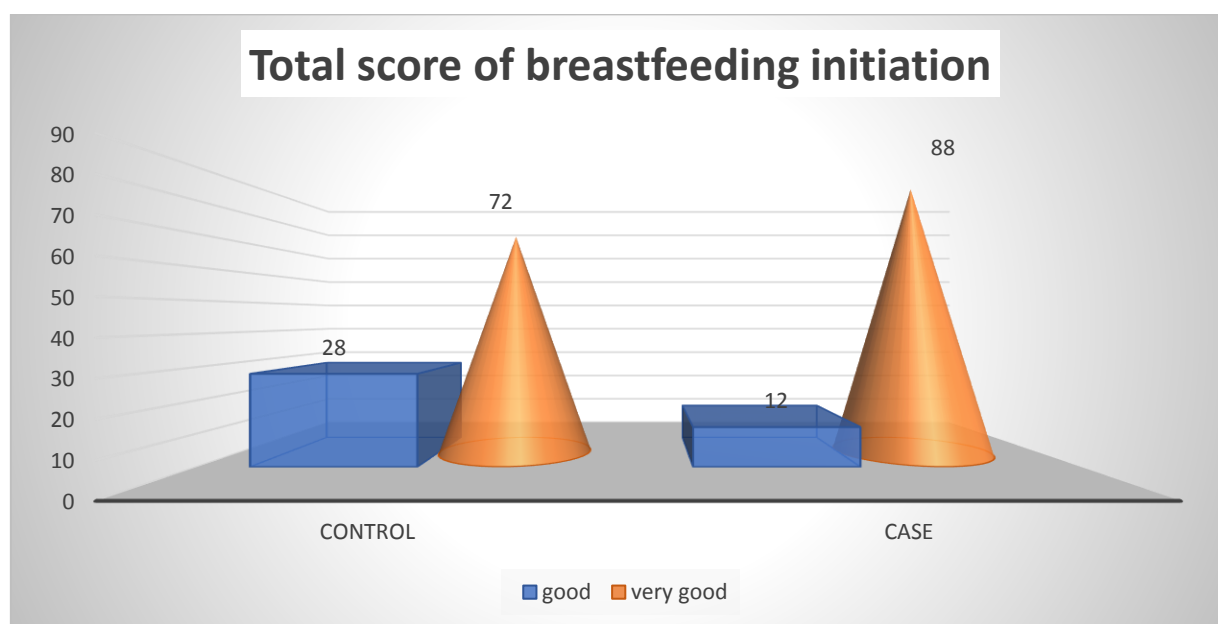


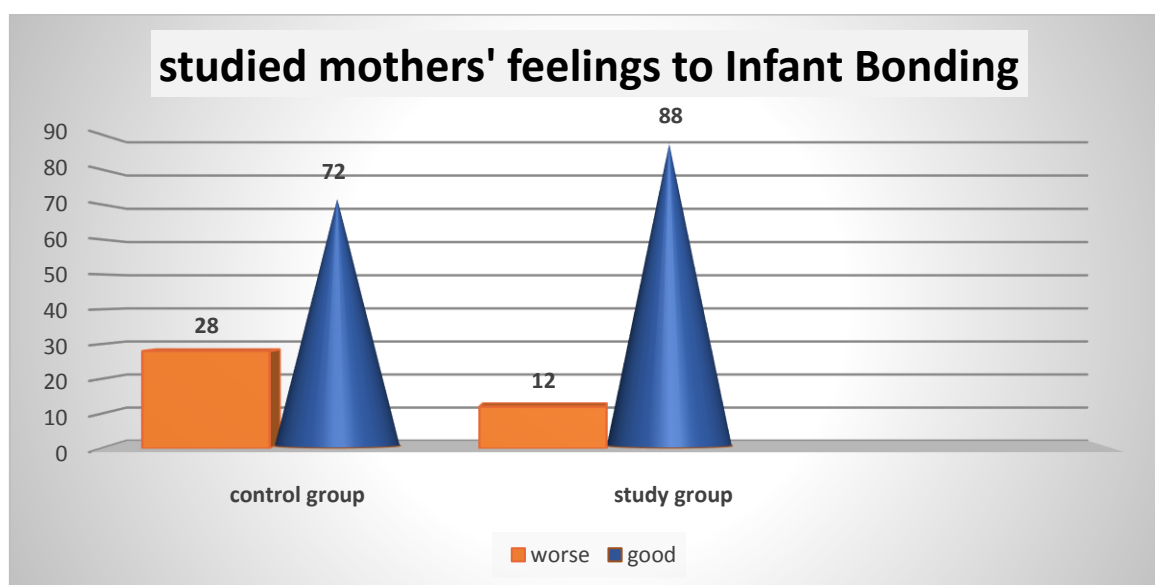
Figure 1: Distribution of total score level regarding breastfeeding initiation (study and control group).

Table (3): Distribution of Neonatal assessment at birth

The studied mothers (n=100)							
Study group (n=50)				Control group (n=50)			
Items		Study		Control		c <sup>2</sup>	P
		N	%	N	%		
<b>Apgar score:</b>	First minutes:					6.431	.092
	7	10	20	11	22		
	8	0	0	4	8		
	9	14	28	18	36		
	10	26	52	17	34		
	Fifth minutes					4.002	.147
	7	9	18	8	16		
	8	8	16	9	18		
	9	14	28	17	34		
	10	19	38	16	32		
<b>Gender of present baby:</b>	Male	28	56	38	76	4.456	.035
	Female	22	44	12	24		
<b>Successful breastfeeding:</b>	Yes	28	56	27	54	.040	.841
	No	22	44	23	46		

**Table (4): Total score of Postpartum Specific Anxiety Scale Research Short-Form Item (PSAS-RSF) for study and control group**

The studied mothers (n=100)					
Study group (n=50)		Control group (n=50)		c <sup>2</sup>	P
Total score	Study	Control			
Mild anxiety	20%	22%	53.278	.000	
Moderate anxiety	52%	30%			
Sever anxiety	28%	48%			

**Figure 2: Total score of studied mothers feeling regarding infant bonding****Table (5): Correlation between studied mothers' level of Postpartum Anxiety and their feelings to Infant Bonding**

The studied mothers (n=100)		
Mothers' feelings to Infant Bonding	mothers' level of Postpartum Anxiety	
	Study group (n=50)	Control group (n=50)
	R	P
	-.823	,000**

## Discussion

Kangaroo care, in which a mother places her newborn on her chest, has been shown to improve maternal-infant bonding, postpartum anxiety, and the infant's ability to respond to stimuli during early breastfeeding (Reshma et al., 2020). Studying how kangaroo care influences

psychological bonding, breastfeeding initiation, placental separation, and maternal anxiety in first-time mothers is the focus of this study.

### Regarding socio-demographic characteristics,

The current study's findings made it clear that no statistically significant differences existed

between the study and control groups. There was a statistically significant variation in degree of education across the samples used in this research. These results are crucial to the validity of this study since they rule out the existence of any confounding variables.

These findings were consistent with the findings of **Safari et al. (2018)** according to their research, both groups are very similar. Mothers' age and education levels, as well as their employment statuses, did not differ significantly between the two groups. In addition, there were no statistically significant differences between the study and control groups with respect to sociodemographic or obstetric history, as reported by **(Essa & Ismail, 2015)** in their study of 100 laboring women recruited at a labour and delivery unit of National Medical Institution in Damanhour, AL Behera Governorate, Egypt.

**Desoky and Metwally (2018)** found no statistically significant variations in demographics between the two groups, which is consistent with the findings of the current study, in terms of education, most women have only completed secondary school; the majority of them are stay-at-home moms and residents of rural areas where their income barely covers basic living costs.

**Regarding duration of third stage of labor,** in this study, there was a highly statistically significant difference. As more than half of the control group had duration from 11 to 15 minutes. Meanwhile, more than of the study group had duration less than 5 minutes. More than half of the study group & nearly three quarters of the control

group, the position of their uterus was below level of umbilicus. Meanwhile, more than three quarters of the study group & more than two thirds of the control group, uterus contracted immediately after using methergine. In addition to, most of the study group & more than three quarters of the control group, the condition of the uterus was not atonic.

Consistent with these findings, **Essa & Ismail (2015)** reported that all women in the study group had a contracted uterus immediately following birth, with a full placenta, no uterine atony, and no excessive blood loss, whereas only about two-thirds, three-quarters, and more than three-quarters of the control group did. The uterus was at or below the level of the umbilicus in nearly all of the study group, whereas in less than a quarter and in more than three quarters of the control group, respectively, methergine was not necessary. The majority of the study group had a successful first breastfeeding experience, but more than half of the control group did not ( $p .01$ ).

Consistent with these results, **Safari et al. (2018)** found that third-stage labour was considerably shorter for mothers who had used kangaroo care during their pregnancies. **Desoky and Metwally (2018)** also found a correlation between SSC and the time it took to deliver the placenta, so our findings corroborate their findings.

These findings also agreed with **Karimi et al., (2019)** who reported that much research on the effect of kangaroo care on the duration of the third stage of labor has been completed, but no meta-analysis has been done in this field. Among research investigated the effect of intervention on

the duration of the third stage of labor; **Sujatha & Saraswathi, (2021) & Morbaty, (2017)** who showed that kangaroo care diminishes the time of third stage of labor in the intervention group compared to the conventional care group.

Consistent with these findings, Abdelmenem et al.'s (2019) investigation of the impact of skin-to-skin contact on the length of the third stage of labour found that the intervention group experienced significantly shorter times to placental separation. This may be because, in the intervention group, mothers release more oxytocin, stimulating uterine contractions that aid in placenta separation and ejection.

Indeed, kangaroo care had no significant influence on placental separation time, as shown by a randomised controlled experiment titled "The effects of kangaroo care on the initiation of breastfeeding, placental separation, and maternal anxiety in primiparous mothers" conducted by El-Nagger et al. (2013).

**Regarding the infant initiation of breastfeeding**, Time to first feeding and total time spent breastfeeding were statistically different in highly significant ways. There was also a statistically significant difference in how women rated their initial breastfeeding experience, the success of their future breastfeeding attempts before to discharge, and their overall level of satisfaction. Possible causes include babies becoming more attuned to their mothers' physiological cues, mothers spending more time holding their babies, and babies learning to breastfeed for nutritional purposes. As a result, the

newborn becomes familiar with sucking from the breast and starts to do so. In addition, a pregnant woman's skin temperature mirrors that of her belly.

**Regarding distribution of neonatal assessment** at birth between the study & control groups. There was no statistically significant difference between study & control regarding the Apgar score at 1<sup>st</sup> & 5<sup>th</sup> minutes, gender of present baby & successful breastfeeding. Regarding the percent distribution of mother's level of skills about breastfeeding between the study and control groups, the current study clarified that mother's had very good skills about breast feeding among study & control groups.

The current study confirmed with **Essa & Ismail (2015)**, who found that majority of the study group had infant self-initiated breast attachment compared to less than half of the control group. All research group newborns finished their first nursing on their own, compared to less than half of the control group ( $p < 0.01$ ). The current study also confirmed with **Desoky & Metwally (2018)**, who found statistically significant differences between the kangaroo care and control groups on all breast feeding status measures. Thus, intervention group women were more likely to start breast-feeding sooner, breast-feed longer, and breast-feed successfully after placenta delivery or before discharge.

In the same direction, **Svensson et al. (2013)** in Stockholm, Sweden, found that healthy babies should stay in skin contact with their mothers after birth and throughout the postpartum period to avoid latching issues. Breastfeeding begins as the

infant's reflexes mature. From contrary point of view, **Carfoot et al. (2005)** found no statistical difference between the intervention group and controls in the north of England in early breast-feeding success.

**Regarding Psychological bonding** between the studied women and their newborns, this research confirmed that Kangaroo care has a positive effect on maternal-child attachment in first-time mothers. This may be because oxytocin and prolactin, two chemicals that help mothers and babies bond, are released more readily during kangaroo care. This is consistent with the findings of the study "Kangaroo mother care and neonatal outcomes" by **Boundy et al. (2016)**, which indicated that kangaroo care boosted bonding behaviours between mothers and their infants, such as gazing and smiling, compared to conventional care. **Freud. (2021)**, another study indicated that moms who used Kangaroo care had considerably higher levels of maternal connection and sensitivity than the control group. **Moore et al. (2016)** also conducted a systematic study and concluded that Kangaroo care helped mothers bond with their babies and had less anxiety.

Indeed, **El-Nagger et al. (2013)** in their randomized controlled trial "The effects of kangaroo care on the initiation of breastfeeding, placental separation, and maternal anxiety in primiparas mothers" found that kangaroo care had no significant effect on psychological bonding between mothers and their infants. The same results were found by **Córdova-Pérez et al (2021)**

that there was no significant effect on psychological bonding.

**For maternal anxiety**, in this study, Kangaroo care has been shown to reduce maternal anxiety among primiparas women. This could be because kangaroo care promotes feelings of intimacy and security between the mother and her newborn, which can help reduce anxiety. This result is similar to a study by **Freud. (2021)** found that kangaroo care significantly reduced maternal anxiety scores compared to traditional care. Also, a study by **Freud. (2021)** has the same results that kangaroo care significantly reduced maternal postpartum anxiety scores compared to traditional care. In addition to, a systematic review by **Moore et al. (2016)** found that Kangaroo care reduced maternal anxiety.

In the identical direction, A randomized controlled trial by **Kurt et al. (2020)** found that mothers who practiced Kangaroo care had significantly lower levels of anxiety compared to control group. In addition to **El-Nagger et al. (2013)** found that kangaroo care reduced maternal anxiety levels among primiparous women.

## Conclusion

Based on this study's results, Kangaroo care is proven as a simple and effective technique that produced many benefits for mother and child. These benefits represented in increased level of psychological bonding between mothers and their babies, early successful breastfeeding initiation, easily placental separation, and decreased level of maternal anxiety among primiparas women.

## Recommendations

Dissemination of the KMC applications in all hospitals

Raising the awareness about KMC between the nurses and physicians

In future investigations, researchers should try to gain a deeper understanding of the Kangaroo Care.

Increasing attention to interpretation and explanation in the educational curriculum for undergraduate and postgraduate students.

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