

## The Effectiveness of Kangaroo Technique on Preterm Baby Weight Gain

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**Abstract:** The aim of the study was to assess mother's perception about kangaroo technique, implement on hospitalized premature babies and evaluate the effectiveness of kangaroo technique on preterm babies weight gain. A quasi experimental design was used in this study. The study subjects consisted of two hundred (200) mothers divided into two identical groups. The studied group included mothers who applied the kangaroo technique, while those exposed to routine hospital care were consider a control. Data were collected through using pre-designed interviewing questionnaire to assess mothers and neonates characteristics, knowledge about kangaroo technique. An observational checklist was used to assess mothers' practices; towards application of kangaroo technique. This technique had been applied for the study group only. The result of the study revealed that there was a statistically significant difference in mother's knowledge and practices between both study and control groups after application of kangaroo technique with significant effects on preterm baby weight and attachment. The study concluded that application of kangaroo technique enhanced mother-child attachment and had positive effect on weight gain and possibility of early discharge from neonatal intensive care units (NICUs). Therefore, the study recommended the application of kangaroo technique for all low birth weight premature babies as part of the routine daily care to babies admitted to the neonatal intensive care units.

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**Keywords:** Kangaroo technique- Premature babies-Mother infant bonding-Duration of hospitalization- weight gain.

### 1. Introduction:

Kangaroo care is a technique practiced on newborn, usually preterm babies wherein the infant is held, skin-to-skin, with an adult. Kangaroo care for preterm babies may be restricted to a few hours per day, but if they are medically stable that time may be extended. Some parents may keep their babies in-arms for many hours per day. Kangaroo care, named for the similarity to how certain marsupials carry their young, was initially developed to care for preterm babies in areas where incubators are either unavailable or unreliable.<sup>[1]</sup> Kangaroo care seeks to provide restored closeness of the newborn with mother or father by placing the infant in direct skin-to-skin contact with one of them. This ensures physiological and psychological warmth and bonding. The kangaroo position provides ready access to nourishment. The parent's stable body temperature helps to regulate the neonate's temperature more smoothly than an incubator, and allows for readily accessible breastfeeding.<sup>[2]</sup>

Beginning kangaroo care within the first 2 hours after birth seems to be the most effective time period for successful breastfeeding. Many advocates of natural birth encourage immediate skin-to-skin contact between mother and baby after birth, with minimal disruption. Babies must be kept warm and dry. This method can be used continuously around the clock or for short periods per day gradually

increasing as tolerated for babies who are compromised by severe health problems. It can be started at birth or within hours, days, or weeks after birth. Proponents of kangaroo care encourage maintaining skin-to-skin contact method for about six weeks so that both baby and mother are established in breastfeeding and have achieved physiological recovery from the birth process.<sup>[3]</sup>

Kangaroo care is beneficial for parents because it promotes attachment and bonding, improves parental confidence, and helps to promote increased milk production and breastfeeding success.<sup>[2,4,5]</sup> Kangaroo care arguably offers the most benefits for preterm and low birth weight babies, who experience more normalized temperature, heart rate, and respiratory rate<sup>[6]</sup>, increased weight gain<sup>[7]</sup>, fewer nosomial infections and reduced incidence of respiratory tract disease.<sup>[5]</sup> Additionally, studies suggest that preterm babies who experience kangaroo care have improved cognitive development, decreased stress levels, reduced pain responses, normalized growth, and positive effects on motor development.<sup>[8,9,10]</sup> Kangaroo care also helps to improve sleep patterns of babies, and may be a good intervention for colic.<sup>[11]</sup> Earlier discharge from hospital is also a possible outcome.<sup>[12]</sup> Finally, kangaroo care helps to promote frequent breastfeeding, and can enhance mother-infant bonding.<sup>[13]</sup>

Kangaroo care often results in reduced hospital stays, reduced need for expensive healthcare technology, increased parental involvement and teaching opportunities, and better use of healthcare dollars. Overall, kangaroo care helps to reduce morbidity and mortality in developing countries, provides opportunities for teaching during postnatal follow-up visits, and decreases hospital-associated costs. <sup>[1]</sup>

The aim of the study is to:

- Assess mother's perception about kangaroo technique.
- Implement kangaroo technique on hospitalized premature newborns.
- Evaluate the effectiveness of kangaroo technique on mother-baby attachment and preterm baby weight gain.

## 2. Subjects and Methods:

Subjects and methods of this study are portrayed under four main topics as follows:

Technical design

Operational design

Administrative design

Statistical design

### I. Technical Design:

The technical design for the study includes research design, research settings, subjects and tools of data collection.

#### Research Design

A quasi experimental design was used in this study to help gaining information about the effect of kangaroo care on the neonate and the mother, and to compare control cases with experimental cases.

#### Research Settings:

The study was conducted in the NICUs at Maternity and Gynecological Hospital affiliated to Kasr El-Aini Teaching Hospital-Cairo University and Maternity and Gynecological Hospital affiliated to Ain Shams University Hospitals.

#### Subjects:

The study subjects consisted of two hundred (200) mothers and their preterm neonates. The subject was assigned randomly to two groups, the intervention (100 mothers & neonate pairs) and control (100 mothers & neonate pairs). The following were the inclusion criteria:

All premature babies weighing from 1.000 gm to 2.500 gm regardless the type of feeding.

Free from congenital anomalies, heart diseases, surgical problems, neonatal jaundice, hypoxic ischemic insult or large for gestational age.

Not on assisted ventilator support.

Mother which willing to participate in the study.

#### Tools of Data Collection:

Data were collected using the following tools:

1- An interviewing questionnaire: It was designed by the researcher and written in simple Arabic language. It is composed of the following parts to collect data in relation to:

Part I: Characteristics of the studied mothers including age, qualification, residence area, occupation and the history of previous pregnancies such as history of intrauterine fetal death, history of abortion or history of neonatal death.

Part II: Characteristics of the studied neonate including gender, gestational age, birth weight and ranking.

2- Mother's knowledge regarding to kangaroo technique:

It includes general knowledge about kangaroo, definition of kangaroo, and importance of kangaroo for the mothers and for the baby.

Questions were in the form of multiple choices. The time consumed to fill in the questionnaire by the researcher for each mother in study and control groups was 15-20 minutes.

The total score level for the questionnaire sheet was "100" marks.

- The mother's answer scores were categorized into either:

Score < 60: poor knowledge.

Score from 60 < 75: average knowledge.

Score 75 to 100: good knowledge.

3- Observational checklist:

An observation checklist for mother's kangaroo care practices was developed by the researcher to evaluate mother's skill for implementation of kangaroo care. This tool was developed by the researcher in form of steps and was conducted for each mother individually, in a pre-selected warm, calm environment. At the beginning a pre-test was conducted to assess the mother's knowledge and skills about the kangaroo care technique, followed by giving instruction and teaching about the Kangaroo technique, after explaining its purpose, benefits, effects on the neonate-mother bond and attachment; then the kangaroo care was applied for each baby after being sure that he/she is clinically stable. The observation checklist was used for four successive times weekly

for a month to insure accuracy mother's skill evaluation.

4- Monitoring preterm baby weight.

## II. Operational Design:

The operational design included preparatory phase, pilot study, and field work.

### Preparatory Phase

A review was done of the past and current available relevant literature, to cover the various aspects of the problem, and to design the study tools for data collection.

### Pilot Study

A pilot study was conducted on 10 premature neonates and their mothers to evaluate the content of questionnaire. The tool was tested on those premature and their mothers who fulfilled inclusion criteria. As a result of the pilot study there was a need to add control cases. Subjects who shared in the pilot study were excluded from the study main sample.

### Field work

Data were collected throughout one year period; data collection of this study was carried out from beginning of May 2005 to beginning of May 2006. The researcher was available daily from 9.00 am to 3.00 pm. Each mother delivering a neonate who was admitted to the NICU and fulfilling the inclusion criteria was interviewed individually and assessed using the previously mentioned study tools. The study groups were exposed to kangaroo care intervention while the control groups were exposed to routine hospital care.

## III. Administrative Design:

An official permission was obtained from chairman of the NICU to conduct this study.

### Ethical Consideration:

A verbal consent was obtained from mothers included with their babies in the kangaroo technique intervention. Those who refused, their babies were considered as control cases.

## IV. Statistical Design:

Data were revised, coded, tabulated and analyzed using numbers and percentage distribution and carried out in a PC computer.

The following statistical techniques were used:

Percentage.

Mean.

Standard deviation.

T- Test for quantity variables.

Chi-square ( $X^2$ ) for qualitative variables.

Paired t-test for comparison of paired two quantity variables.

### Significance of the Results:

When  $p > 0.05$  it is statistically insignificant difference.

When  $p < 0.05$  it is statistically significant difference.

When  $p < 0.01$  or  $p < 0.001$  it is high statistically significant difference.

## 3. Results:

Table (1) shows that, there was no statistically significant difference between the study and control groups by their total score level regarding to kangaroo care as  $X^2 = 2.9$  at  $p$ - level  $> 0.05$ .

Table (2) shows that, there was a statistically significant difference in weight change of the premature babies of the study subjects at the 2nd, 3rd, & 4th week (t-test = 11.766, 22.996 & 15.291 respectively at  $p = 0.000$ ).

Table (3) shows that there was a statistically significant difference in weight change of the premature babies of the study subjects at the 2nd, 3rd, & 4th week ( $t = 11.525, 16.399, & 19.772$  respectively at  $p = 0.000$ ).

Table (4) shows that, there was no statistically significant difference between the study and control groups regarding to their mean weight on admission (often one week), but after the first week, there was highly statistically significant difference in mean score for weight at  $p$  level  $< 0.0001$ .

**Table (1): Distribution of both Experimental and Control Groups by their Total Score Level Regarding to Kangaroo Care Technique.**

Item	Study		Control		$X^2$	P value
	No= 100	%	No= 100	%		
Good	7	7	2	2	2.9	$> 0.05$
Average	23	23	24	24		
Poor	70	70	74	74		

**Table (2): Weight Change in the Experimental Group from Week to Week.**

Study Group I	Weight Change		Paired t-test	
	Range	Mean±SD	t	P-value
After 1 <sup>st</sup> Week	120.00 - 200.00	149.40±13.05		
After 2 <sup>nd</sup> Week	140.00 - 205.00	166.50±13.27	-11.766	0.000
After 3 <sup>rd</sup> Week	160.00 - 210.00	184.60±10.77	-22.996	0.000
After 4 <sup>th</sup> Week	20.00 - 210.00	192.90±26.78	-15.291	0.000

**Table (3): Weight Gain for Control Group During the first 4 Weeks (n=100).**

Control Group II	weight Change		Paired t-test	
	Range	Mean±SD	t	P-value
After 1 <sup>st</sup> Week	40.00 - 150.00	69.40±23.15		
After 2 <sup>nd</sup> Week	60.00 - 130.00	93.47±21.23	-11.525	0.000
After 3 <sup>rd</sup> Week	70.00 - 140.00	110.10±16.30	-16.399	0.000
After 4 <sup>th</sup> Week	40.00 - 140.00	122.81±15.66	-19.772	0.000

**Table (4): Comparison between Experimental and Control Groups by their Weight Gain (n=200).**

Weight	Study group	Control group	T-test	
	Mean±SD	Mean±SD	t	P-value
On admission	1436.08±442.31	1436.08±442.31		
After 1 <sup>st</sup> measure	1336.20±416.51	1336.20±416.51		
After 1 <sup>st</sup> Week	1467.20±457.46	1405.60±421.56	0.990	0.323
After 2 <sup>nd</sup> Week	1655.50±416.92	1507.24±425.06	2.478	0.014
After 3 <sup>rd</sup> Week	1853.90±447.51	1625.83±427.77	3.645	0.000
After 4 <sup>th</sup> Week	2023.80±449.11	1748.65±428.77	4.384	0.000

#### 4. Discussion:

The results of applying kangaroo technique on knowledge and attachment, among both studied groups, showed that there were statistically insignificant difference between study and control groups as regards their knowledge related to concept of KC and its importance for the baby. However, the difference in knowledge in the study group pre and post kangaroo technique showed a highly statistically significant difference meaning that simple education for these mothers was very fruitful and had a positive impact on them.

Almost all the mothers in the study group had no information about kangaroo care techniques as in the pre intervention either they gave wrong answers or they had no answers about definition of KC and its importance for the mother and the baby. Accordingly there was highly statistically significant difference in comparison between pre and post practice assessment.

Analysis of the results of the mother-neonate attachment revealed that, there was highly statistically significant difference in the score obtained in the questionnaire before and after the

practicing of KC, this means that the attachment between the premature baby and his/her mother has significantly increased with the application of KC.

In a similar study, Wallace, and Marchall (2001), found that skin to skin contact between mother and newborn babies promotes maternal-neonate attachment. Similarly, Spanjer (2002) stated that KC increases togetherness, that which is far removed of the threat of separation, it provides a sense of containment and closeness, in addition mothers are more quickly adapted to the appearance of their babies, strengthening the mother confidence in gaining control over her emotions, her competencies in mothering skills and her perception of herself as a good mother.

Previously, Ludington-Hoe and Golant (1993) stated that, KC facilitates bonding, enhances warm melting and loving sensation that comes with bonding and the mother will sooner feel affectionate relationship.

Analysis of the results of the current study questionnaire showed that there was highly statistically difference in mothers' response in pre and post test of the study group, while there was no

difference in the control group. These results are explained by the fact that this difference before and after the practicing of KC is due to the effect of the procedure that lead to enhancing the attachment and bonding between the mother and the baby and increasing mothers knowledge about the benefits of KC.

The present study results revealed that weight of the premature neonates of the experimental group showed better increase from time of applying the technique, this is a definite proof that the kangaroo mother care was effective and improved the neonate feeding, mothers' milk production and provided easy accessibility to the mother breast.

Despite that the weight of neonates of the control group who did not practice the KC were increasing from week to week due to the normal growth of the neonate and the routine care provided in the NICU, yet there was a statistically significant change in the weight of the premature baby in the study group after the practice of KC compared to the control group. This finding is directly related to the effect of Kangaroo care that is believed to improve the neonate weight through increasing the milk production, and neonate accessibility to the breast, as demonstrated by (Padden, Glen and WHO 1997) which reported that, the kangaroo care leads to successful lactation because of increased hormonal and sensory stimulation of the mothers milk production, that causes increase in the neonate weight, and prevention of hypoglycemia.

### 5. Conclusion:

Based on the study findings it could be concluded that:

Mother's knowledge and practice towards kangaroo care technique had been improved after the implementation of the technique by the researcher. There was a highly statistically significant difference between the mean weight gain of the study group who received the kangaroo care by their own mothers and the control group who received the routine care of NICUs; with a direct proof to what extent the kangaroo care implementation had a positive effect on weight gain. The researcher detected to what extent the technique had increased the mothers and their neonatal attachment.

### Recommendations

The study recommends that:

Kangaroo care technique should be part of the routine care of all premature and, low birth weight babies admitted to NICUs.

An illustrated leaflet demonstrating step by step kangaroo care technique should be distributed to all neonatal intensive care units all over the country

to be followed by neonatal intensive care staff and should be adopted as a hospital protocol for neonatal care.

Training courses for health care providers on the importance and benefits of kangaroo care technique should be implemented on a wide scale.

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