

The Effectiveness of Kangaroo Technique on Preterm Infant's Weight Gain

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Abstract:

The aim of the study was to assess the effectiveness of kangaroo technique on preterm infant's weight gain. Research design: A quasi experimental design was used in this study. Settings: The study was conducted in two Neonatal Intensive Care Units (NICUs) at Maternity and Gynecology Hospital one affiliated to Cairo University and the second belonging to Ain Shams University hospitals. Subjects: A purposive sample consisted of one hundred (100) preterm infant and had eligible criteria for kangaroo care (KC). Fifty (50) preterm infant served as studied underwent KC by their own mothers and Fifty (50) preterm infant served as control who receive standard incubator care for preterm infant. Data were collected by using three tools; an interviewing questionnaire format was design to assess mothers' knowledge about kangaroo technique. Preterm infant file to identify eligible criteria for KC, monitoring the nonspecific anthropometric measurement (preterm infant body weight only) and recorded it per day, then calculate the weight gain per week and calculate every week for four successive weeks. The results of the study revealed that there was no statistically significant difference between the study and control groups regarding to their mean weight gain on admission, but after the first week, there was a highly statistically significant difference in mean weight gain between study and control groups. The study concluded that application of kangaroo technique by preterm infants' mothers and had positive effect on preterm infant's weight gain. Therefore, the study recommended the application of kangaroo technique for all preterm infants as part of the routine daily care to preterm infants admitted to the NICUs.

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Introduction:

'Preterm infants' refers to neonate born anytime before 37 weeks of gestational age.^[1] Preterm infants require special care in intensive care units, and may spend days or weeks in incubators, until their condition has clinically stabilized. Preterm infants have been traditionally separated from their mothers, receiving the required care in incubator at intensive care units and usually deprived of maternal contact^[2]

Kangaroo care is a technique practiced on newborn, usually preterm infants where in the infant is held, skin-to-skin, with an adult. Kangaroo care for preterm infants may be restricted to a few hours per day, but if the neonate is medically stable that time may be extended. Kangaroo care, named for the similarity to how certain marsupials carry their young, was initially developed to care for preterm infants in areas where incubators are either unavailable or unreliable.^[3]

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.^[4]

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 infant after birth, with minimal disruption. Infants 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 infants 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 infant and mother are established in breastfeeding and have achieved physiological recovery from the birth process.^[5]

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.^[4,6,7] Kangaroo care arguably offers the most benefits for preterm and low birth weight infants, who

experience more normalized temperature, heart rate, and respiratory rate^[8], increased weight gain^[9], fewer nosocomial infections and reduced incidence of respiratory tract disease.^[7] Additionally, studies suggest that preterm infants who experience kangaroo care have improved cognitive development, decreased stress levels, reduced pain responses, normalized growth, and positive effects on motor development.^[10,11,12] Meanwhile, it helps to improve sleep patterns of babies, and may be a good intervention for colic.^[13] Earlier discharge from hospital is also a possible outcome^[14] and it helps to promote frequent breastfeeding, and can enhance mother-infant bonding.^[15]

Significance of the study:

The practice of kangaroo care has evolved worldwide to be an intervention strategy in NICUs for premature neonates and their mothers. increased parental involvement and teaching opportunities.^[16] 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.^[3]

Aim of the study:

The aim of the study was to assess the effectiveness of kangaroo technique on preterm infant's weight gain.

Hypothesis:

There will be a statistical significant difference between the preterm infants who receive KC by their own mothers compared with preterm infants exposed to routine NICUs care regarding weight gain.

Subjects and Methods:

Research Design

A quasi experimental design was used in this study.

Research Settings:

The study was conducted in two Neonatal Intensive Care Units (NICUs) at Maternity and Gynecology Hospital one affiliated to Cairo University and the second belonging to Ain Shams University hospitals. The two settings were chosen for being highest admission rate for preterm infants in Cairo Governorate.

Subjects:

A purposive sample consisted of one hundred (100) preterm infants with mean birth weight was (1328.2±392.2), the mean gestational age was 36.65 week±2.66 and had eligible criteria for KC as

recorded in their file, birth weight appropriate for gestational age, no mechanical ventilator, no symptomatic sepsis, no hypothermia, cardiorespiratory stability and mother consent to participate in the study. Fifty (50) preterm infant underwent KC by their own mothers and Fifty (50) preterm infant served as control who receive standard incubator care for preterm infant. The (2) groups were matched for gender, birth weight, gestational age, and medical risk. No group difference was found in mode of delivery, Apgar score, and the amount of maternal milk for infant.

Tools of Data Collection:

Data were collected by using three tools:

I. An interviewing questionnaire, it consisted of two parts:

Part 1: It included demographic Characteristics of preterm infants such as gestational age, birth weight, as well as preterm infant's mothers' demographic characteristics such as age, educational level, and work state.

Part 2: It is concerned with preterm infant mother's knowledge about KC technique such as definition, its benefits for preterm, and how to perform.

Scoring system:

According to knowledge obtained from the mothers. Mothers' knowledge was scored and calculated using the model answer sheet prepared by the researchers. The total score level for the questionnaire sheet was "100" marks.

Score < 60: poor knowledge.

Score from 60 < 75: average knowledge.

Score 75 to 100: good knowledge.

II. Preterm infant file to identify eligible criteria for KC. As recorded by the NICU staff consultant and physician such as weight appropriate for gestational age, not undergoing to ventilator, no symptomatic sepsis, no hypothermia, cardiorespiratory stability and mother consent to participate in the study.

III. Monitoring the nonspecific anthropometric measurement in form of preterm infant's body weight only and recorded it per day, then calculate the weight gain per week and calculate every week for four successive weeks.

Tools had been validated by five expertise in the field in the final form of tool was obtained.

Pilot Study

A pilot study was conducted on 10 preterm infants who fulfilled eligible criteria and their mothers to evaluate the effectiveness of the application of KC technique as well as the questionnaire about KC. Based on the results of the

pilot study, some modifications and clarifications of some questions were done. Mothers who shared in the pilot study were excluded from the study sample.

Field work

The actual field work started from the beginning of May 2006 up to end of May 2007. The researchers were available in the study settings two days in the morning Saturday and Thursday and the four days afternoon. The in- born preterm infant with a birth weight from 13282.2 to less than 23500 gm. were examined for eligible criteria for KC. When eligibility criteria were met, the study was scheduled for the afternoon of the same day. It started by interviewing each mother on individual bases at the previous mentioned settings. The researcher started by introducing herself to each mother and giving the brief idea about the aim of the research and its components. Mothers' verbal consent was obtained. Each interviewing questionnaire was filled by the researchers and each mother interview lasted for 20 to 30 minutes, each mother was met by the researchers three times per day for one week, then every week for the other successive weeks.

Kangaroo care technique for each individualized mother was performed in the following phase:

Phase (1): Assessment phase: It was done for mothers having preterm infants in both studied and control group to assess their knowledge about KC technique to identify the mother's needs for KC application technique.

The general objective of KC to supply the preterm infant, mothers of the studied group with the essential knowledge and practice to perform KC technique effectively and efficiently.

Phase (2): Development phase: the content of KC technique was developed; it included the theoretical part about definition, its benefits for the preterm infants as well as the explanation step by step KC technique for the mother.

Phase (3): Implementation phase:

The aim of this phase was to implement the KC technique. Each mother in the studied group was met by the researchers separately at morning shift for explanation of KC benefit steps by steps demonstration how the mother can perform as well as mother consent to share in the study. Then researchers met the same mother at the same day in the afternoon shift 3PM to 6PM for KC demonstration for the eligible preterm infants. The researchers met each mother 3 times /week to be assure for continuation of KC application in absence of the researchers. Preterm infants' body weight measured in front of the mother and recorded.

Phase (4): Evaluation phase: The aim of this phase was to evaluate the effect of application of KC technique on preterm infants' weight gain.

The body weight for matched preterm infants in the studied group who received the KC by their own mothers at Cairo University was compared with preterm infants who received the routine NICU in Ain Shams University Hospital. The mean weight gains for the studied group/week were calculated for (4) successive weeks as well as the control group who received the routine NICU care. Comparison between two mean weight gain for studied and control was performed.

Administrative Design:

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

Ethical Consideration:

Approval of the ethical committee and administrative approval was obtained .A verbal consent was obtained from mothers included with their infants in the kangaroo technique intervention.

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- Test for quantity variables. Chi-square (X^2) was used 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.

Results:

Table (1) shows that, there was no statistically significant difference between the study and control groups by their total score level regarding knowledge about kangaroo care technique before the intervention as $X^2 = 2.9$ at p - level > 0.05 . But after intervention there was highly statistically significant difference between pre and post test for the studied group of mothers regarding mother's knowledge about kangaroo care as $X^2 = 21.3$ at p level < 0.001 .

Table (2) shows t-test comparing weight gain with time within preterm infants of the studied group at admission (W0), after one week (W1) 2nd (W2), 3rd (W3) and 4th week (W4) proved there was a

statistically significant difference between (W1-W0), (W2-W1), (W3-W2) and (W4-W3) which is 79.2, 89.6, 22.8, 31.2 respectively and between (W4-W0) $t=61.5$ at $p=0.0001$.

Table (3) shows t-test comparing weight gain with time within preterm infants of the control group between (W1-W0), (W2-W1), (W3-W2) and (W4-

W3) as well as between (W4- W0) $t=57.3$ at P level 0.0001.

Table (4) shows that, there was no statistically significant difference between the studied and control groups regarding to their mean weight on admission, but after the first to fourth week, there was highly statistically significant difference between weight gain (gm) as it was 723.6 ± 117.7 to 401 ± 68.7 respectively $t=32.2$ at $p < 0.0001$.

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

Knowledge Score	Study			Control			X ²	P value
	Good	Average	Poor	Good	Average	Poor		
Pre	7	23	70	2	24	74	2.9	>0.05
Post	90	8	2	2	24	74	21.	<0.001

Table (2): Comparing Weight Gain with Time within Studied Group from Week to Week (No. =50).

Studied Group I	Weight Gain(gm)		Paired t-test	
	Mean±SD	SEM	t	P-value
W1-W0	151.0±19.1	1.9	79.2	0.000
W2-W1	168.3±18.8	1.9	89.6	0.000
W3-W2	198.4±87.1	8.7	22.8	0.000
W4-W3	205.9 ±65.9	6.6	31.2	0.000
W4-W0	723.6 ±117.7	11.8	61.5	0.000

Table (3): Comparing Weight Gain with Time within Control Group from Week to Week (No. =50).

Control Group II	weight Gain(gm)		Paired t-test	
	Mean±SD	SEM	t	P-value
W1-W0	71.2±25	2.5	28.5	0.000
W2-W1	94.3±22.8	2.3	41.0	0.000
W3-W2	110±9	1.9	58.9	0.000
W4-W3	123±18.3	4.4	66.0	0.000
W4-W0	401±68.7	7.0	57.3	0.000

Table (4): Comparison between Studied and Control Groups by their Weight Gain (No. =100).

Weight	Mean±SD	Difference of means	P-value
(W4-W0) Study group (50)	723.6 ±117.7	321.8	0.000
Control group (50)	401±68.7		

Discussion:

Childbirth has a significant effect on the social, psychological, and physical wellbeing of women and their families, so the role of the nurses is to support women during this period of adaptation, promote health, and minimize the consequences when preterm neonate is delivered.^[4,17]

The results of applying kangaroo technique on knowledge, of studied group, showed that there was statistically significant difference between pre and post intervention regarding to mothers' knowledge related to kangaroo care techniques. The mothers in the study group had no information about kangaroo care techniques as in the pre intervention either they gave wrong answers or had no answers about definition of KC and its importance for the mother and for the infant. However, the difference in knowledge in the study group pre and post practice assessment showed a highly statistically significant difference. These results are explained by the fact that this difference before and after the practicing of KC is due to the effect of the application of KC procedure that lead to enhancing the attachment and bonding between the mother and the neonate and increasing mothers knowledge about the benefits of KC. This may be due to simple education for those mothers was very fruitful and had a positive impact on the application of KC.

The present study results revealed that body weight of the premature neonates of the studied 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. This results similar 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^[18] 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.

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 difference in the weight of the premature infant in the

study group after the practice of KC compared to the control group.

In a similar study,^[19] found that skin to skin contact between mother and newborn promotes maternal-neonate attachment. Similarly,^[20-21] 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.

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 researchers. There was a highly statistically significant difference between the mean weight gain of the study group who received the kC by their own mothers and the control group who received the routine care of NICUs; with a direct proof to what extent the kC implementation had a positive effect on weight gain. The researchers detected to what extent the technique had increased the mothers and their neonatal attachment.

Recommendations

The study recommended 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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