

The effect of kangaroo care on fathers' attachment levels and their participation in baby care.

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Abstract

This is a quasi-experimental study conducted to evaluate fathers' attachment levels to their infants and their participation in baby care. The study was conducted between February 1st, 2019 and March 31, 2019 with 106 fathers in the postpartum clinics of an A-II type state hospital in Kahramanmaraş, Turkey. The inclusion, exclusion and matching criteria were taken into consideration in selecting the study sample. Data were obtained from the experimental group using the father information form, paternal-infant attachment scale, father's participation in baby care evaluation form, father's kangaroo care application schedule, fathers' participation in newborn care schedule, and kangaroo care application training brochure. Data were obtained from the control group using the father information form, paternal-infant attachment scale, father's participation in baby care evaluation form, and fathers' participation in newborn care schedule. For statistical analysis, the NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) was used.

The suitability of the quantitative data for normal distribution was tested with the Shapiro-Wilk test and graphical analysis. Student-t test was used for comparison between normal and quantitative variables and Mann-Whitney U test was used for comparisons between non-normal distribution and quantitative variables. Wilcoxon signed-ranks test was used for intra-group comparisons of quantitative variables that were not normally distributed. Chi-Square test and Fisher exact test were also used in the comparisons. Spearman correlation analysis was used to evaluate the relationships between quantitative variables. In the comparisons, the confidence interval was 95% and statistical significance was taken as $p < 0.05$.

The study found that kangaroo care increased the attachment level of fathers and their participation in baby care. As the participation level of fathers in baby care increases the level of father-baby attachment increases too. Although not all the fathers in the experimental group did provide kangaroo care for fourteen days, the number of fathers who participated in kangaroo care was high and the fathers performed kangaroo care for 57 ± 9.6 min. In the study, fathers who had first paternity experience and who did not participate in infant care had the highest "watching the baby sleep", "talking to baby", "being able to comfort the baby when it cries" and "supporting mother's breastfeeding" practices in the care of the newborn. Fathers did not perform "ear care". Nurses can practice kangaroo care with fathers. Care protocols, guidelines and institutional policies related to fathers' kangaroo care and baby care practices can be developed. Nurses are advised to inform fathers about the care of the newborn. The use of ASM is recommended for fathers' participation in baby care evaluation form to monitor the newborn.

Keywords: Neonatal nursing, Neonatal care, Parental participation, Paternity role, Kangaroo care, Attachment.

Introduction

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Description and importance of the problem

Being a bio-psycho-socio-cultural entity, human sustains life in interaction with a biological, physical and social environment. These interactions may cause to physiological and psychological changes to ensure homeostasis [1]. Paternal physiology has various hormones affecting fathers' paternity behaviors. After baby is born, prolactin level of father's increases and their paternal behaviors come out. The related

literature discusses that paternal behavior is increased by estrogen, decreased by stimulation of progesterone receptors, generally decreased by testosterone, prolactin levels increase a day after when fathers do not see their children, and their levels of oxytocin are related to the time spent with the baby [2]. A study found that testosterone and Luteinizing Hormone (LH) levels in men who are married and have children and take part in the care of their children are lower than fathers who do not take part in child care [3]. One important component of

children's micro systems is father. Paternal behaviors and factors directly affect children. In the traditional framework, fathers are those who earn a livelihood, follow strict discipline and sometimes is a playmate, yet help the mother more when they participate in child's care and are less sensitive to the signs of the baby regarding their needs [4]. Today, changing conditions have altered father's role to be more active in the care, education and life of the child. Good paternity is associated with a father who is more engaged with his child's life. Although mothers are more active in raising children, fathers have taken on more responsibilities in this [5].

In recent years, intimacy between fathers and children has increased. This intimacy is affected by important factors such as father's attitudes towards gender roles, education, age, psychological characteristics, relationship with his father, mother's attitudes, mother's employment status, marital relationship, child's age and gender [6]. The emotional, cognitive and social skills of children who have been in contact with their father from the first days of their infancy are stronger compared to other children, and fathers' interest in their children has a positive effect on their happiness and mental health [7,8].

Fathers should be involved in all activities regarding child care within a year so as to establish a good attachment between them and their babies [9]. Considering the effects of father-child interaction, it is remarkable that kangaroo care, one of the applications that ensure such interaction, and its effect on fathers' attachment to their babies and indirectly on the father's participation in baby care.

Participation of father in cases when there are no supportive people and mother has postpartum problems is important to ensure baby's needs, support adaptation process, and take on various responsibilities for the baby not to get stressed during mother's recovery period. Thus, it is a vital problem for parent-child health that fathers do not apply kangaroo care and do not participate in baby care.

Because mother is the first one to provide care to and meet the needs of the baby and due to the difficulties of reaching to fathers during the research, the majority of studies have focused on the mother-child relationship and the father-child relationship remains in the background [7]. There are very few studies in nursing literature investigating the kangaroo care of fathers the effect of this care on fathers' participation in baby care and their attachment to their babies.

Considering the hypotheses of the study, nursing care may support continuous use of kangaroo care in families and affect participation of fathers in baby care. The information obtained from this study is important in terms of the improvement of nursing science.

Description of kangaroo care

Kangaroo care, an important part of family-centered care, is applied to preterm or term infants, provides interaction between the parent and the baby, and is a method that ensures skin-to-skin contact by placing the baby, with a diaper only, on the parent's chest in an upright position [10,11]. This is called as kangaroo care because it recalls the way kangaroos deal with their offspring [12].

The effects of kangaroo care on infants

The studies in the related literature stated that kangaroo care decreases the neonatal mortality rate, increases breastfeeding of infants, prevents hypoglycemia and contributes to growth and development rates. Furthermore, heart rate, respiratory rate and body temperature of infants receiving kangaroo care are stabilized and the metabolic adaptation process is accelerated. These studies identified that infants who were provided kangaroo care by their parents cried less, fell asleep quicker, slept for longer hours, were calmer, and had shorter periods of unrest. Moreover, fear and anxiety rates of infants receiving kangaroo care from their parents were lower [13]. Evidence from the literature made this care technique be approved and supported by parents and health care personnel to optimize rest and sleep of infants [14]. Kangaroo care reduces the length of hospital stay of the preterm low birth weight newborns and those who receive kangaroo care start to suck mother's milk in a shorter time than compared to those who do not receive it [15]. According to Derebent et al. infants who received kangaroo care during blood collection from premature newborns hospitalized in the neonatal intensive care unit felt less pain during the invasive procedure and the premature infant pain profile score was lower [12,16].

These results show that kangaroo care is an effective method for reducing pain in invasive interventions [16,12]. As stated by Yildirim, the study conducted by Hall et al. indicated that kangaroo care has beneficial effects against infection. Kangaroo care was found to significantly reduce some infections such as pneumonia, septicemia, etc. Similarly, nosocomial infections were also reduced [15].

According to Ahn et al. kangaroo care has beneficial effects to the growth and maternal attachment of premature infants [17,18]. Intimacy in the first days of life is also effective in the first year of the infant and forms the basis of personality and self-development. In particular, education type in the first 18 months, child's growth type, and emotional interaction established with the infant are very effective in his/her future personality development.

Psycho-social task of infants in the first year of their life is to learn to trust. Infants who begin to communicate with their parents in earlier period after birth and grow with this communication can trust both themselves and others readily [19].

Aim of the Study

This quasi-experimental study was conducted to evaluate attachment levels to their infants and baby care participation of fathers who received and applied kangaroo care on infants born in a public hospital.

Research hypotheses

H1: Fathers who receive and apply kangaroo care at hospital continue this care at home after hospital discharge.

H2: Attachment levels of fathers in the experimental group, who received training of and applied kangaroo care to their infants, is higher than those of fathers in the control group.

H3: Participation rate of fathers in the experimental group, who received training of and applied kangaroo care to their infants, is higher than that of fathers in the control group.

Materials and Methods

Type of research

This quasi-experimental study used pre and post-test to evaluate attachment levels to their infants and baby care participation of fathers who received and applied kangaroo care for the term newborn.

Setting and time period of the study

This study was carried out in a public hospital with 74 beds between February 1, 2019 and March 31, 2019. The hospital is a baby-friendly hospital. The infants stay in their own beds next to mother's bed and fathers can easily communicate with the mother and baby. When the infants are in the care room, fathers can meet them through the appointments made. Although the hospital supports kangaroo care, this is not included in the routine program.

Population and sample of the study

Fathers of the term infants (gestational age 40 ± 2 weeks) in the hospital where the study was conducted were included as the study population. Review of the hospital's data of the year 2017 showed that 8517 births happened that year, of them 8336 were delivered by Turkish citizens and 3181 were delivered by foreigners. The sample of the study was calculated according to the common sampling formula in light of this information. The sample was selected from the population considering the inclusion, exclusion and matching criteria. First the experimental group and then the control group were included in the study as the both groups were in the same environment, the parents could see each other, have interaction and be influenced by one another.

Fathers who showed similar characteristics to those of the experimental group (the state of taking a paternity leave, father's educational status, mother's educational status and age) based on matching criteria were taken into the control group. According to the known sampling calculation formula; $Nt2pqn=d2(N-1)+t2pq$ N:number of individuals in the population, n:number of individuals to be included in the sample, p:prevalence of the event to be analyzed, q=frequency of non-occurrence of the event to be analyzed, t:theoretical value found in the t table at a certain degree of freedom and the detected error level, d:desired to be done based on the prevalence of the event+deviation t:1.96.

Inclusion, exclusion and matching criteria: Inclusion Criteria for Infants

1. Born at term (gestational age 40 ± 2 weeks)
2. Being a healthy newborn
3. Being in postpartum clinics

4. Having a stable general condition after the second reactive period

Inclusion criteria for fathers

1. Having a baby for the first time
2. Being at least primary school graduate
3. The presence of family elders or relatives providing baby care
4. Father's daytime work
5. Spouse's postpartum good general condition

Exclusion criteria for fathers

1. Having no biological child
2. Being a foreigner or an immigrant
3. Having a health problem that may hinder participation in the study
4. Previous participation in baby care
5. Father's working more than 10 hours a day

Matching criteria for the experimental and control groups

1. The use of paternity leave
2. Father's educational status
3. Age
4. Mother's educational status

Dependent, independent and external variables of the study: Dependent Variable-correlation between fathers' scores from participation in baby care and father-infant attachment levels, and between attachment levels and scores from participation in baby care.

Independent variable: Kangaroo care

External variables: Father's educational status, daily working hours, age, spouse's age, spouse's educational status, family structure, income status, infant's type of delivery, infant's gender, planned pregnancy, participation in domestic affairs, spouse's breastfeeding.

Data collection tools:

1. Father information form consists of 12 questions, including socio-demographic information prepared by the researcher.
2. Paternal-infant attachment scale: The 19-items original form was developed by Condon et al. [20], and its Turkish adaptation was done by Güleç [21] to determine postpartum attachment of father and infant.
3. Fathers' participation in baby care evaluation form: In this study, Cronbach's alpha value of the fathers' participation in baby care evaluation form was $\alpha=0.988$ in the pre-test and $\alpha=0.985$ in the post-test.

4. Fathers' kangaroo care practice chart: This is a fourteen-day kangaroo care chart prepared for fathers. It includes sections indicating whether fathers provided kangaroo care,

and if yes, how many hours they provided care. It was determined how many times fathers in the experimental group provided the fourteen-day kangaroo care and the number of days was determined and evaluated.

5. Fathers' participation in neonatal care chart: This is a fourteen-day baby care participation chart prepared for fathers. This includes skin care, oral care, eye care, nose care, ear care, belly care, bottom care, flatulence, hand and foot care, changing clothes, talking to the baby, watching the baby while sleeping, relieving the baby when crying, nutrition, supporting the mother's breastfeeding, 44 (???) changing position of the baby, taking care of the baby during waking at night.

6. Kangaroo care practice education brochure: This is an education brochure indicating how fathers should provide kangaroo care and the points to be considered during the care.

Implementation of data collection tools:

1. First step: After the convenience of the father and baby to the desired inclusion and exclusion criteria was evaluated, 53 voluntary fathers were included in the experimental group and again after the same evaluation, 53 voluntary fathers were included in the control group.

2. Second step: Pre-test was administered to the groups using the father information form, Paternal-Infant Attachment Scale (PIAS) and fathers' participation in baby care evaluation form.

3. Third step: The experimental group was instructed with kangaroo care and care was planned, administered and evaluated. The kangaroo care training brochure, the kangaroo care chart to mark when they provided care and their participation chart in baby care were given to the fathers. When the baby entered the first resting period and slept, father provided kangaroo care. After the kangaroo care, feeding the baby and the baby had the first sleep; at least 1 hour interval kangaroo care was administered in accordance with the literature in the second reactive period. Until being discharged, the fathers were supported in providing kangaroo care. The control group did not receive kangaroo care training, did not provide kangaroo care, and 45 of them were given fathers' participation in neonatal care chart to mark it when they participate. Because the kangaroo care was supported in the clinic, it was designed that if a father in the control group received kangaroo care, this father would be excluded from the sample. No father was excluded from the sample because none of them provided kangaroo care.

4. Fourth step: After hospital discharge, the care provided by both parents to their baby continued through interviews on phone. Every week, the parents were called and asked whether the fathers in the control group provided kangaroo care and the charts were marked or not.

5. Fifth step: At the end of the second week, the parents were called and meetings were planned. They were met either at home or hospital to collect the fathers' participation in neonatal care charts from the control group and the kangaroo care practice chart and the fathers' participation in neonatal care charts from the experimental group. Later on, a post-test was

made on PIAS and fathers' participation in baby care evaluation form. After the post-test, information about kangaroo care and its education brochure were given to the control group to ensure their participation in the care.

Data Analysis

For the statistical analyses, Number Cruncher Statistical System (NCSS) 2007 software (Kaysville, Utah, USA) was used. To analyze the data, descriptive statistical methods (mean, standard deviation, median, frequency, and percentage, minimum, maximum) were used. Correspondence of quantitative data to normal distribution was tested using the Shapiro-Wilk test and graphical analyses. The student t-test was used in the comparisons of quantitative variables that showed normal distribution between two groups, and the Mann-Whitney U test was used for quantitative variables that did not show normal distribution. Chi-square and Fisher exact tests were used in the comparisons. Intra-group comparisons of the non-normally distributed quantitative data, the Wilcoxon signed ranks test was used. The Pearson correlation analysis was used to evaluate the correlations between quantitative variables. In the comparisons, the confidence interval was 95% and the significance was taken as $p < 0.05$.

Research Ethics

To conduct the study, research ethics committee approval was obtained from a university and institutional permission was obtained from the ministry of health local health authority. The Helsinki declaration of human rights was adhered.

Findings

This study was conducted with 106 participants in total, being the experimental group ($n=53$) who had a baby born in term for the first time and met the inclusion criteria and the control group ($n=53$). Fathers' age, working hours, educational status, spouse's age, and spouse's educational status were similar in both groups. Both groups had nuclear family, moderate income level and did not participate in domestic affairs. In both groups, there were mothers who breastfed their babies voluntarily mostly, who breastfed involuntarily, who did not breastfeed voluntarily and who did not breastfeed involuntarily, respectively.

There were vaginal deliveries mostly in the experimental group, while there were cesarean deliveries mostly in the control group. Most fathers in the experimental group had a daughter and fathers in the control group had a son. Pregnancy in the experimental group was mostly unplanned, while it was mostly planned in the control group. There was no significant difference between the groups' age, daily working hours, spouse's age, educational status, spouse's educational status, family structure, and economic status ($p > 0.05$). Infant's gender, participation in domestic affairs and spouse's breastfeeding did not significantly differ between the groups ($p > 0.05$).

Vaginal delivery was significantly higher in the experimental group and cesarean delivery was significantly higher in the

control group ($p < 0.05$). Unplanned pregnancy in the experimental group and planned pregnancy in the control group dominated ($p < 0.05$). In the experimental group, on average, an increase of 4.98 ± 2.96 in the reconciliation and tolerance, an increase of 10.78 ± 3.86 in the pleasure in interaction, and an increase of 3.03 ± 1.89 in the love and pride subscale scores were statistically significant. In the control group, on average, an increase of 3.90 ± 3.38 in the reconciliation and tolerance, an increase of 6.77 ± 4.35 in the pleasure in interaction, and an increase of 2.75 ± 2.08 in the love and pride subscale scores were statistically significant.

The change in the post-test reconciliation and tolerance, and pleasure in interaction subscales scores of the experimental group compared to the pre-test was significantly higher than the control group, whereas there was no significant difference between the changes in the love and pride subscale. The scores of the experimental group from PIAS were found to be higher, but there was no significant difference compared to the control group ($p = 0.054$; $p > 0.05$). The average increase of 18.79 ± 7.12 in the post-test scale score of the experimental group compared to the pre-test was significant ($p = 0.001$; $p < 0.01$). The average increase 13.42 ± 7.76 in the post-test scale score of the control group compared to the pre-test was significant ($p = 0.001$; $p < 0.01$). The difference in the post-test total score of the experimental group compared to the pre-test score was significantly higher than in the control group ($p = 0.001$; $p < 0.01$).

While there was no significant difference between the pre-test answers of the groups for the items "I feel anger when I deal with the baby", "I feel that the baby sours when I deal with it", "I feel bored when I deal with the baby", "My interaction with the baby, more than any other fathers, is...", "I try to take part in baby care", "When I have to leave the baby, I...", "Getting satisfaction with being with the baby", "My feelings about coming together when I stay away...", "I found myself looking at the sleeping baby in the past three months", and "My times with the baby", there were significant differences in the post-test between them.

There was a significant difference between the answers of the groups for the items "My feelings about the baby for the last two weeks...", "I feel proud when I am with my baby", "I find myself talking about the baby with others", "I find myself thinking about the baby when I am away", and "I think I have not made time for myself for the last three months" and between their pre-test and post-test. While there was no significant difference in the post-test between the groups, there was a significant difference in the pre-test between their answers to the item "When I think about the things I gave up for the baby...".

In the pre-test total scores of both groups, the fathers' scores ranged between 15.2 and 40 points from the reconciliation and tolerance subscale and the mean was 30.92 ± 4.39 . Their scores from the pleasure in interaction subscale ranged between 11.3 and 30.3 and the mean was 18.24 ± 4.25 . Their scores from the love and pride subscale ranged between 5 and 15 and the mean was 10.35 ± 2.42 . Their scores from the scale total ranged between 36.1 and 83.9 and the mean score was 59.52 ± 9.78 . Internal consistency of the reconciliation and tolerance subscale was quite reliable with $\alpha = 0.760$, the pleasure in interaction subscale was quite reliable with $\alpha = 0.710$, the love and pride subscale was quite reliable with $\alpha = 0.660$, and the scale total was highly reliable with $\alpha = 0.873$. In the post-test total scores of both groups, the fathers' scores ranged between 25.1 and 40 points from the reconciliation and tolerance subscale and the mean was 35.37 ± 3.70 .

Their scores from the pleasure in interaction subscale ranged between 14.3 and 35 and the mean was 27.01 ± 5.86 . Their scores from the love and pride subscale ranged between 8.6 and 15 and the mean was 13.24 ± 1.81 .

Their scores from the scale total ranged between 49.4 and 90 and the mean score was 75.62 ± 10.57 . Internal consistency of the reconciliation and tolerance subscale was quite reliable with $\alpha = 0.711$, the pleasure in interaction subscale was highly reliable with $\alpha = 0.886$, the love and pride subscale was quite reliable with $\alpha = 0.649$, and the scale total was highly reliable with $\alpha = 0.914$ (Table 1).

Fathers' scores from participation in neonatal care chart		Total (n=106)		Test value
		Experimental group (n=53)	Control group (n=53)	p
Pre-test	Min-Max (Median)	19-114 (68)	12-125 (77)	Z : 1.155
	Mean \pm SD	68.72 \pm 29.19	75.23 \pm 31.11	b0.248
Post-test	Min-Max (Median)	40-137 (112)	26-132 (108)	Z :- 1.888
	Mean \pm SD	107.30 \pm 19.26	93.26 \pm 30.35	b0.059
	Difference	38.58 \pm 27.11	18.04 \pm 19.43	Z :- 3.939
	p	c0.001**	c0.001**	b0.001**

Table 1. Evaluation of the scores of fathers' participation in baby care from the pre-test and post-test according to the groups.

There was no statistically significant difference between fathers' scores in both groups from participation in neonatal care in the pre-test ($p > 0.05$). The post-test scores of the experimental group from fathers' participation in baby care

were found to be higher, but there was no significant difference compared to the control group ($p = 0.059$; $p > 0.05$). The mean increase of 38.58 ± 27.11 in the post-test scale total score of the experimental group compared to the pre-test and the mean

increase of 18.04 ± 19.43 in the post-test scale total score of the control group compared to the pre-test were statistically significant. The difference in the post-test total score of the experimental group compared to the pre-test score was significantly higher than in the control group ($p=0.001$; $p<0.01$) (Table 1).

In the pre-test, fathers responded “I can’t” to the items “Cutting and maintaining nails and toenails of my baby”, “Choosing the best clothing for my baby”, “Changing and following up the position of my baby so that it doesn’t stay in the same position”, “Monitoring the baby for its sleep/awakening pattern, sleep quality and problems it may experience when sleeping”, and they responded “I ask for help of my spouse/family elders/caregiver” for the items “Monitoring vitamin D support, vaccines and screening tests during the neonatal period of my baby”, “Observing the symptoms of illness and discomfort of my baby”, “Monitoring the growth and development of my baby”, “Taking baby to a physician when it is sick”, “Taking the baby to a health care professional (physician, nurse, midwife, etc.) for care and health when needed”, and “Making a decision on any matter related to my baby”, which showed similarity. In the post-test, they provided different answers responding “I ask for help of my spouse/family elders/caregiver” and “I do it on my own” for the item “Changing and following up the position of my baby so that it doesn’t stay in the same position”; “I ask for help of my spouse/family elders/caregiver” for the item “Monitoring vitamin D support, vaccines and screening tests during the neonatal period of my baby”; “I ask for help of my spouse/family elders/caregiver” for the item “Observing the symptoms of illness and discomfort of my baby”; “I do it on my own” for the item “Holding and carrying the baby”; “I do it on my own” and “I ask for help of my spouse/family elders/caregiver” for the item “Showing comforting behaviors and soothing my baby when it cries”; “I do it on my own” to the item “Taking the time to take care of my baby and talk to it”; “I do it on my own” and “I ask for help of my spouse/family elders/caregiver” for the item “Taking baby to a physician when it is sick”. They responded “I ask for help of my spouse/family elders/caregiver” for other items. Furthermore, the number of fathers in the control group exceeded the number of fathers in the experimental group.

In the post-test, there were differences between fathers in both groups regarding the items “its cleanliness when I see my baby’s skin is dirty”, “its cleanliness and care when I see any change in the mouth and tongue of my baby”, “its cleanliness and care when I see any change in my baby’s eyes”, “its cleanliness and care when I see any change in my baby’s nose”, “its cleanliness and care when I see any change in my baby’s ears”, “its cleanliness and care when I see any change in my baby’s belly”, “diaper change”, “controlling it when I see a change in my baby’s belly”, “relieving my baby’s gas”, “preparing the baby for a bath”, “my baby’s bath”, “after-bath care for my baby”, “body temperature control of my baby”, “cutting and maintaining my baby’s nails and toenails”, “choosing the best clothing for my baby”, “controlling the comfort and the clothes of my baby”, “changing clothes on my baby”, “preparing the baby formula or breast milk stored in the freezer to feed my baby” and “feeding my baby with the prepared formula or breast milk”. In the experimental group, the response rate of “I do it with the help of my relatives” was higher than the control group. There was a significant difference in the post-test between the groups regarding the item “changing and following up the position of my baby so that it doesn’t stay in the same position”. The response rate of “I do it with the help of my relatives” was higher in the experimental group and the response “I do it on my own” in the control group. In the pre-test, there was a significant difference between the groups regarding the items “holding and carrying the baby”, “Showing comforting behaviors and soothing my baby when it cries”, “taking the time to take care of my baby and talk to it”, “taking the baby to a health care professional (physician, nurse, midwife, etc.) for care and health when needed”, and “making a decision on any matter related to my baby”.

The answer “I can’t do” was higher in experimental group than the control group. However, there was no significant difference between the groups in the post-test. There was a significant difference between the groups regarding the item “taking the baby to a physician when it is sick”. The response rate of “I do it on my own” was significantly higher in the experimental group than the control group (Table 2).

Evaluation form total score of fathers' participation in baby care		Pre-test	Post-test
Experimental group	Number of Items	36	36
	Min-Max (Median)	19-114 (68)	40-137 (112)
	Mean \pm SD	68.72 \pm 29.19	107.30 \pm 19.26
	Cronbach's alpha	0.992	0.982
Control group	Min-Max (Median)	12-125 (77)	26-132 (108)
	Mean \pm SD	75.23 \pm 31.11	93.26 \pm 30.35
	Cronbach's alpha	0.985	0.985
Total	Min-Max (Median)	12-125 (72.5)	26-137 (111.5)
	Mean \pm SD	71.97 \pm 30.20	100.28 \pm 26.26
	Cronbach's alpha	0.988	0.985

Table 2. Evaluation form total score distribution of fathers' participation in baby care from the pre-test and post-test in the experimental and control groups and evaluation of their internal consistency.

The total score from the pre-test father's participation in baby care evaluation form ranged from 12 to 125 in the experimental group and the mean score was 71.97 ± 30.20 .

Internal consistency of the scale was highly reliable with $\alpha=0.988$.

The total score from the post-test father's participation in baby care evaluation form ranged from 26 to 137 and the mean score was 100.28 ± 26.26 . Internal consistency of the scale was highly reliable with $\alpha=0.985$ (Table 2).

All fathers provided kangaroo care at a rate of 88.27% (n=655) in total for 14 days, while 11.73% (n=87) of the care was not performed. Fathers provided kangaroo care for 14 days for at least 54 ± 12 minutes a day and 59.4 ± 7.2 minutes at most and 57 ± 9.6 minutes on average.

All fathers in the experimental group (n=53) provided kangaroo care on the 1st day with Mean \pm SD of 55.2 ± 10.8 minutes and 96.2% of them (n= 51) on the 14th day with Mean \pm SD of 59.4 ± 7.2 minutes. The number of neonatal care that fathers participated was higher in the experimental group than the control group.

There was a positive and significant correlation between the number of fathers' participating in baby care and the scores they obtained from the reconciliation and tolerance subscale of the PIAS (as the number of participation increased, the reconciliation and tolerance scores increased) with a weak correlation of 0.308 in the experimental group and a moderate correlation of 0.431 in the control group.

Their scores from the pleasure in interaction subscale showed a positive correlation (as the number of participation increased, their score from the related subscale increased) with 0.465 in the experimental group and 0.573 in the control group.

There was a positive correlation in their love and pride subscale scores (as the number of participation increased, their score from the related subscale increased) with a weak correlation of 0.355 in the experimental group and a moderate correlation of 0.404 in the control group.

Considering the number of fathers participating in baby care and their scores from the PIAS, the positive correlation (as the number of participation increased, the total scale score increased) was moderate in the experimental group with 0.457 and moderate in the control group with 0.547.

There was no significant correlation between the number of fathers participating in baby care in the experimental group on the 1st day to 4th day.

There was a positive and weak correlation between the number of fathers participating in baby care in the experimental group (as the number of participation increased, the number of neonatal care participation increased) and the number of fathers participating in neonatal care on the 5th day to 14th day.

There was a positive and moderate correlation between the number of fathers participating in baby care in the control group (as the number of participation

increased, the number of neonatal care participation increased) on the 1st, 2nd, 3rd, 5th, 7th and 11th day and the number of fathers participating in neonatal care on the 4th, 6th, 8th, 9th, 10th, 12th, 13th and 14th day.

Results

Meera et al. stated that the postpartum behavioral skills strengthening program (breastfeeding, bathing, cord care, diaper change, baby massage, hugging, etc.) that mothers and fathers participate in is effective in developing behavioral skills for postpartum care.

The same study also showed that the participating couples had increased intimacy, attached to their babies more and this helped to reduce their parenting stress. Simsiki et al. and Dinc et al. discussed that participation of father in baby care affected attachment of the father and infant [22,23].

Considering the number of fathers participating in baby care and their scores from the PIAS, the positive correlation (as the number of participation increased, the total scale score increased) was moderate in the experimental group with 0.457 ($r=0.457$; $p=0.001$; $p<0.01$) and moderate in the control group with 0.547 ($r=0.547$; $p=0.001$; $p<0.01$).

In this case, as the participation rate of fathers in baby care increases, their level of attachment increases accordingly. Although there were limited studies conducted on fathers' participation in baby care and paternal-infant attachment, the findings from the present study are supported by the related literature in terms of the effect of fathers' participation in baby care on their attachment levels [24].

Fathers' age, working hours, educational status, spouse's age, and spouse's educational status were similar in both groups. Fathers in both groups had nuclear family, moderate income level and did not participate in domestic affairs. In both groups, there were mothers who breastfed their babies voluntarily mostly, who breastfed involuntarily, who did not breastfeed voluntarily and who did not breastfeed involuntarily, respectively.

Most fathers in the experimental group had a daughter and fathers in the control group had a son. No significant difference was found between the groups in terms of age, daily working hours, spouse's age, educational status, spouse's educational status, family structure, economic status, gender of the baby, participation in domestic affairs and spouse's breastfeeding ($p>0.05$).

This indicates that fathers have similar experiences in terms of age, daily working hours, spouse's age, educational status, spouse's educational status, family structure, economic status, gender of the baby, participation in domestic affairs and spouse's breastfeeding.

Vaginal delivery and unplanned pregnancy were significantly higher in the experimental group and cesarean delivery and planned pregnancy were significantly higher in the control group ($p<0.05$). This indicates that there is a difference

between the experimental and control groups in terms of delivery method and planned pregnancy.

Discussion

This study found that 88.27% of fathers provided kangaroo care for 14 days in total and 11.73% did not provide such care, and the mean duration of the care was 57 ± 9.6 in total. These findings did not validate the hypothesis-1 “father who receive and apply kangaroo care at hospital continue this care at home after hospital discharge.”, but demonstrated that the number of fathers participating in kangaroo care was high. Fathers’ participation in care was highest on the first day with 100% (n=53) and the least was on the 4th day with 81.1% (n=43).

The difference in the PIAS post-test total score of the experimental group compared to the pre-test score was significantly higher than in the control group ($p=0.001$; $p<0.01$). These findings validated the hypothesis-2 “attachment levels of fathers in the experimental group, who received training of and applied kangaroo care to their infants, are higher than those of fathers in the control group.” and kangaroo care provided by fathers increased attachment levels.

The difference in the number of fathers participating in baby care post-test total score of the experimental group compared to the pre-test score was significantly higher than in the control group ($p=0.001$; $p<0.01$). These findings validated the hypothesis-3 “participation rate of fathers in the experimental group, who received training of and applied kangaroo care to their infants, is higher than that of fathers in the control group.” and kangaroo care provided by fathers increased their participation.

The study indicated that the number of fathers answering that they would ask for help of their spouse/family elders/caregiver to do the cleaning and care of the baby’s skin, mouth, eyes, nose, ears, navel, controlling the navel area and body temperature, relieving baby’s gas, preparing the baby for a bath, providing during and after-bath care to the baby, cutting and maintaining baby’s nails and toenails, choosing the best clothing for the baby, controlling the comfort and the clothes of the baby and changing clothes, preparing the baby formula or breast milk stored in the freezer to feed the baby or they would take the baby to the doctor on their own when the baby got sick was significantly higher in those who applied kangaroo care compared to those who did not apply it. This indicates that application of kangaroo care positively contributes to the participation of fathers in baby care.

The present study showed that fathers who experienced paternity for the first time and never provided baby care did the followings from more to less, respectively; “watching the baby sleeping”, “talking to the baby”, “comforting the baby when it cries”, and “supporting the mother when breastfeeding”, “changing baby’s position”, “relieving baby’s gas”, “changing baby’s clothes”, “naval care”, “skin care and diaper change”, “eye care and hand and foot care”, “oral care”, nose care”, and “nutrition”, but did not provide “ear care”. This study has indicated that the rate of neonatal care provided by fathers who apply kangaroo care is higher than that of fathers who do not

apply kangaroo care, and fathers who apply kangaroo care participate more in neonatal care.

Fathers who applied kangaroo care in this study took part in “watching the baby sleeping”, “talking to the baby” and “comforting the baby when it cries” on the 1st day to 14th day more than the fathers who did not apply kangaroo care.

Considering the number of fathers participating in baby care and their scores from the PIAS, the positive correlation (as the number of participation increased, the total scale score increased) was moderate in the experimental group with 0.457 ($r=0.457$; $p=0.001$; $p<0.01$) and moderate in the control group with 0.547 ($r=0.547$; $p=0.001$; $p<0.01$). As fathers’ participation levels in baby care increased, their attachment levels to the baby increased accordingly.

No significant difference was found between the experimental and control groups in terms of age, daily working hours, spouse’s age, educational status, spouse’s educational status, family structure, economic status, participation in domestic affairs and spouse’s breastfeeding ($p>0.05$).

Fathers showed similarity in terms of these descriptive attributes. Although most fathers in the experimental group had a daughter and fathers in the control group had a son, there was no significant difference between the two groups ($p>0.05$).

Vaginal delivery and unplanned pregnancy were significantly higher in the experimental group and cesarean delivery and planned pregnancy were significantly higher in the control group ($p<0.05$).

Conclusion

Because fathers’ attachment and care participation scores are higher among those who apply kangaroo care, nurses are recommended to practice kangaroo care with fathers.

The aforementioned types of care can put into practice by developing care protocols, guidelines and institutional policies that will enable nurses to learn and practice both kangaroo care and neonatal care on the basis of a family-centered approach. Because the number of fathers who provide care to the newborns in the first days is less and the number of those who provide such care in the following days is higher, nurses can inform fathers about the care of the newborn, ensure their participation in care, and can support fathers to take part in it at earlier periods after discharge.

Because families are contacted using phone calls to ensure the continuity of care, the family health centers are recommended to use the form in the follow-up of newborns. The father’s participation in baby care evaluation form can be reused in greater sample groups for further evaluation because it has been used for the first time in this research.

Conflict of Interest

The authors declare no conflict of interest for this study.

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Authors' Contributions

Conception: GM, BM and PU; Design: GM, BM and PU; Data Collection: GM, BM and PU; Conducting research: GM, BM and PU; Statistical Analysis: GM, PU; Literature review: GM, BM and PU; Writing: GM, BM and PU; Critical Review: GM, BM and PU.

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