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A Pre-Experimental Study To Evaluate The Effectiveness Of Kangaroo Mother Care On Physiological Parameters Among Preterm Infants Admitted In NICU

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ABSTRACT

Introduction: *Kangaroo Mother Care (KMC) is skin-to-skin contact between a mother and her newborn, frequent and promoting effective thermal control, exclusive breastfeeding, prevention from infection, and early discharge from the hospital have been effective in reducing the risk of mortality and bonding among preterm and low birth weight infants with the mother.*

Aims: *The aim of the study was to evaluate the effectiveness of kangaroo-mother care on physiological parameters among preterm infants Admitted in NICU in a selected hospital at Delhi/NCR.*

Method: *A pre-experimental research design was used for the study. Non-probability Purposive sampling technique was used for selecting the samples for study. The sample consists of 30 preterm Infants admitted in the NICU. Tools developed and used for data collection were: structured physiological parameters record sheet. The data was analyzed and interpreted as per the objective and the research hypothesis stated. Descriptive and inferential Statistics were used for data analysis.*

Results: *The result showed that there was a significant difference between the mean of the post-test scores and as obtained 't' value of physiological parameters in the temperature post-test(2.9) „t" value (15.29),Respiratory rate post-test(2.9) 't' value(10.81), Heart Rate post- test (2.93)„t' value (13.58),Oxygen Saturation post-test score (2.96) "t" value (10.77), Weight Gain post-test score (2.9) 't' value(12.54) and physiological parameters scores of all parameters ,as obtained "t"-value was lower than the tabulated value for df (29)=2.05 at 0.05 level of significance.*

Conclusion*: It can be inferred that Kangaroo Mother Care effective in improving the physiological parameters of preterm Infants admitted in the NICU. A similar study can be conducted with larger sample for better generalization. Various Other benefits of Kangaroo Mother Care such as a weight gain, thermoregulation and sleep duration of Preterm Infants admitted in NICU can be tried out.*

Key Words: *Kangaroo Mother Care; Physiological Parameters (Temperature, Respiratory Rate, Heart Rate, Oxygen Saturation, Weight Gain) Preterm Infants.*

INTRODUCTION

A normal pregnancy period is about 40 weeks and 40 weeks are required for fetal development during a typical pregnancy. A preterm infant or "preemie" baby is a baby born too early or about three weeks before the due date. The preterm infants are born before 37 weeks of gestational age. Late preterm baby is born between 34 and 36 completed weeks of pregnancy. Moderately preterm baby is born between 32 and 34 weeks of pregnancy. Very preterm baby is born at less than 32 weeks of pregnancy. Extremely preterm is born at or before 25 weeks of pregnancy. All these premature infants are more prone to serious health problems in the future. Pre-term babies have immature organs that may not be able to function outside of the uterus. Premature or early birth puts both the mother and the infant at risk for serious health issues. Infants who are born prematurely often experience several complications, including premature apnea, underdeveloped lungs, bleeding in the brain, cerebral palsy, intestinal discomfort, blood infection or neonatal sepsis, patent ductus arteriosus (PDA), retinopathy, or inadequately formed ocular blood vessels. A mother's multiple pregnancies, smoking, prior cervical surgery, having a weak cervix, heart disease, and other related issues can all contribute to preterm birth. Neonatal intensive care units must frequently provide specialized medical care to preterm infants (NICU). Some infants

spend weeks or months in the NICU.[2]
The current infant mortality rate for India in 2023 is 26.619 deaths per 1000 live births, a 3.89% decline from2022. The infant mortality rate for India in 2022 was as 27.695 deaths per 1000 live births, a 3.74% decline from 2021. The kangaroo mother care (KMC) was first introduced in 1979 in a hospital in Bogota, Colombia because of a shortage of incubators high death rate from infection, and the abandonment of premature infants by their mothers, since that time, many investigators have carefully evaluated Kangaroo Mother Care and found it to be beneficial to mother and infants. Kangaroo Mother Care is early continuous skin-to-skin contact and exclusive breastfeeding. Kangaroo Mother Care works to lower newborn infant mortality rates and enhance the lives of premature babies. Preterm infants less than 37 weeks gestational age and weighing less than 2.5 kg are the target of the Kangaroo Mother Care intervention once they have stabilized and adapted to extrauterine life. The benefits of Kangaroo Mother Care results in increased breastfeeding rates as well as increased duration of breastfeeding. Even when initiated late and for a limited time during the day and night, Kangaroo Mother Care has been shown to exert a beneficial effect on breastfeeding. Thermal control prolonged skin-to-skin contact between the mother and her preterm/ LBW infant provides effective thermal control with a reduced risk of hypothermia. Promote the bonding between mother and baby, for stable babies, Kangaroo Mother Care is at least equivalent to conventional care with incubators in terms of safety and thermal protection[6].

The World health organization (16 may 2023), released two new resources to support the wider uptake of kangaroo mother care (KMC) a lifesaving technique that includes ongoing skin-to-skin contact and exclusive breastfeeding — to benefit more small and preterm babies. Now the leading cause of death of children under 5 prematurity is an urgent public health issue. Every year, an estimated 13.4 million babies are born preterm (before 37 weeks of pregnancy) while an even higher number - over 20 million babies - have a low birth weight (under 2.5 kg at birth). For these babies, KMC is a proven, effective intervention for saving lives and improving their health and development. Kangaroo mother care is one of the most critical, lifesaving measures to improve the survival prospects and well-being of babies born early or small," said Dr Anshu Banerjee, Director for Maternal, Newborn, Child and Adolescent Health at WHO. "Ensuring mothers and babies everywhere can stay together and practice kangaroo mother care immediately after birth will require a radical rethink of how maternal and newborn care is organized these new publications aim to support this process. The use of CPAP (continuous positive airway pressure) and medications for breathing problems, along with interventions to provide kangaroo mother care after the birth of preterm infants and exclusive breastfeeding initiation, are recommended by the WHO as preterm infant treatment guidelines in order to lower the morbidity and mortality rate in preterm and low birth weight babies.[7] According to WHO recommendations, the mother and family members play an important role in providing Kangaroo Mother Care to preterm infants. Mothers and babies should not be separated unless the infant is seriously illness. Counseling and education regarding preterm babies must be provided to the mother, and family members, and the health professionals must be qualified so that they can give education and counseling during home visits.[8]

According to the World Health Organization (WHO) (2022), plus global public health, India alone accounts for 20% of neonatal and 17% of infant deaths. India has a high infant mortality rate (IMR), and at 28 infant deaths per 1000 live births, an estimated 15 million births occur prematurely each year. Estimates from 2010 and 2014 imply that India contributed 23-24% of the global average, with approximately one in six (13%-17%) of live births being preterm. India is a large contributor to the global preterm birth figures. Preterm birth rates vary widely across India; The association between preterm births and infant mortality is not thoroughly known, particularly in terms of age at death in infancy, despite the high rates and stark subnational differences of IMR and preterm births in India. These connections have only been studied in a small number of low- and middle-income country (LMIC) context studies. Preterm births are associated with very high rates of early child fatalities in LMICs including Malawi, Mozambique, Tanzania, China, and Nepal. Now, presently the survival rate of preterm infants has increased in India by the intervention of kangaroo mother care on preterm infants. Ministry of Health and Family Welfare, the government of India, has launched so many programs for the care of premature babies and young infants. Various health programs have been launched in India like, New-Born Action Plan(NIAP), Navjat Shishu Suraksha Karyakram NSSK), Janani Shishu Suraksha Karyakram (JSSK), Integrated Management of Neonatal &Childhood Illness (IMNCI), Infant and Young Child Feeding (IYCF).The

Kangaroo Mother Care is one of the important programs that was recommended by the WHO in 1978.The kangaroo Mother Care effectively maintains the physiological parameters of preterm infants and reduces the morbidity and mortality rate of preterm infants in worldwide.

According to the UNICEF (2023) Author(s) Ministry of Health of Ethiopia: The Kangaroo Mother Care Technical and Implementation Guideline Improving Preterm and Low Birth Weight infant survival rate in Ethiopia Newborn mortality continues to be the leading cause of under-5 deaths globally and accounted for 47% of all these deaths in 2021. Of these deaths, preterm-related complications accounted for 34% of under-5 deaths. Preterm and low birth weight (LBW) infants have a 15 times higher risk of death than those born term and appropriate for gestational age. In Ethiopia, neonatal mortalityis unacceptably high with 33 deaths per 1,000 live births based on the 2019 Ethiopia Mini-Demographic and Health Survey, a preterm-related complication is among the leading causes of mortality. This guideline has been prepared to facilitate the implementation of KMC practice at hospitals, health centers, and community levels of the health system. The guideline also aims to provide guidance to the MOH, RHBs, zonal health departments, world health offices, hospitals, health centers, and Health Extension workers (HEWs) on the health system resources and supports needed to implement KMC at different health system levels.

The COVID-19 increased the risk of death for newborns due to Mother and newborn COVID-19 separation puts babies at risk of death. The survey suggests that the COVID-19 pandemic affecting the quality of care provided, to babies in all regions of the world and threatening the implementation of life-saving interventions like breastfeeding and kangaroo mother care. A recent analysis showed that there is an increased risk of death among preterm or low birth weight babies if kangaroo mother care is not practiced, and this risk is 65-fold higher than the risk of death due to COVID-19 infection among newborns. This research data analyses in 127 countries, estimating that if universal coverage of KMC was achieved, more than 125,000 newborn lives would be saved compared to the risk of newborns catching COVID-19 and dying, which would result in fewer than 2,000 deaths. St. John"s Medical College, Bangalore, India, and a lead author on the study, said: "Kangaroo Mother Care (KMC) is one of our most cost-effective ways to protect small and sick newborns. Now it is more critical than ever to ensure mothers are supported to do Kangaroo Mother Care and that healthcare professionals feel safe and comfortable to support in the delivery". The Current WHO recommendations on Kangaroo mother care started immediately after birth is critical for saving lives, starting kangaroo mother care only after the baby is stabilized in an incubator or warmer, which can take on average 3-7 days. This new study suggests that, when compared with the existing practice, starting kangaroo mother care immediately after birth can save up to 150,000 more lives each year. Keeping the mother and baby together right from birth with zero separation will revolutionize the way neonatal intensive care is practiced for babies born early or small," said Dr Rajiv Bahel, Head of the Newborn Unit at WHO, and "When started at the soonest possible time, kangaroo mother care can save more lives, improve health outcomes for babies, and ensure the constant presence of the mother with her sick baby." The results of the immediate kangaroo mother care study indicate the need for a global paradigm shift in the care of small babies with zero separation of babies from their mothers by having dedicated Mother-Newborn ICUs. "The best way to nurture the newly born low birth weight baby, including in high-income countries, is through ongoing skin-to-skin contact with the mother, in a mother-newborn couplet care unit that provides care and medical treatment for both"

OBJECTIVES

- To assess the level of physiological parameters of preterm infants.
- To evaluate the effectiveness of kangaroo mother care on the physiological parameters of preterm infants.
- To determine the association between the pretest and post-test scores of physiological parameters of the Preterm Infants with selected demographic variables.

HYPOTHESIS / ASSUMPTIONS

H1: There will be significant difference in mean pre-test and post-test scores of the temperature of preterm Infants as measured by the physiological parameters record sheet at 0.05 level of significance

H2: There will be significant difference in mean pre-test and post-test scores administration of Kangaroo Mother Care among Respiratory rate of preterm Infants as measured by physiological parameters record sheet at 0.05 level of significance

H3: There will be significant difference in mean pre-test and post-test scores administration of Kangaroo Mother Care among heart rate of preterm Infants as measured by physiological parameters record sheet at 0.05 level of significance

H4: There will be significant difference in mean pre-test and post-test scores administration of Kangaroo Mother Care among oxygen Saturation of preterm Infants as measured by physiological parameters record sheet at 0.05 level of significance

H5-There will be significant difference in mean pre-test and post-test scores administration of Kangaroo Mother Care among weight gain of preterm Infants as measured by the physiological parameters record sheet at 0.05 level of significance H6: There will be significance association between post- test score of physiological parameters (temperature, respiratory rate, heart rate,

RESEARCH METHODOLOGY

Research Approach

Quantitative research approach was adopted for this study

Research Design

Pre-experimental one group pre test post test was used

The design is presented as:

O1xO2

O1- Pretest observation of Kangaroo Mother Care and physiological parameters of preterm Infants.

X-Administration of Kangaroo Mother Care.

O2- Post-test observation of Kangaroo Mother Care and physiological parameters of preterm Infants

Variables Under Study:

The independent variable was administration of kangaroo mother care to improve the physiological parameters in preterm infants admitted in NICU.

The dependent variables were physiological parameters (Temperature, Respiratory Rate, Heart rate, oxygen saturation, Weight gain) of preterm infants admitted in NICU.

Attribute variables:

(Age in days, Gender, Birth weight in grams, Gestational age in weeks, The educational level of mothers, Occupational status of mothers, Duration of hospital stay, KMC provided)

Study Setting

In the present study, the research study was conducted in "Yashoda Super-Speciality Hospital Kaushambi Near Dabur Chowk, Ghaziabad UP hospital admitted in NICU Delhi/NCR."

Target Population / Inclusion And Exclusion

The target population was comprised of preterm infants less than <37 weeks of gestation who are hospitalized in the NICU, Yashoda Super-Speciality Hospital Kaushambi Near Dabur Chowk, Ghaziabad UP hospital Delhi/NCR.

Inclusion Criteria

- Infant birth weight of < 2.500 kg
- An APGAR score of six at 1 minute.
- Babies being breastfed Not in sick or on oxygen.

• The preterm infants are admitted to neonatal units in the hospital whose postnatal mothers and family members are willing to participate in the study.

Exclusion Criteria
Preterm infants who are:
- As APGAR score of 5 or less at birth
- On Oxygen
- Postnatal mothers due to sickness.

Sample
The sample comprised of preterm infants admitted in NICU in Yashoda Super Specialty Hospital, Kaushambi, Ghaziabad, UP.
Sample Size
sample size consisted of 30 preterm infants admitted in the NICU of Yashoda Super Specialty Hospital, Kaushambi Near Dabur Chowk, Ghaziabad UP Hospital Delhi/NCR.

Sampling Technique
The sample technique was used non-probability purposive sampling techniques was chosen to select the 30 mothers of preterm infants for the study.

Sample Size Calculation
The Sample size calculation was estimated using power analysis and was found to be (30) sample size for the present study.

Description of the Tool.
TOOL-I -Demographic Variables.
TOOL II- Structured physiological parameters record sheet is used to evaluate the physiological parameters of Preterm Infants before and after administration of Kangaroo Mother Care by monitoring the temperature, respiration, heart rate, and oxygen saturation, weight Gain of the preterm Infants.

Method Of Data Analysis
The obtained data were analyzed, tabulated, and interpreted by using descriptive and inferential statistics, and the Mean, Median standard deviation, mean difference, and "t" value of pre-test and post-test of all physiological parameters score of preterm Infants admitted in NICU and fisher exact test used to describe the association between the post-test temperature score of selected demographic variables of the preterm infants admitted in NICU

RESULTS:

Table-1 Frequency and percentage distribution of demographic variables of mothers of preterm infants **N=30**

SN	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE
1)	**Age in days**		
	a) 0-7 days	11	37%
	b) 8-14 days	16	53%
	c) 15-21 days.	1	3%
	d) 22-28 days	2	7%
2)	**Gender**		
	a) Boy	20	67%
	b) Girl	10	33%
3)	**Birth weight in grams**		
	a) 1000gms- 1499gms	3	10%

	b) 1500gms-1999gms	9	30%
	c) 2000gms- 2499gms	18	60%
	d) <2500gms	0	0%
4)	**Gestational age in week**		
	a) 30 weeks -31+6 weeks	5	16%
	b) 32 weeks - 33+6 weeks	8	27%
	c) 34 weeks -35+6 weeks	11	37%
	d) 36weeks -36+6 weeks	6	20%
5)	**Educational status of mother**		
	a) No formal education	0	0%
	b) primary education	3	10%
	c) high/senior secondary school	6	20%
	d) Graduate	21	70%
6)	**Occupational status of mother**		
	a) house wife	17	57%
	b) private job	9	30%
	c) government job	3	10%
	d) self employed	1	3%
7)	**Duration of hospital stay**		
	a) 1-10 days	17	57%
	b) 11-20 days	11	37%
	c) 21-30 days	2	6%
	d) 31<	0	0%
8)	**KMC provider**		
	a) Mother	25	84%
	b) Father	0	0%
	c) Grandparents	4	13%
	d) Other relatives	1	3%

Data presented in table 1 revealed that majority of Age in days preterm infants 11 (37%) belong to age below 0- 7days and 16 (53% belong to 8-14days 1(3%) belong between and 15- 21days of age and 2(7%) belong to 22-28days of age**.** Majority of Boy and girls infants 20(67%) belong to boys and 10(33%) belong to having girls preterm infants**.** Majority of Birth weight in grams Preterm Infant3 (10%) belong to 1000gms- 1499gms 9(30%) belong to 1500gms-1999gms and 18(60%) are belongs to 2000gms-2499gms and 0(0%) belong <2500gms**.**Majority of gestational age of preterm Infants 5 (16%) belonged to 30weeks- 31+6 weeks and 8(27%) belonged to 32weeks-35+6weeks and 11(37%) belonged to 34weeks-35+6weeks and 6(20%) belonged to 36weeks -36+6 weeks**.** Majority of educational status of mothers of Preterm Infants are 0(0%) are belong to No formal education and 3(10%) belongs to primary education and high school are belongs to 6(20%) and 21(70%) belongs to Graduate. Majority of Occupational status of mothers17(.57%) have to belong House wife 9(30%) belongs to Private job and 3(10%) belongs to government job and 1(3%) belongs to self employed**.** Majority of Preterm Infant's duration of hospital stay were 17 (.57%) belongs to 1-10 days and11 (37%) belongs to 11-20 days and 2(6%) belongs to 21- 30days and 0(0%) belongs to have31<**.** Majority of KMC Provider 25(84%) belongs to the mother 0(0%) belongs to the father 4(13%) grandparents and 1(3%) belongs to Other relative.

TABLE:2 The Mean, Median standard deviation, mean difference and "t" value of pre-test and post-test temperature score of preterm Infants admitted in NICU N=30

Total Score	Mean	Median	Standard Deviation	Mean Difference	t-value
Pre-test	1.59	2	0.50		
Post-test	2.9	3	0.30	1.31	15.29*

***df (29) =2.05 at 0.05 level of significance**

The data presented in table 2 shows that the mean post-test of temperature score of preterm Infants is (2.9) which was higher than mean pre-test scoring (1.59) with the mean difference of (1.31). The obtained mean difference was found to be statistically significant. The calculated "t" value was 15.29 which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis was accepted. Hence it was concluded that Kangaroo Mother Care was effective in improving the temperature score of preterm Infant in NICU.

TABLE:3 Mean, Median standard deviation, mean difference and "t" value of pre-test and post-test respiratory rate score of preterm Infants admitted in NICU. N=30

Total Score	Mean	Median	Standard Deviation	Mean Difference	t-value
Pre-test	1.62	2	0.49		
Post-test	2.9	2	0.35	1.28	10.81*

***df (29) =2.05 at 0.05 level of significance**

The data presented in table 3 shown that the mean post test of respiratory rate of preterm Infants is(2.9) which is higher than mean pre-test scoring(1.62) with the mean difference of 1.28).The obtained mean difference was found to be statistically significant .The calculated "t" value is 10.81 which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis accepted. Hence it was concluded that Kangaroo Mother Care was effective in improving the respiratory rate of preterm Infant in NICU.

TABLE : 4 Mean, Median standard deviation, mean difference and "t" value of pre-test and post-test heart rate score of preterm Infants N=30

Total Score	Mean	Median	Standard Deviation	Mean Difference	t-value
Pre-test	1.72	2	0.42		
Post-test	2.93	3	0.25	1.21	13.58*

***df (29)=2.05 at 0.05 level of significance**

The data presented in table 4 shown that the mean post-test of heart rate of preterm Infants was (2.93) which was higher than mean pre-test scoring (1.72) with the mean difference of (1.21).The obtained mean difference was found to be statistically significant as the calculated "t" value is 13.58 which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis was accepted. Hence, it was concluded that Kangaroo Mother Care was effective in improving the heart rate of preterm Infant in NICU

TABLE:5 Mean, Median standard deviation, mean difference and "t" value of pre- test and post-test Oxygen Saturation score of preterm Infants N=30

Total Score	Mean	Median	Standard Deviation	Mean Difference	t-value
Pre-test	1.66	2	0.48		
	2.96	3	0.18	1.3	10.77*

***df (29) =2.05 at 0.05 level of significance.**

The data presented in table 5 shown that the mean post test of oxygen saturation of preterm Infants was (2.96) which is higher than mean pre-test scoring (1.66) with the mean difference of (1.3). The obtained mean difference was found to be statistically significant as the calculated "t" value was 13.77. which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis accepted. Hence it

was concluded that Kangaroo Mother Care was effective in improving the oxygen saturation of preterm Infant in NICU.

TABLE:6 Mean, Median standard deviation, mean difference and "t" value of pre- test and post-test weight gain score of preterm Infants. N=30

Total Score	Mean	Median	Standard deviation	Mean Difference	t-value
Pre-test	1.77	2	0.42		
Post-test	2.9	3	0.30	1.2	12.54*

***df(29) =2.05 at 0.05 level of significance**

The data presented in table 6 shown that the mean post test of weight Gain of preterm Infants was (2.9) which was higher than mean pre-test scoring (1.77) with the mean difference of (1.2). The obtained mean difference was found to be statistically significant as the calculated "t" value is 12.54 which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis accepted. Hence it was concluded that Kangaroo Mother Care was effective in improving weight gain of the preterm Infant in NICU.

Findings related to the association between demographic variables and a post-test score of physiological parameters score of (temperature, respiratory rate, heart rate, oxygen saturation and weight gain) with selected demographic variables

There was no significant association between the post-test score of physiological parameters of temperature, respiratory rate, heart rate, oxygen saturation and weight gain with selected demographic variables of the preterm infants. Hence, research hypothesis was rejected and null hypothesis was accepted.

DISCUSSION

According to reports from the World Health Organization (WHO) and PLOS Global Public Health (2022), India accounts for a considerable proportion of global infant and neonatal deaths, with 17% of infant fatalities and 20% of neonatal deaths occurring in the country. The infant mortality rate (IMR) in India is estimated at 28 deaths per 1,000 live births, reflecting the high burden of premature births, which is about 15 million annually. Data from 2010 to 2014 further indicate that India contributed between 23% and 24% of the global average of preterm births, with nearly one in six live births (13%–17%) being preterm. These figures highlight India's substantial role in the global incidence of preterm deliveries.

After the infant is stabilized in an incubator or warmer, which might take three to seven days on average, kangaroo mother care should be initiated. This is crucial for saving lives. According to this recent study, establishing kangaroo mother care as soon as possible after birth can save up to 150,000 more lives annually

Regarding temperature, in the pre-test of preterm Infants 18(60%) were having good temperature and in posttest 27(90%) were having excellent temperature. The mean posttest of temperature of preterm Infants is (2.9) which was higher than mean pre-test scoring (1.59) with the mean difference of (1.31). The obtained mean difference was found to be statistically significant. The calculated "t" value was 15.29* which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis

Regarding respiratory rate, In the pre-test of preterm Infants 18(60%) were having good temperature and in posttest 27(90%) were having excellent temperature. The mean posttest of temperature of preterm Infants is (2.9) which was higher than mean pre-test scoring (1.59) with the mean difference of (1.31). The obtained mean difference was found to be statistically significant. The calculated "t" value was 15.29 which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis accepted. Hence it was concluded that Kangaroo Mother Care was effective in improve the temperature score of preterm Infant in NICU.

Regarding heart rate In the pre-test of the preterm Infants 22(73%) was having good heart rate. And in post test 28(93%) were having excellent heart rate, hence Kangaroo Mother Care is effective in improving the heart rate among preterm Infants in NICU The mean post-test of heart rate of preterm Infants was (2.93) which was higher than mean pre-test scoring (1.72) with the mean difference of (1.21).The obtained mean difference

was found to be statistically significant as the calculated "t" value is 13.58* which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis was accepted. Hence, it was concluded that Kangaroo Mother Care was effective in improving the heart rate of preterm Infant in NICU.

Regarding oxygen saturation in the pre-test of the preterm Infants 21(70%) were having oxygen saturation and in post-test 29(97%) were having excellent oxygen saturation. The mean post- test of oxygen saturation of preterm Infants was (2.96) which is higher than mean pre-test scoring (1.66) with the mean difference of (1.3). The obtained mean difference was found to be statistically significant as the calculated "t" value was 13.77. which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis accepted. Hence it was concluded that Kangaroo Mother Care was effective in improving the Oxygen Saturation of preterm Infant in NICU
Regarding weight gain In the pre-test of the preterm Infants 23(77%) were having good weight gain and in post test 27(90%) were having excellent weight gain. The mean post test of weight Gain of preterm Infants was (2.9) which was higher than mean pre-test scoring (1.77) with the mean difference of (1.2). The obtained mean difference was found to be statistically significant as the calculated "t" value is 12.54 which was higher than table value at 0.05 level of significance at df (29). Null hypothesis was rejected and research hypothesis accepted. Hence it was concluded that Kangaroo Mother Care was effective in improving weight gain of the preterm Infant in NICU.

There was no significant association between the post-test score of physiological parameters of temperature, respiratory rate, heart rate, oxygen saturation and weight gain with selected demographic variables of the preterm infants. Hence, research hypothesis was rejected and null hypothesis was accepted.

A study was conducted **to** assess the Knowledge regarding Kangaroo Mother Care among Postnatal Mothers at selected Hospitals of Gulbarga. total of 60 post-natal mothers who were selected by using non probability convenience sampling technique. The tool of the present study was used self-constructed structured knowledge questionnaire for to collected the data regarding knowledge of kangaroo mother care by structured knowledge questionnaire sheet. The study results revealed that 53% of post-natal mothers had poor knowledge regarding kangaroo mother care followed by 45% had average knowledge and least i.e. 1% had good knowledge regarding kangaroo mother care. The knowledge scores ranged from 01-23. Mean knowledge score was 9.18 with a standard deviation of ±4.45.in this study.

A study was conducted to evaluate the effectiveness of nesting on posture and physiological parameters among premature babies admitted in the NICU of Delhi Newborn Center, Rohit Kunj, Pitampura, New Delhi. The result of the study showed that there was a statistically significant effect In posture, the post-test of the experimental group,15(100%) were having acceptable posture and in control group15 (100%) were having need for repositioning. In physiological parameters of premature babies, the post-test of the experimental group, 13 (87%) were having excellent temperature, and in control group, 5 (33%) were having good temperature. In the post-test of experimental group, 10 (67%) were having excellent respiration, and in the control group, 4 (27%) were having good respiration. In post-test of experimental group, 9 (60%) were having excellent heart rate, and in control group, 4 (27%) were having good heart rate. In the post-test of experimental group, 15 (100%) were having excellent oxygen saturation, and in control group, 8 (53%) were having good oxygen saturation. It is concluded that the nesting is effective in maintaining the posture and improving the physiological parameters of premature babies in the NICU in hospital.

Another similar study conducted to evaluate the effectiveness of Kangaroo Mother Care on the physiological parameters of neonates In Selected Hospital of Haryana and Punjab. The tool developed and used for data collection were physiological parameters record sheet and characteristic of mother and neonates. Section two consist of record sheet The total sample 60 neonates 30 for experimental group and 30 for control group, non-probability purposive sampling technique is adopted for the study. According to the study's findings, all

physiological measures were within the range of normal following (after 60 min) KMC. The average temperature on day1 at the 60th minute (after KMC) was substantially higher than the average temperature in the control group on days 2 and 3 (98.05 C F before KMC) and day 1 (98.47 C F) at 60th minute Both the experimental group and the control group's mean heart rates on days 1 and 3 were higher than the mean heart rates in the experimental group and control group before KMC (138.40 and 138.06, respectively). In comparison to day 1's respiratory rate (42.20), the mean respiratory rate (40.06) at 60th minute on day 3 is extremely low. Mean saturation level has not changed much before or 60 minutes after KMC, and it is still within normal limits. Recommendations. The study can be replicated on A study can be done to compare the effect of kangaroo mother care and incubator on preterm Infants.

A systematic review conducted Zengin. H on the effects of kangaroo mother care on the physiological parameters of premature neonates in neonatal intensive care unit, conducted to determine systematic the effects of Kangaroo Mother Care on the physiological parameters of premature newborns in the Neonatal Intensive Care Unit. total 11 studies done for systematic review and 9 studies for meta-analysis, including 634 participants were found eligible for inclusion. Tools using the Stata 16 software for the meta-analysis {PROSPEROCRD42021283475} it was determined that the "temperature" ($z = 3.21$; $p = 0.000$) and "oxygen saturation" ($z = 2.49$; $p = 0.000$) values created a positive and there was no sufficient evidence to state that it affected the "heart rate" ($z = -0.60$; $p = 0.55$) and "respiratory rate" ($z = -1.45$; $p = 0.15$) values. effects on temperature and oxygen saturation (spo_2) ($p < 0.05$). one-hour or shorter applications of KMC had a higher effect on the temperature and oxygen saturation values (1.83; and 1.62, respectively). kangaroo mother care that there was no sufficient evidence to state that it affected the "heart rate" and "respiratory rate.

Another study conducted a comprehensive literature search using meta-analysis study, total of 12 studies on Effects of Kangaroo Mother Care in the NICU on the Physiological Stress Parameters of Premature Infants was done, to analyze the randomized controlled trials that explored the effect of kangaroo mother care on physiological stress parameters of premature infants This meta-analysis was able to include a total of 12 studies. The average respiratory rate of preterm newborns receiving Kangaroo Mother Care was lower than that of infants receiving routine incubator care, per statistical analysis (MD, 3.50; 95% CI, 5.17 to 1.83; p 0.00001). The mean heart rate, oxygen saturation, and temperature of infants cared for by kangaroo mothers were greater, and clinical heterogeneity. Heterogeneity between studies was as low if I2 < 50%, medium if I2 = 50–75%, and high if I2 > 75% The Kangaroo care is a safe practice that may have a significant impact on various physiological indicators of stress in preterm infants when used in neonatal intensive care units. Conclude of the study is that additional research is required to determine the effects of physiological stress in the neonatal intensive care unit on the development of preterm newborns due to clinical variability.

A similar study conducted to assess the effectiveness of a structured teaching program (STP) regarding kangaroo mother care (KMC) in terms of knowledge among postnatal mothers at selected hospitals district Mandi, Himachal Pradesh, To assess the knowledge regarding kangaroo mother care among postnatal mother and find the association between the knowledge among postnatal mothers regarding kangaroo mother care with selected demographic variable. Total 60 postnatal mothers were included into the study by using purposive sampling technique. The tool of the study structured knowledge questionnaire used to assess the knowledge regarding kangaroo mother care before and after structured teaching program. The result of the study mean percent knowledge was 70.80 and difference observed 35.00 after structured teaching program. It was found there was no significance association between knowledge regarding kangaroo mother care with their selected socio demographic variables in the study conclusion of the study. It was concluded that structured teaching program. regarding kangaroo mother care increasing the knowledge of postnatal mother during structure teaching programme.

CONCLUSION

The present study demonstrated that Kangaroo Mother Care (KMC) had a positive effect on the physiological parameters of preterm infants. Following the intervention, the infants showed significant improvement in all

five measured parameters, as reflected in the comparison between pre-test and post-test scores. All 30 participants were preterm infants who initially presented with low physiological scores but improved notably after receiving KMC. No significant association was found between post-test scores and demographic variables at the 0.05 level of significance, indicating that improvements were independent of demographic factors. Future research on KMC may be extended to assess additional physiological parameters, as existing evidence confirms its benefits for preterm infants.

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