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A Study to Assess the Effectiveness of Cluster Care on Physiological Parameters among Preterm Newborns Admitted in NICU at NMCH, Nellore

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Abstract
The frequent clustered nursing care justified the requirement of constant care service for preterm newborns. This study aims to assess the association of different physiological parameters among "preterm babies" admitted to the NICU at NMCH, Nellore. This study has used a "quantitative research approach" and "quasi-experimental non-equivalent control group design". A total of 60 preterm newborns have been selected to obtain the study result and fulfill the aim. It has been found that clustered care for different physiological developments among preterm newborns is essential.
Keywords*:* Cluster Care, Gestation Weeks, Nursing, Delivery, NICU, Preterm Newborns, and Premature

Introduction

Preterm baby or premature baby refers to the birth of any child at less than thirty-seven weeks of the gestation period, contrarily to full-term delivery at nearly forty weeks. The classification of preterm born is generally first, "early preterm birth" (32 to 34 weeks), second, "late preterm birth" (34 to 36 weeks), and third, "much early preterm birth" (prior to 32 weeks). The preterm delivery percentage at 32 to 36 gestation weeks, has increased constantly over the past years. The gestation age during birth is the most significant prognosticator of the subsequent survival and health of the infant. Moreover, premature babies are at higher risk of cerebral palsy, vision problems, developmental delays, and hearing problems. Although the prime reason for preterm birth is still

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unknown, the “National Intensive Care Unit” has the basic latent to offer quality sleep to preterm babies. The objective of this study is to evaluate the effectiveness of “cluster care” regarding “physiological parameters” with experimental and control groups. The aim of this study is to assess the association of different physiological parameters among preterm babies admitted to the NICU at NMCH, Nellore.

Review of Literature

Impacts of clustered care on preterm newborns

The Preterm babies admitted to the NICU require special care to survive, as there they are exposed to invasive and painful processes along with some environmental stimuli. They experienced some noninvasive processes comprising position change, health care, weighting, nutrition, and changing diapers that are stressful in different ways for them. Stress reflected on preterm babies by different methods might result in huge neurological damage that consequences in "abnormal development"[1]. Here, one of the most significant stresses is a disruption of the sleep cycle of newborns. Different studies have resulted that newborns are exposed to nearly sixteen non-invasive and invasive processes at the time of their initial fourteen days of NICU admission [2]. The NICU center is full of acoustic and optical stimuli, along with medical treatments as well as nursing care cause stress on the newborns. Early childbirth within advanced and developed nations is 5 to 12 percent, whereas in developing countries it comprises nearly 40 percent [3]. “Cluster care” is the process that has been implemented in some areas as an agent of “stress relief” for the newborns. This care aims to offer a longer period of rest in newborns, minimize infections, and decrease hospitalization of neonates "admitted to the NICU".

The association of different physiological parameters among preterm babies

Positive impacts of clustered care on newborn babies are reduced oxygen requirement, improved comfort of babies, and decreased stress-related parameters. The newborn’s comforts aid in adjustment to the “extrauterine environment” and optimistically impact social, sensory, emotional, physiological, and mental development [4]. “Apnea frequency” reduced average “heart rate” and enhanced weight gain had been observed in newborns who have more sleeping and resting duration through cluster care implementation. The utilization of non-pharmacological and pharmacological methods in pain management is significant for improving premature babies’ comfort levels [5]. Nurses are operating in the “NICU” are needed to offer “cluster care” to the newborns in the “individualized developmental care” extent.

Methodology

This study has used a “quantitative research approach” and “quasi-experimental non-equivalent control group design”. Two distinct groups have been selected to conduct this study where, one group had undergone intervention, whereas the other one had not undergone any intervention.

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Group	Pre-assessment	Intervention	the control group
Experimental	O_1	X (Cluster care - "kangaroo mother care", and weight gain)	O_2
Control	O_1		O_2

Table 1: Selected two groups

This specific study was done in the "NICU" of the "Narayana Medical College Hospital", Nellore, and the targeted population was "preterm newborn babies". The "Non-probability convenience" sampling technique has been used here, and the sample size comprises a total of 60 "preterm newborns" (here, 30 were in the "experimental group" and the rest were in "the control group").

Inclusion criteria:

Preterm babies who were,

- Born in between 32 to 37 weeks of gestation periods.
- Admitted to NICU.

Exclusion criteria:

Preterm babies who were,

- Have neurological defects.
- Critically ill.
- Have defects from birth.

Variables:

The independent variables were the newborns who had undergone clustered care. The dependent variables were physiological parameters among newborns evaluated by checklist.

The checklist reliability was evaluated with the help of the "split half process" which is $r = 2r/l+r$, here r valued for 0.9. The information of this study was determined by "descriptive statistics" and the feasibility of the tool was evaluated by doing the study from July 27, 2022, to August 01, 2022, with six study participants. A certificate of ethical clearance was acquired from the ethics chamber of "Narayana College of Nursing", Nellore. In order to conduct this study, by describing the nature of this study, informed consent has been obtained from the newborns' parents.

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Data Analysis and Discussion

(n=30+30)

Age	Experimental group(n=30)		Control group(n=30)	
	Frequency	Percentage%	Frequency	percentage %
<7days	24	80	19	63.3
7 – 14 days	6	20	11	36.7
Total	**30**	**100**	**30**	**100**

Table 2: Percentage and Frequency distribution of newborns dependent on age

The above table presented that, among the experimental group babies aged below 7 days were 80 percent (24), and those aged between 7 to 14 days were 20 percent (6). The babies aged below 7 days were 63.3 % (19) and those aged between 7 to 14 days were 36.7 % (11) in the control group.

(n=30+30)

Birth weight in grams	Experimental group(n=30)		Control group(n=30)	
	Frequency	Percentage%	Frequency	Percentage%
1500-1700	8	26.6	13	43.3
1701-1900	9	30	9	30
1901-2100	2	6.7	2	6.7
2101 – 2300	8	26.7	6	20
2301 – 2499	3	10	-	-
Total	**30**	**100**	**30**	**100**

Table 3: Percentage and Frequency distribution of newborn babies depended on birth weight

From the above table it has been observed that in the experimental group, babies' birth weights from 1500 to 1700 gms were 26.6 % (8), 17901 to 1900 gms were 30 % (9), and 1901 to 2100 gms were 6.7 % (2). Also, the birth weight of babies from 2101 to 2300 gms were 26.7 % (8) and 230 to 2499 gms were 10 % (3). In the control groups birth weights of babies from 1500 to 1700 gms were 43.3 % (13), 1701 to 1900 gms were 30 % (9), and 1901 to 2100 were 6.37 % (2). Also, the

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birth weight of babies from 2101 to 2300 gms were 20 % (6), and data from 2301 to 2499 gms were invalid.

(n=30+30)

	CRITERIA	PRE-ASSESSMENT		POST ASSESSMENT	
Sl.NO	Physiological parameters	Frequency	Percentage	Frequency	Percentage
1	Normal	8	26.6	7	23.3
2	Moderate deviation	16	53.4	14	46.7
3	Severe deviation	6	20	9	30

(a)

(n=30+30)

	CRITERIA	PRE-ASSESSMENT		POST ASSESSMENT	
Sl. N O	Physiological parameters	Frequency	Percentage	Frequency	Percentage
1	Normal	10	33.3	17	56.7
2	Moderate deviation	12	40	10	33.3
3	Severe deviation	8	26.7	3	10

(b)

Table 4: Contrast of cluster care on newborns' physiological parameters in (a) the control group and (b) the experimental group

From the above tables, it has been observed that in the control group, the rate of physiological parameters of pre-assessment was 26.6 %(Normal), 53.4 % (Moderate deviation), and 20% (Severe deviation). In the post-assessment period, the values were 23.3 % (Normal), 46.7 % (Moderate deviation), and 30 % (Severe deviation). In the experimental group, the rate of physiological parameters of pre-assessment was 33.3 % (Normal), 40% (Moderate deviation), and 26.7% (Severe deviation). In the post-assessment period, the values were 56.7% (Normal), 53.3% (Moderate deviation), and 10% (Severe deviation).

Villarroel *et al.* opined that preterm babies were sometimes admitted to the NICU just after birth as they were not fully matured and had some medical conditions that needed specialist care [6]. Frequency medical and nursing supervision is offered to the newborns until they are ready to be released from the hospital setting.

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Conclusion

From the above study, it can be concluded that “cluster care” defines to the implementation of “individually planned care” for “premature newborns”. This will be advantageous for narrating the “cluster care” concept to nurses who generally care for premature newborns in “the NICU”. the development and growth of babies is a long-term process, here scientific discharge guidance is an effective continuation in terms of “cluster nursing care”.

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