

Quantitative Evaluation of Normal Sucking range among Term Neonates. A prospective observational study.

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ABSTRACT:

Background: In normal term neonate rate of suck and swallow, and quantity of milk intake per suck will be increased gradually. Harmonized and safe way of oral feeding is depending on the maturity of nervous system, oral cavity and gastrointestinal tract. First indicator of neurological problem is feeding difficulty in infant period. Though several researches evaluated the patterns of suckling among preterm and term newborns, only a few studies have

been conducted on the quantitative evaluation of sucking in term babies. Henceforth, the present study aimed to quantitatively evaluate the normal sucking range among term neonates during breastfeeding.

Methods: This is a prospective, observational study of neonates feeding assessed during direct breastfeeding. The subjects were healthy 3 to 8 days old term neonates greater than or equal to 37 weeks gestation with a birth weight of 2500 g or greater than it and having exclusive breast-feeding with LATCH score of greater than 8 of mother's having childbirth in SIMATS, Chennai were included.

Result: From the statistical analysis it is shown that normal sucking range of term neonate from 3-8 days were (51.62 \pm 6.96) in case neonates produces lesser than the calculated range they said to have difficulty in direct breast-feeding.

Conclusion: Quantitative evaluation of sucking range helps in identifying neonates with feeding difficulty and enroll them in early intervention program.

INTRODUCTION:

One of the complicated activities in neonatal period is maintaining normal pattern of sucking followed by swallow and respiration during direct breast-feeding¹. Direct breast-feeding is necessary for neonatal and infantile period to achieve adequate immunity^{2,3}. Sucking is one of the primitive reflexes which originate during 28 weeks of intrauterine life. Harmonized way of suck followed by swallow and breathing achieved above 32 weeks of intrauterine life⁴. Therefore, neonates born preterm have difficulty in maintaining this harmonized pattern which leads to milk aspiration^{5,6}. Sucking pattern includes the movement of tongue and jaw, tongue transport the food to the pharynx by sealing the oral cavity, initiation of swallowing begins in the pharyngeal phase⁷.

Many factors influence the feeding performance in neonates normal burst and pause phase such as age, attachment position, duration of feed, tiredness and satisfaction and hunger, milk flow rate and production⁸. Major factors influencing direct breast-feeding are immature sucking pattern and milk production. Immature sucking pattern is due to preterm birth⁹.¹⁰ Healthy term neonate has matured sucking pattern at the time of birth. Sucking is characterized by co-ordination of swallow followed by respiration, in which many components are involved such as cortex, brain stem and cranial nerves^{11,12}.

The bond present between mother and the neonate before infant begins is feeding process oxytocin released in response to neonates crying. Both physiological and psychological benefits present in direct breast-feeding. There is a complicated mechanism underlying between mother and child direct breast-feeding. Another common factor influencing the milk flow is stress. The common cause for stress in maternal period is neonate in neonatal intensive care unit. Breast pumps are used in neonates who have difficulty in direct breast feeding but the feeding method differs from the direct breast feeding and it doesn't show successful result in milk production^{13,14}.

In normal term neonate rate of suck and swallow, and quantity of milk intake per suck will be increased gradually¹⁵. Harmonized and safe way of oral feeding is depending on the maturity of nervous system, oral cavity and gastrointestinal tract. First indicator of neurological problem is feeding difficulty in infant period¹⁶. Sucking pattern are analyzed using ultrasound method during direct breast-feeding and through artificial method^{17, 18, 19}. Several studies have examined the sucking patterns of preterm and term newborns, however there has been a limited study on quantitative evaluation of suckling among term infants. A lot of variations in performance were noticed not only among diverse types of term and preterm, but also within the similar type. There is a lack of comparison between breast-feeding neonates.

The dental malocclusion contributed by environmental factors including nonnutritive suckling habits such as suckling of thumb and the usage of a pacifier, as well as bottle feeding²⁰. Suckling behaviors in breastfeed or bottle-feed newborn using teats revealed the same nutritional sucking process in aspects of sucking action, pause, and rate^{21, 22}. Additional disadvantage of feeding using bottle is nipple confusion, it causes infants to choose the drift of teat and proceeds the milk in huge amount with the minimum action, contrast to nipple flow^{22, 23}. But it is essential for the infant to suck the direct breastfeed for the nutrition supply. Hence, the current study focused to quantitatively evaluate the normal sucking range among term neonates during breastfeeding.

METHOD:

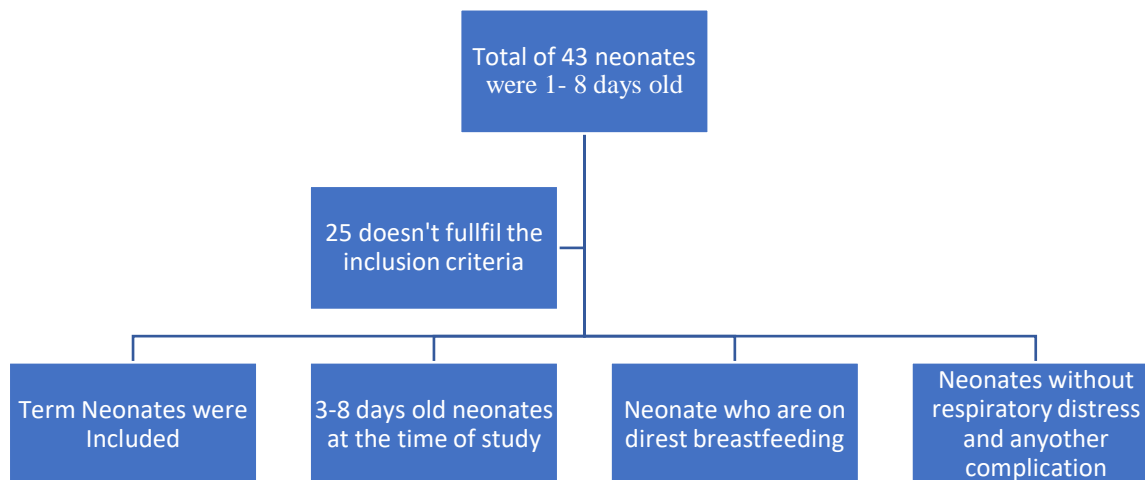
Study design: Prospective observational study.

Sampling technique: Purposive sampling was done.

Study setting and duration of the study: The study was carried out between the April starting and the May ending in the year 2021 at the physiotherapy department in collaboration with the Neonatal intensive care unit (NICU) at the Pediatrics department, Saveetha Medical College and Hospital, Tamilnadu, India.

Ethical and consent: The prospective observation research was done after the approval of Institutional Scientific Review Board, in Saveetha Institute of Medical And Technical Science. After explaining the study, written informed consent form was signed by the parents of the neonates who were participated. The study was approved by the IEC.

Selection criteria: All term neonates born in Saveetha medical college and hospital, Thandalam, India, they are greater than or equal to 37 weeks gestation and have a birth weight of 2500g or more. 3 to 8 days old neonates who are exclusive direct breast-feeding who's LATCH score were greater than 8 at the time period of April 2021 to May 2021 were included. Mother-neonate pair were recruited. Neonates with feeding difficulties were excluded such as maxilla-facial congenital anomalies, problem with upper respiratory tract and neonates in NICU.



FEEDING SESSION:The length of feeding observation 10 minutes will be same for all neonates of 3-8 days. Special care will be provided at the beginning of the feeding sessions, for correct attachment of the neonate to the mother, with proper position of the head and trunk for direct breast-feeding. It also includes comfortable environment.

DATA COLLECTION:

Observation was made during regular feeding time of the neonate by prior information given to the mother before day. Observations were made similar for each subject. By observing the movement of jaw, cheeks and surrounding musculature is taken as one successful suck. Through this method number of sucks were calculated during the first 10 minutes of direct-breastfeeding, within that 10 minutes, three 1minute values were taken on random sequence.

OUTCOME MEASURE:

Neonates whose LATCH score^{24, 25} were greater than 8 are enrolled in this study. Neonates will feed direct-breast milk, at their own pace. The frequency of suckling in a random 3-minute feeding noticed over a 10-minute period in babies aged 3 to 8 days will be used as the result. The observation of the jaw movements, cheeks, and surrounding muscles during direct-breast feeding is used to measure the number of sucks²².

DATA ANALYSIS:

In this study, the reported data will be used to determine the feeding, in aspects of sucks per minute, while breast-feeding. Gender analysis of 18 neonates were male and female ratio of 11:7with the percentage of 61% and 39%. Mean and standard deviation of age group selected

were (4.83 +/-1.61), with the mean birth weight of (3.082 +/-0.48). To evaluate normal sucking range, mean and standard deviation were used (Table1).

Table 1. DEMOGRAPHIC DATA:

Male and female ratio	11:7
Percentage of male and female	61% and 39%
Mean +/- standard deviation of neonates age	(4.83 +/-1.61)
Mean +/- standard deviation of birth weight	(3.082 +/-0.48)
Mean +/-_standard deviation of sucking rate	(51.62+/-6.96)

RESULTS:

This study recruited term neonates with a male to female ratio of 11:7 and birth weight of greater than or equal to 2500g. The goal of the study was to measure the sucking range, number for continuous 10 minutes and random 3 minutes were taken. Means and standard deviations were calculated for number of sucks shown in table 1. The average range of sucking rate was L_H, (51.62-6.96_51.62+6.96) which is (44.66_58.58). The analysis of statistical data showed the normal sucking range among healthy terminfants was (45-59).

DISCUSSION:

Various techniques were available to analysis the sucking pattern in neonates such as, with the use of transducer or any other sensor-based devices²⁶. These advanced techniques can give an accurate value but still they interrupt with neonates feeding performance, as well as mother and child bond. Simple method of calculating feeding performance in sucking rate through direct observation²².

During the first few days of neonate's life, neonates find difficulty in maintaining harmonized way in-between suck, swallow and breathe²⁷. Sucking immaturity is the major problem faced during the neonatal period and still there is a lag in identifying the individuals with sucking difficulty. Poor LATCH score indicates neonates need assistance during direct breast-feeding and hence, neonates with LATCH score of greater than 8 were enrolled in this study^{24,25}. Sucking rate is measured through direct observation by movement of jaw, cheeks and surrounding musculatures but it cannot reveal whether neonate having difficulty in feeding. Hence, the normal sucking range (sucking rate per minute) is measures to identify the infant with sucking difficulty^{22, 28,29}.

Moral A. et, al., Similar to our study used sucking rate to find difference between bottle and direct-breastfeeding method and they didn't encouraged bottle feeding for infants who were in the direct breast-feeding group²².

Lau C, used two-fold technique one with therapist finger to assess and obtain quantitative evaluation of feeding performance of the infant, and another with nipple and bottle to monitor the nutritive sucking. In contrast to our study, they used therapist finger to observe the sucking burst in the infants¹⁹.

Kron et, al., used sucking rate or minute rate throughout the feeding session along with minute pressure and minute consumption through nutritive method but not through direct breast-feeding method to analyze feeding behavior²⁸.

In this study, healthy term neonates with birthweight of 2500g or greater than it with LATCH score greater than 8 were enlisted. Thus, it is applicable for both term and pre-term neonates. This study aimed to quantitatively measure the range of sucking in term neonates to identify the normal number of sucks produced by neonates among the age group of between 3-8 days. During this method ultrasound, transducers any other devices are not encouraged because it might distract interaction between mother-child during feeding.

CONCLUSION: Poor LATCH score results in malnourishment and further complications and neonates with feeding difficulty may produce decreased number of suck or no suck and hence they were excluded. The current study analyzed the sucking range among healthy term neonates to estimate the appropriate value without bias. According to this study neonates of age 3-8 days with the average rate of sucks in-between (45-59) are termed to have a good feeding performance, in-case reduce in the range indicate early intervention need to give to improve the feeding pattern. Future researches with optimal sample size and randomization are required to estimate the range between term and pre-term neonates.

CONFLICT OF INTEREST: Nil

SOURCE OF FUNDING: Nil

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