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The Effect of Pre-Feeding Oral Stimulation on The Sucking Ability of LBW Babies in The NICU Room

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Abstract
Introduction: *The inability to drink in LBW is caused by weak sucking muscle ability and unstable oral ability and swallowing and breathing on LBW babies influenced by maturity of the structure of the brain and cranial nerves. The LBW babies taken care does not suck directly on the mother's breast, this is because the mother and baby are taken care for separately.* ***Objective****: To analyze the effect of Pre-Feeding Oral Stimulation on the sucking ability of LBW Babies in the NICU Room at Harapan Insan Sendawar General Hospital.* ***Method:*** *This study used experimental research with one group pre-test and post-test. The population in this study were all LBW infants who were treated in the NICU room.* ***Results and Discussion:*** *The result of research was gained that the average of baby's sucking ability before oral stimulation was 2.67 where the lowest value of sucking ability is 0 and the highest value of sucking ability was 6. The average of baby's sucking ability after oral stimulation is 3.73 where the lowest value of sucking ability was 1 and the highest value of sucking ability was 7. The Statistical test results by conducting Wilcoxon T test were found that the P value was 0.01. So, the p-value (0.01) is smaller than the alpha value (0.05), it means that the null hypothesis is rejected.* ***Conclusion****: There is an effect of Pre-Feeding Oral Stimulation on the Sucking Ability of LBW Babies in the NICU Room at Harapan Insan Sendawar General Hospital in the year 2022.*
Keywords: Pre-Feeding Oral Stimulation; Sucking Ability; Low Birth Weight Babies;

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Introduction

Low Birth Weight hereinafter referred to as SLBWB is a baby born with a body weight of less than 2500 grams, regardless of the age of gates (Raudah et al., 2022). SLBWB can be caused by 2 things premature birth or birth at 37 weeks of gestation < 37 weeks IUGR (Intrauterine Growth Restriction) which is usually called disruption of fetal growth (Hartiningrum &; Fitriyah, 2018)

According to the World Health Organization (WHO, 2015) in the world there is an incidence of low birth weight is as much as 15.5% which means about 20.6% of babies born each year and 96.5% of them are in developing countries including Indonesia. Based on data from the Ministry of Health (DEPKES, 2018) the prevalence of low birth weight in Indonesia is 6.2%.

SLBWB does not have a strong drinking ability, inability to drink in SLBWB is caused by the ability of the muscles to suck is still weak, oral ability is not stable and causes related to neurological disorders on the effectiveness of sucking, swallowing and breathing reflexes in SLBWB are influenced by maturity of brain structure and cranial nerves (ANANDA, 2019)

Difficulty drinking is characterized by weakness in sucking, this is a concern for health workers because it often delays the change to the process of drinking or breastfeeding by mouth independently (AMELIA, 2022). When delaying discharge from the hospital negatively affects the relationship between mother and baby and becomes the cause of a process of drinking disorders in the baby. These various reasons are a reference for early intervention to improve oral feeding ability by stimulating the ability to suck on SLBWB.

Perioral (structures outside the mouth) and intraoral (structures inside the mouth) stimulation programs are one of the interventions used to improve sucking ability in SLBWB infants (Maghfuroh et al., 2021). There is an effect of oral stimulation on the development of sucking, improved digestion and the potential to reduce the length of hospital stay after perioral and intraoral stimulation for 15 minutes each day.

Based on the initial observations of researchers conducted at Harapan Insan Sendawar Hospital, it was obtained from annual records in the Neonatal Intensive Care Unit (NICU) room in 2020-2021, the total number of SLBWB babies who experienced problems with oral feeding stimulation was 80%.

From the observations and experiences of researchers in the NICU room, the average act of teaching stimulation is only done by doctors, but now researchers feel this is part of nursing intervention, so as NICU room nurses want to teach infants and parents about oral stimulation so that the baby can have a stronger sucking reflex.

From the observations of researchers conducted in January-December 2020 in the NICU room of Harapan Insan Sendawar Hospital, the total birth of SLBWB was 99 babies, with a body weight of 1000-1500 grams of 26 babies and ≤ of 2500 grams as many as 73 babies. Then from the total, there were 32 babies with oral feeding problems, while in 2021 from January to November there were 77 babies weighing ≤1000 grams 4 babies, 1000-1500 grams as many as 14 babies ≤ 2500 grams as many as 49 babies. Of the total,

34 babies had problems with oral feeding. Babies with SLBWB who are treated do not breastfeed directly on the mother's breast, this is because the mother and baby are treated separately.

Where the baby is usually cared for in the Neonatal Intensive Care Unit (NICU) or because the baby's mother has gone home first, while the baby still needs special care. Babies need to be fed with milk and given through the orogastric tube according to the baby's target needs. If breast milk is not given by the mother to the baby, there will be swelling in the mother's breast and nutrition for the baby has not been fulfilled so that the baby often cries because the baby still feels hungry, therefore the length of hospital treatment also increases for the baby and his mother. So, the hospital wants to try the baby is to massage the baby's cheeks so that the baby can have stimulation to swallow faster and stronger, that is where the nurse sees to what extent the baby's ability to swallow.

Method

This research is an experimental study. The research design used was a pre-experimental design o*ne group pre-test-posttest.* This design involves a group that is given a pre-test (O1), given treatment (X), and given a post-test (O2) with the aim of looking for the influence of one variable with another variable by providing special treatment and strict control in a condition.

To measure the dependent variable, the author used the Early Feeding parameter instrument and observation sheet. In this study, researchers used observation sheets of oral stimulation work procedures and observation sheets of drinking ability as research instruments.

The data obtained will be processed and the results will be displayed in percentage frequency distribution tables using univariate analysis formulas. Univariate analysis is used to determine the proportion of each research variable. Data is presented in tabular form & interpreted, then the data is processed with the help of computerization using statistical tests.

After complete data is collected and tabulated based on the sub-variables studied, then calculations are carried out using the Paired T Test statistical test with consideration of the purpose of this study is to determine the influence of independent variables and dependent variables without any control group, the data scale used is ordinal and the sample used is free.

Result and Discussion

Result

Univariate Analysis

Table 1

Frequency Distribution of Respondents' Characteristics by Gender in the NICU of Harapan Insan Sendawar Hospital West Kutai in 2022

No	Characteristics of respondents by gender	Frequency	Percentage
1.	Man	7	46,7
2.	Woman	8	53,3
	Total	**15**	**100**

Based on table 1, it is known that as many as 8 (53.3%) respondents were female, while 7 (46.7%) respondents were male.

Table 2

Frequency Distribution of Respondent Characteristics Based on Gestational Age in the NICU room of Harapan Insan Sendawar Hospital West Kutai in 2022

No	Characteristics of respondents based on gestational age	Frequency	Percentage
1	29-30	1	6,7
2	31-32	2	13,3
3	33-34	5	33,3
4	35-36	5	33,3
5	37-38	2	13,3
	Total	**15**	**100**

Based on table 2, it is known that the most respondents at gestational age 33-34 were 5 (33.3%) and gestational age 35-36 as many as 5 (33.3%).

Table 3

Frequency Distribution of Respondents' Characteristics Based on Birth Weight in the NICU room of Harapan Insan Sendawar Hospital West Kutai in 2022

No	Characteristics of Respondents Based on Birth Weight	Frequency	Percentage
1	1000-1500	1	6,7
2	1600-2000	11	73,3
3	2100-2400	3	20
	Total	**15**	**100**

Based on table 3 it is known that as many as 1 (6.7%) respondents have a Birth Weight between 1000-1500 grams, as many as 11 (73.3%) respondents have a Birth Weight between 1600-2000 grams, and as many as 3 (20%) respondents have a Birth Weight between 2000-2400 grams.

Table 4

Frequency distribution based on duration of oral stimulation intervention di ruang NICU Harapan Insan Sendawar Hospital Kutai Barat 2022

No	Lama intervened	Total	Percentage
1	1-3 Hari	4	26,7
2	4-5 hari	9	60
3	6 hari	2	13,3
	Total	**15**	**100**

Based on table 4, it is known that as many as 4 (26.7%) respondents with a duration of oral stimulation intervention 1-3 days, as many as 9 (60%) respondents with a duration of oral stimulation intervention 4-5 days, and as many as 2 (13.3%) respondents with a duration of oral stimulation intervention 6 days.

Table 5

Normality Test *Shapiro-wilk normality test* at pre-test and post-test

Value Variables	p -value	Information
Ability to drink after oral stimulation	0.037	Data is not normally distributed

Table 5 shows that there are variables of drinking ability after *oral stimulation* obtained data are not normally distributed

Table 6

The ability to suck low birth weight babies (SLBWB) before oral stimulation is carried out in the NICU RSUD Harapan room of Sendawar Sendawar West Kutai in 2022

No	Pre-Test Value	Frequency	Percentage
1.	0	1	6,7
2.	1	5	33,3
3.	2	1	6,7
4.	3	4	26,7
5.	4	1	6,7
6.	5	1	6,7
7.	6	2	13,3
	Total	**15**	**100**

Based on table 6, data was obtained that as many as 5 SLBWB infants (33.3%) received a score of 1 for the ability to suck before oral stimulation.

Table 7

The Ability to Suck Low Birth Weight (SLBWB) Babies After *Pre-Feeding Oral Stimulation* in the NICU Room of Harapan Insan Sendawar Hospital West Kutai in 2022

No	Pre-Test Value	Frequency	Percentage
1.	1	1	6,7
2.	2	5	33,3
3.	3	2	13,3
4.	4	2	13,3
5.	5	2	13,3
6.	7	3	20,0
	Total	**15**	**100**

Based on table 7, data was obtained that as many as 5 SLBWB babies (33.3%) received a score of 2 for the ability to suck after oral stimulation.

Bivariat Analysis

Table 8

Average Distribution of the Sucking Ability of Low-Birth-Weight Babies (SLBWB) Before and After *Pre-Feeding Oral Stimulation* was carried out in the NICU Room of Harapan Insan Sendawar Hospital West Kutai in 2022

Variable	N	Mean Rank	p-value
The ability to suck before the intervention	**15**	**.00**	**0,001**
The ability to suck after the intervention		**7.50**	

From the results of the study, it was found that the mean rank of infants before being given pre-feeding oral stimulation intervention was 0.00 while the ability after being given the intervention mean rank was 7.50 The results of statistical tests obtained p value = 0.001 means that at alpha 5% there was a significant difference between the ability to suck babies before and after being given pre-feeding oral stimulation intervention

Discussion

The results of the study based on table 1 found that as many as 8 (53.3%) respondents were female, while 7 (46.7%) respondents were male. The total number of female respondents is more than male respondents. Based on a statement from Nurcahayati, n.girsang, b.M., &; wahyuni, d, (2018) that baby boys have more physical strength than baby girls. Based on this table, it was found that most gestational ages had a gestational age of 33-34 weeks as much as 5 (33.3%) and respondents had a gestational age of 35-36 weeks. Weak suction reflex in premature babies is something that is often encountered, this is based on research conducted by Yuanita Yusuf (2019) at (Fatimah &; Purwaningsih, 2022) which states that this mechanism can only be coordinated by the

baby to begin breastfeeding around 32-34 weeks of age and becomes very effective at 36-37 weeks gestation.

This is supported by research conducted by (Thakkar et al., 2018) Premature babies often have difficulty feeding by mouth due to hypotonia, immature oro-motor control and lack of coordination in sucking, swallowing and breathing. According to the assumption of researchers in this study, Total respondents at gestational age less than 36 weeks became the cause of weak ability to suck the baby, so oral stimulation was necessary.

The results of this study also showed that the total respondents who had a birth weight range between 1600-2000 were more, namely a total of 11 respondents. Low Birth Weight Babies often have difficulties *oral feeding* due to organ immaturity resulting in the failure of care for Low Birth Weight Babies (Roesli Utami, 2016) at (Sugiati et al., n.d.).

According to *the World Health Organization* (WHO), all newborns with a birth weight of less than 2,500 grams are called *Low Birth Weight Infants* (SLBWB). Characteristics of healthy newborns weight 2,500-4000gram with body length 48-52 cm, chest circumference 30-38 cm, head circumference 33-35 cm, heart frequency 120-160 times / minute, breathing approximately 60-40 times / minute. Low newborns have three infant reflexes, namely the suction and swallowing reflexes, the morrow reflex or hugging motion when startled, and the graps reflex or grasping. According to the researchers' assumptions, weak suction reflex is caused by lack of energy and has not formed organs optimally in SLBWB babies

The results of the study based on table 6 obtained the average sucking ability of infants before oral stimulation, where the lowest value of sucking ability was 0 as many as 1 (6.7%) respondents and the highest value of sucking ability was 6 as many as 2 (13.3%) respondents. The ability to suck in conditions before oral stimulation is still not optimal.

That the suction reflex before oral stimulation was that most had less suction reflex which was as many as 15 respondents (54%) and a small percentage had a good suction reflex which was as many as 1 respondent (3%)

Research by (Saputro &; Megawati, 2019) The characteristics of respondents based on the suction reflex before oral stimulation at IRNA Mawar RSUD dr. Iskak Tulungagung in 2017 showed that, out of 30 respondents all SLBWB babies experienced a weak suction reflex (100%). The immature development of sucking in premature babies is characterized by the emergence of oral feeding problems that will cause delays in breastfeeding, low body weight and dehydration during the early weeks after birth. This sucking weakness is associated with the maturity of the baby's nerve structure and the strength of the mouth muscles. Infants younger than 1 week usually experience delays in oral feeding problems.

Another researcher, Lessen (2011) deep (ANANDA, 2019) reported that oral stimulation (*premature infant oral motor intervention*Babies can drink five days sooner and go home two to three days sooner. Oral stimulation was performed five minutes a

day, for seven days in nineteen premature infants with gestational age 26–29 weeks. Baby premature do not have adequate drinking ability.

Inability to drink in premature infants is caused by the ability of sucking muscles is still weak, oral capacity is not stable, and causes related to neurological disorders. The effectiveness of coordination between sucking, swallowing, and breathing reflexes in premature infants is influenced by the maturity of brain structures and cranial nerves

In accordance with the theory that an infant's drinking ability is a measure of observation, oral feeding skills can be used from the moment of initiation of oral breastfeeding to maturation of oral feeding skills. The initial section, "Oral *Feeding Readiness*," is designed to assess whether the infant has sufficient energy to eat, is under optimal circumstances, and has sufficient baseline oxygen saturation. The middle section, "*Oral Feeding Skills*," has items for assessing four important skill domains for eating. The final section, "*Recovery Oral Feeding*," is used to evaluate the impact of feeding on infant alertness, energy levels, and physiological systems.

The baby will have difficulty in the coordination of sucking, swallowing, and breathing, resulting in apnea, bradycardia, and decreased oxygen saturation. In infants with deficient sucking and swallowing reflexes, nutrients can be provided through the sonde to the stomach. The stomach capacity of premature babies is very limited and it is easy to experience abdominal distention that can affect breathing.

According to the researchers' assumptions, the baby's ability to suck well is needed because with good suction it can be given good nutrition, so that it can meet nutritional needs. If the baby's sucking ability is less it will be at risk to the baby because nutritional intake cannot enter so that nutrients are also not fulfilled which will result in apnea, bradycardia and decreased oxygen saturation. Lack of ability to swallow is also due to the premature age of the baby because the suction muscle is still weak.

The results of the study based on table 7 also obtained that after oral stimulation, where the lowest value of sucking ability was 1, which was 1 (6.7%) respondents and the highest value of sucking ability was 7, namely 3 (20%) respondents. This data shows a change in the average sucking ability of babies. Thesuction reflex after oral stimulation was that most had sufficient suction reflexes, namely as many as 18 respondents (64%) and a small number had less suction reflexes, namely as many as 4 respondents (14%).

Research conducted by (Saputro &; Megawati, 2019) showed that most respondents after oral stimulation, the suction reflex of SLBWB infants became strong at 23 babies (76.7%). SLBWB babies who are given oral stimulation for 15 minutes per day will experience an increase in the effectiveness of the suction reflex per day in total 20% to 47% more than those who do not do oral stimulation according to research conducted by physiotherapists T. Field and Scafidi. In infants less than 0-1 month old who are stimulated 15 minutes 1 x a day for 7 days a strong suction reflex is obtained. Sensory stimulation of these oral structures can enhance oral structures in the sucking process (*sucking*) and swallow (*Swallowing*). Stimulation is carried out in the perioral including pressing the cheek area, lips as much as 8 X and intra oral including the inner cheeks,

lower upper gums, tongue using a pacifier (4x each side of the gum) for ± 5 minutes followed by placing the pacifier in the middle of the palate to trigger the suction reflex by letting the baby suck the pacifier.

Oral motor intervention or oral stimulation is defined as sensory stimulation of the lips, jaw, tongue, soft palate, pharynx, larynx and respiratory muscles that are influential in the oropharyngeal mechanism. Sensory stimulation of these oral structures can increase the ability of oral structures in the process of sucking and swallowing (Niatul, 2021)

The results of statistical tests by doing the *Wilcoxon test* obtained a p value of 0.000. The P value (0.000) is smaller than the alpha value (0.05) which means that the null hypothesis is rejected. It can be concluded that there is an effect of *pre-feeding oral stimulation* on the ability to suck in SLBWB babies in the NICU room of the Harapan Insan Sendawar Regional General Hospital. This result is in line with research conducted by Saputro & Megawati (2017) showing thatbased on the results of the *Paired Sample T-Test* test obtained p *value* = 0.000 < alpha 0.05, so that H0 was rejected and H1 was accepted. There are differences in the suction power of SLBWB babies before and after oral stimulation is given, thus there is an effectiveness of oral stimulation against weak suction reflexes in SLBWB infants at IRNA Mawar RSUD dr. Iskak Tulungagung, it was found that there was an effect of oral stimulation on the suction reflex of SLBWB babies.

The ability to suck in premature babies is influenced by internal factors, namely gestational age and external factors, namely stimulation. Oral stimulation carried out by massage, muscle blood flow will increase causing vasodilation of active muscles so that oxygen and other nutrients in the total tissue increase and cardiac output will increase.

Oral stimulation with massage of vagus nerve tone (Xth nerve) which will increase the absorption of gastrin and insulin thus better absorption of food and faster weight gain. Increased activity of the vagus nerve will cause the baby to get hungry quickly which will stimulate the suction reflex and will feed more often to the mother. The sucking process involves structure and function in the area of the cavity of the mouth, lips, tongue, soft and hard palate and jaw.

Muscles that play an important role are the tongue and pharyngeal muscles. Other muscles that also play a role are the muscles around the face. Muscle weakness is one of the causes of the weak sucking process. Oral stimulation is able to boost the immune system. increase the flow of lymph fluid throughout the body to cleanse harmful substances in the body, positively change brain waves, improve blood circulation and breathing, stimulate digestive and disposal functions, increase weight gain, reduce depression and tension, promote deep sleep, reduce pain, reduce bloating and colic (abdominal pain), improve the inner relationship between parents and their babies, increase the volume of breast milk, develop communication, understand baby cues, increase self-confidence

Special oral stimulation interventions that provide movement assistance to activate muscle contractions and to provide movement against resistance to build strength. The focus of this intervention is to improve functional responses to pressure and movement, reach, strength, and control of various movements of the lips, cheeks, jaw and tongue.

Oral motor is a basic survival skills such as sucking and swallowing with babies beginning with the third month of pregnancy. The strong suction reflex in babies occurs 30 minutes after delivery, so it is highly recommended if the baby's reflexes are strong within 30 minutes of being breastfed.

A sign of a strong suction reflex is that if stimulation is given to the baby's mouth, the baby immediately sucks it. The suction reflex that is still weak in infants is characterized by the baby is lazy to bend, the cough reflex has not been sempuma, and is not immediately responsive or sucked when given stimulation to the mouth. According to the researchers' assumptions, the condition of a baby with low birth weight can be seen that the ability to suck or drink will be reduced due to the body's ability to respond. The baby's sucking ability will be affected by the stimulation given to the baby. The more often oral stimulation is given to the baby, the more trained the baby will be to suck. Oralstimulation in low weight is very important to cause weak suction reflex stimulation to be stronger.

This shows that the results of the study are in accordance with the theory that oral stimulation reflexes have a significant influence on suction reflexes in SLBWB infants. Basically, the suction reflex is not influenced by the sex or weight of the baby. The suction reflex tends to be related to nerve maturity, because the suction reflex is generated by cranial nerve stimulation. If the baby is born prematurely, then the nerves are immature so that in premature babies it is always followed by a weak suction reflex.

Conclusion

Based on the results of research and analysis that has been done, it can be concluded; First, SLBWB babies who were respondents in this study were 8 (53.3%) female participants, while male respondents were 7 (46.7%) people. Second, the ability to suck babies before oral stimulation where the lowest value of sucking ability is 0, which is as many as 1 (6.7%) respondents and the highest value of sucking ability is 6, which is as many as 2 (13.3%) respondents.

Third, the ability to suck babies after oral stimulation where the lowest value of sucking ability is 1, which is as many as 1 (6.7%) respondents and the highest value of sucking ability is 7, which is as many as 3 (20%) respondents. Fourth, the results of statistical tests by conducting the *Wilcoxon test* found results that the p value was 0.001. Where the p-value (0.001) is smaller than the alpha value (0.05) which means that the null hypothesis is rejected. It can be concluded that there is an Effect of *Pre Feeding Oral Stimulation* on the Ability to Suck in SLBWB Babies in the NICU Room of the Harapan Insan Sendawar Regional General Hospital in 2022.

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