Effect of Evidence-Based Protocol regarding Transition to Oral Feeding on Neonatal Nurses and Preterm Infants Outcomes

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Abstract

Background: Implementing evidence-based feeding protocols for premature infants is essential as they significantly enhance clinical outcomes such as improved weight gain, height development, and head circumference measurements. These protocols also facilitate a successful transition to oral feeding, ensuring comprehensive care for premature infants. **Aim:** Evaluate the effect of evidence-based protocol regarding transition to oral feeding on neonatal nurses and preterm infants' outcomes. The **design**: is quasi-experimental. **Setting:** The study was conducted in the NICU at Children's Hospital, Mansoura University, Mansoura City, Egypt. **Subject:** The current study involved two groups (nurses and preterm infants) as follows: All nurses (53) working in the previously mentioned setting as well as a convenience sample of (40) preterm infants from both genders. **Tools of data collection**: Tool I: Demographic Characteristics tool, Tool II: it consisted of two parts Part one: Neonatal nurses' knowledge about transition to oral feeding in preterm infants: Part two: Neonatal nurses' practical knowledge regarding transition to oral feeding in preterm infants: Tool III: Neonatal nurses' practices regarding transition to oral feeding in preterm infants**. Results:** Statistically significant differences ($P \leq 0.001$) were observed in the total scores of neonatal nurses' knowledge and practices related to transitioning preterm infants to oral feeding in NICU settings before and after the introduction of an evidence-based protocol. **Conclusion:** This indicates that the implementation of the protocol led to improved knowledge and practices among the nurses regarding oral feeding in preterm infants.**Recommendations:** Healthcare professionals in the neonatal intensive care unit should apply safe, evidence-based practices such as skin-to-skin care, non-nutritive nursing, test weight, alternate feeding modalities, and nipple shields to smooth the transition to full oral feeding.

Keywords: Evidence-Based Protocol, Transition, Feeding, Neonatal, Nurses, Preterm, Infants, Outcomes

Introduction:

Approximately 20 million infants are born preterm annually (>37 weeks), a figure that continues to rise. Many preterm newborns can be fed orally for extended periods postnatally **(Collins et al., 2016; Premji, 2019; Lincetto & Banerjee, 2020)**. These infants commonly experience poor oral-motor development, with feeding issues twice as prevalent compared to full-term infants. Oral feeding, involving coordination of sucking, swallowing, and breathing, is complex and typically develops around 32–34 weeks of gestation. Delayed transition to independent oral feeding in premature infants can lead to prolonged tube feeding, delaying autonomy in oral feeding and necessitating ongoing medical care, potentially contributing to eating disorders, delayed hospital discharge, and increased financial burdens **(Touzet et al., 2015; McKinney et al., 2016; Moreira et al., 2017)**.

Various sensorimotor interventions such as non-nutritive sucking (NNS), kangaroo care, tactile and kinesthetic stimulation, and oral stimulation are employed to enhance oral feeding skills in preterm infants. Due to their immature oral-motor skills, tube feeding (orogastric and nasogastric) is commonly preferred initially. As infants grow postnatally, alternative methods like bottle feeding, cup feeding, spoon feeding,

and syringe feeding become prevalent alongside tube feeding. Shortening the transition to direct breastfeeding is crucial for sustaining breastfeeding, reducing hospitalization duration, and ensuring adequate nutrition **(Miller et al., 2014; Schanler et al., 2014; Rocha et al., 2017 Lubbe, 2018; Rhooms et al., 2019)**

Various interventions have proven effective in speeding up the transition from tube to full oral feeding, which also shortens hospital stays. Using a pacifier for non-nutritive sucking speeds up the transition to full oral feeding, leading to earlier removal of feeding tubes and shorter hospitalization periods. Introducing suck feedings early likewise hastens the shift from tube to oral feeding, enabling quicker tube removal. Pre-feeding stimulations of the cheeks, lips, jaw, gums, and tongue help achieve full oral feeding sooner without significantly affecting the length of hospital stay. Moreover, interventions involving oral-motor exercises, including facilitated movements to stimulate muscle contractions and resistance training for muscle strength, contribute to accelerating the achievement of complete independence in oral feeding (**Lessen, 2011)**.

According to Kish (2013), infants' readiness for oral feeding is determined by the coordination of sucking, swallowing, and breathing functions, influenced by factors such as gestational age, regulation of behavioral states, physiological stability, and the supportive environment provided by caregivers.

Achieving full oral feeding is a critical milestone for premature infants and is often a key criterion for hospital discharge. Each infant's feeding readiness and skills are identified based on their health status and developmental progress. Regular assessments by skilled providers are essential to evaluate oral readiness and feeding performance. Implementing evidence-based feeding protocols in premature infants is crucial as they positively impact clinical outcomes such as weight, height, and head circumference. These protocols help structure the stages of feeding transition and may enhance overall clinical results. Future research could focus on different evidence-based feeding protocols to optimize the transition stages, thereby reducing the time and effort required from nurses, which is vital for clinical feasibility **(Kültürsay et al., 2018; Aatif et al., 2018; Celen, Tas Arslan, & Soylu, 2021)**.

This research focused on identifying strategies, durations, and assistance necessary to start oral feeding in premature infants successfully. Thus using the multidisciplinary team in NICUs leads to proper oral feeding discussion and translates the research results into clinical practice through using updated evidence-based practice. Applying evidence-based practice clinical guidelines in the NICU greatly affects the consistency, continuity, and quality of care for premature infant feeding. In addition, it supports providing care decisions based on the best scientific knowledge, enhances positive hospital culture regarding proper feeding process in addition to using strong scientific evidence, and allows the clinicians to be more secure in their clinical judgment. Neonatal nurses have an important role in assisting premature infants transition to oral feeding through evaluate the readiness of the infants for oral feeding and implement evidence-based interventions like semi-elevated side-lying positioning, feeding based on cues, non-nutritive sucking, and activities to improve oral-motor skills **(Bakker, Jackson & Miles, 2021; Ghomi et al., 2021).**

Significance of the study:

Neonatal nurses are essential for ensuring premature infants transition securely and effectively to oral feeding. However, there is limited understanding of nurses' practices and knowledge regarding this process, with few studies examining factors influencing infants' readiness and the effectiveness of interventions. Research on nurses' awareness and performance of evidence-based practices during this transition remains insufficient **(Girgin & Gözen, 2020)**. Neonatal nurses' knowledge about oral feeding readiness, cue-based feeding, positioning, non-nutritive sucking, and oral-motor development techniques needs enhancement to support preterm infants effectively in feeding. Applying evidence-based feeding interventions in the NICU is essential for a safe transition to oral feeding **(Lubbe, 2018; Girgin & Gözen, 2020)**.

Aim of the study:

This study aimed to evaluate the effect of evidence-based protocol regarding the transition to oral feeding on neonatal nurses and preterm infants' outcomes

Hypotheses:

H 1: The implementation of evidence-based protocols is anticipated to enhance neonatal nurses' knowledge and practices related to the transition to oral feeding in preterm infants.

H 2: Infants' outcomes are expected to be improved after the implementation of evidence-based protocol.

Subject and Methods

Design:

This study utilized a quasi-experimental design with a single group undergoing pretest and posttest evaluations.

Setting:

The study was conducted in the NICU at Children's Hospital, Mansoura University, Mansoura City, Egypt, over three months, from April 2024 to June 2024.

Subjects:

The study included two distinct groups, namely nurses and preterm infants.

- All nurses (53) working in the previously mentioned setting with different ages, educational backgrounds, and years of experience.
- A convenient sample of (40) preterm infants from both genders who were admitted to NICU and exposed to transition to oral feeding was involved in the current study. The following were considered as inclusion criteria: preterm infants of both sexes; gestational age 32-36 weeks; weight 1500 grams; and not receiving oral milk until inclusion in the study. The exclusion criteria comprised: (1) commencing oral feeding, (2) requiring mechanical ventilation, (3) having significant congenital abnormalities, (4) undergoing surgery, or (5) experiencing severe medical conditions such as bronchopulmonary dysplasia, NEC, sepsis, or intraventricular hemorrhage.

Tools of the study:

Four tools were used in data collection: a structured questionnaire and an observational checklist, both of which were designed by researchers after a comprehensive reviewing of recent literature and studies (**Arvedson et al. 2010; Ross & Philbin, 2011; Tamilia, Formica, Scaini & Taffoni, 2016; Ghomi et al., 2019; Girgin & Gözen, 2020)**.

Tool I: Demographic Characteristics A structured questionnaire sheet comprising the subsequent two parts.

Part one: Nurses' characteristics such as age, gender, marital status, qualifications, and years of experience in NICU and attending any previous training courses regarding neonatal feeding.

Part two: Preterm infants' characteristics: These include gestational age, birth weight, sex, time at first enteral feed, and first transition time to oral feeding.

Tool II: it consisted of two parts

Part one: Nurses' knowledge regarding the transition to oral feeding in preterm infants:

It consisted of 40 items containing true and false statements to evaluate the neonatal nurses' level of knowledge about the process of transitioning preterm infants to oral feeding.

Part two: Nurses' practical knowledge regarding the transition to oral feeding in preterm infants:

The second section includes multiple-choice questions regarding the signs of infants' readiness for feeding before and during each feeding, the signs of stress or fatigue that indicate stoppage of feeding, and how to deal with difficulties of breastfeeding for prematurity.

Tool III: Nurses' practices regarding the transition to oral feeding in preterm infants: It was used to determine nurses' current practices regarding nonnutritive sucking, therapeutic tasting, alternative methods used,

criteria of nipple, and position used for bottle-feeding.

Scoring System:

A scoring system was used to assess nurses' level of knowledge about premature infant's transition to oral feeding in the NICU. They were classified as having poor knowledge if their score was below 60%, average if it ranged from 60% to less than 75%, and good if it was 75% or higher. In terms of their practices, nurses were deemed competent if they scored 85% or above and incompetent if they scored below 85%.

Tool IV: Preterm Infants Outcomes Criteria: During the transition period, assess Glucose levels during the first 24 hours of the intervention, daily volume intake, and weight every 48-72 hours.

Validity and reliability:

A group of five specialists in pediatric nursing and neonatology from Mansoura University reviewed the instruments without making any modifications based on their evaluation. The internal consistency reliability of all tool items was evaluated using Cronbach's Alpha test, resulting in a coefficient of 0.87 for tool I, 0.71 for tool II, and 0.72 for tool III.

Data Collection:

Data collection occurred from April 2024 to June 2024. Before the initiation of the evidence-based intervention, participants completed a pretest one week in advance. Following the conclusion of the program, a posttest was administered two weeks later.

Evidence-Based Protocol:

- Researchers provided group education to NICU nurses on evidence-based feeding practices for preterm infants transitioning to oral feeding.

- The educational content, including topics like evidence-based feeding protocols, infant readiness for oral feeding, hunger, and stress cues, factors influencing oral feeding, infant physiological parameters, and safe feeding strategies, was developed based on updated literature and evaluated by pediatric nursing professors and a neonatologist from Mansoura University.

- Education involved PowerPoint presentations and videos, with interactive methods like Q&A sessions, group discussions, and brainstorming.

- Each participant received a copy of an evidence-based feeding protocol at the end of the program.

Nurses, under researchers' supervision, implemented a 12-step protocol labeled from "A" to "L." **Step A** involved 5-minute nonnutritive sucking sessions every 3 hours using a pumped breast or a dry soother preterm pacifier.

Step B included a therapeutic tasting, achieved by dripping breast milk/formula onto the mother’s breast or pacifier.

Step C ensured the infant received the total oral feeding volume continuously from the breast or pacifier as drops.

Steps D–L involved feeding infants with breast milk or a feeding bottle.

In the **final stage, L**, mothers participated in feeding under nurse supervision, with a limit of 30 minutes.

- Throughout the process, nurses provided support to premature infants by swaddling them and positioning their heads in a semi-elevated, side-lying posture.

- Oral feeding success was determined within a 24-hour period when the infant received the required volume by breastfeeding or a feeding bottle. This intervention continued until discharge. Following the initiation of feeding, nurses adhered to the protocol regarding the volume and duration of enteral feeding.

- Nurses monitor signs of premature infant readiness for feeding, such as being calm and alert, responding to gentle facial touch, managing secretions, hand-to-mouth movements, mouth opening, lip licking, and maintaining a flexed body posture, alongside monitoring physiological stability before and during each feeding session.

- In addition, if the preterm infant exhibits any signs of distress or fatigue, such as

attempting to remove the pacifier, arching the body, turning the head, sudden eye-opening, increased respiratory effort, fanning out fingers, grimacing, hiccupping, experiencing aspiration, coughing, changes in skin color, apnea, bradycardia, decreased oxygen saturation, milk leakage from the mouth, or reduced sucking activity, feeding should cease.

- Following the implementation of evidence-based interventions, neonatal nurses evaluated both their outcomes and those of preterm infants using Tools II, III, and IV.

Ethical consideration:

Research Ethics Committee at the Faculty of Nursing Mansoura University provided ethical approval (Ref. No. 0572). Then the hospital's director and the heads of the NICU were given their authorized permission to conduct this study. The researchers explained the purpose as well as the process of the study to the nurses and they were assured that their participation was voluntary and they had the right to withdraw at any time. Moreover, the confidentiality of their data was ensured throughout the study period.

Statistical Analysis:

Version 21.0 of the Statistical Package for the Social Sciences (SPSS) was utilized to code and enter the collected data. The data were presented using percentages, numbers, means, and standard deviations for quantitative variables. The chi-square test was used to examine any associations between category variables. A paired t-test, associations between the continuous variables were found. The significance level (P-value) of all tests was equal to or less than 0.05.

Results:

Table 1 shows that over a third (35.8%) of the nurses were between the ages of 30 to under 35 years, with a mean age of 29.9 ± 3.4. regarding their qualifications, the majority (58.5%) held a bachelor's degree, while 35.8% diploma in nursing. Regarding their experience years in NICU, more than one-third (37.7%) had over 10 years of experience, a mean was 8.5 ± 2.1 years. Additionally, the majority (79.2%) of nurses had not participated in any teaching programs for the transition to oral feeding in preterm infants.

Table (2) reported that more than half of the neonates (55%) were females and 45% of them were males. In addition, 60% of them weighed below 1500 kg or had very low birth weight. While 20% had a body weight ranging from 1500 to < 2000kg & 2000 to ≤ 2.500 kg subsequently. As regards the time of starting enteral feeding, it was noticed that 52.5% of neonates started enteral feeding before the 5th day of birth. Regarding the type of milk feeding, 60% of newborns received a combination of expressed breastmilk and preterm formula.

Table (3) showed that there were statistically significant differences in the total scores of nurses' knowledge and practices about the transition to oral feeding in premature infants in NICU pre and post-implementation of evidence-based protocol P ≤0.001)**.**

Table (4) mentioned that there were statistically significant differences (P ≤0.001) in glucose levels at 24, 48, and 72 hours after implementation of the evidence-based protocol**.** On the other hand, there were no statistically significant differences regarding daily volume intake & weight at 24, 48, and 72 hours after implementation of the evidence-based protocol.

Table (1): Percentage Distribution of nurses'characteristics (N= 53)

Items	Frequency	%
Age in years		
▪ 20 - < 25 Y	14	26.4
▪ 25 - < 30 Y	11	20.8
▪ 30 - < 35 Y	19	35.8
▪ 35 + Y	9	17.0
X ± SD	29.9 ± 3.4	
Qualifications		
▪ Bachelor's degree	31	58.5
▪ Technical nursing institute	3	5.7
▪ Nursing Diploma	19	35.8
NICU Experience years		
▪ < 1 Y	7	13.2
▪ 1 - < 5 Y	10	18.9
▪ 5 - < 10 Y	16	30.2
▪ 10 + Y	20	37.7
X ± SD	8.5 ± 2.1	
Attending any teaching courses about transition to oral feeding in preterm		
▪ Yes	11	20.8
▪ No	42	79.2

Table (2). Preterm Neonates' Characteristics and their medical data (N=40)

Items	Frequency	%
Gender		
▪ Boy	18	45
▪ Girl	22	55
Gestational age (weeks)		
▪ 28 - < 30	15	37.5
▪ 30 - < 32	11	27.5
▪ 32 - < 34	9	22.5
▪ 34 - ≤ 36	5	12.5
Birth weight (g)		
▪ < 1.500	24	60
▪ 1.500 - < 2000	8	20
▪ 2000 - ≤ 2.500	8	20
Age (days) at the study beginning		
▪ < 7	13	32.5
▪ 7- < 14	12	30
▪ 14- < 21	6	15
▪ 21- ≤ 28	9	22.5
Time of start enteral feeding		
▪ Before 5th day of birth	21	52.5
▪ On 5th day of birth or after	19	47.5
Milk feeding type		
▪ Expressed breast milk	6	15
▪ Preterm formula milk	10	25
▪ Both	24	60

Table (3): Total Percentage Scores of Nurses'Knowledge and Practice about the transition to oral feeding in premature in NICU pre and post-implementation of Evidence-based Protocol (N= 53)

Items	Pre-implementation		Post-implementation		Test of significance	
	No.	%	No.	%	T-test	P value
Total Percent Scores of Knowledge						
▪ Poor	30	56.6	12	22.6	16.31	≤0.001
▪ Average	13	24.5	9	17.0		
▪ Good	10	18.9	32	60.4		
Mean ± SD	**14.96±3.98**		**25.5±3.59**			
Total Percent Scores of Practice						
▪ Competent	13	24.5	38	71.7	8.53	≤0.001
▪ Incompetent	40	75.5	15	28.3		
Mean ± SD	**7.36±3.14**		**10.14±0.84**			

Table (4): Preterm neonates Outcomes Criteria

Outcomes criteria	24 hours after implementation	48 hours after implementation	72 hours after implementation	P-value
▪ Glucose levels	30.67 ± 8.2	43.49 ± 3.6	46.49 ± 5.7	< 0.001
▪ Daily volume intake	150.54 ± 1.72	165.09 ± 2.64	185.67± 2.3	< 0.011
▪ Weight	1500.54 ± 3.2	1570 ± 1.3	1585± 1.6	0.005

Discussion:

Nurses in neonatal care units must possess adequate knowledge and skills to assist preterm infants in transitioning to independent oral feeding successfully **(Pratiwi et al., 2023).** Over the years, efforts have been directed toward enhancing nurses' competencies in this area **(McKenna et al., 2022)**. It is widely acknowledged that nurses play an essential role in ensuring the safe and effective transition of premature to oral feeding, highlighting the significance of education in improving nurses' proficiency **(Ketefian et al., 2005, Embleton, 2013, Girgin & Gözen, 2020).** The current study was conducted to evaluate neonatal nurses' knowledge of evidence-based intervention strategies, which aid in the process of helping premature infants transition to oral feeding.

The findings of the current study about nurses' characteristics **(Table 1)** showed that more than two-thirds of nurses were in the age group of 30 to less than 35 years. **Kritzinger et al. (2019)** who studied " Prevalence and associated prenatal and perinatal risk factors for oropharyngeal dysphagia in high-risk neonates in a South African hospital" found that conflicting results, indicating that fewer than 50% of nurses were in the 20-30 age group, contrasting with the present study's findings. **Pratiwi et al. (2023)** study findings found that over half of the nurses within the 20-30 age.

In the present study, more than half of the nurses had bachelor's degrees. This finding was similar to **Pratiwi et al., (2023**) who reported that more than half of the nurses were BScN degree holders. In addition, **Arafa et al., (2021))** who studied the " Effect of olfactory and gustatory stimulations on preterm neonates' feeding progression and sniffing away feeding tube results" study results showed that the majority of nurses had a BSN degree. Our study finding was contrary to **Naz, Afzal & Mukhtar., (2024)** who reported that less than six percent of nurses have a BSN degree. These results may be due to the NICU is being a critical working place that needs more nurses who are qualified and the BSN degree program for nurses to provide better nursing interference for preterm infants.

Concerning years of experience in the NICU, our study confirmed that more than one-third of nurses had 10 years of experience or more. The study done by **Pratiwi et al., (2023)** who studied " Prevalence and associated prenatal and perinatal risk factors for oropharyngeal dysphagia in high-risk neonates in a South African hospital" revealed that less

than half of nurses had 1-3 years of experience in the NICU contradicted these results. Furthermore, in **Fathi, Ouda, & Kunswa., (2022)**, study revealed that approximately half of the nurses had 1-3 years of Neonatal Nursing Unit (NNU) experience. The researchers suggested that this disparity in findings could be attributed to variations in the characteristics of the study subjects.

Regarding the training provided to nurses in the current study **(Table 1),** the majority of participants did not receive specific courses on transitioning preterm infants to oral feeding. The researchers speculated that this observation could be due to NICU nurses considering feeding as a fundamental daily nursing task, thus perceiving less need for specialized training compared to other skills. Moreover, they attributed this lack of training to potential factors such as inadequate in-service and continuous education programs, limited on-the-job training, and insufficient staff development opportunities within the hospital setting.

The present study outcomes revealed that more than half of the neonates were females and the rest of them were males **(Table 2).** These findings were in line with the previous research by **Pratiwi et al., (2023)** who found female premature babies were more dominant. Another research conducted by **Majoli et al., (2021)** was similar and found that more than half of the studied preterm neonates were females. In addition, contrary to the current study, **Naz, Humayoun, and Afzal., (2022)** reported that the mean age of the preterm males represented more than two-thirds and the rest of them were females. On the other hand, the study showed that sixty percent of the preterm neonates weighed less than 1500 grams or had very low birth weight. Furthermore, in the contradicted study conducted by **Wahyuni et al., (2022)** who stated that most of the infants had low birth weight conditions.

These study findings illustrated that more than half of the studied preterm neonates started enteral feeding before the 5^{th} day of birth. In addition, sixty percent of newborns received a combination of expressed breastmilk and preterm formula. This study followed **Morag et al., (2019)** who reviewed that neonates had an average of 14 days (SD = 6.98 & range 3-39 days) for the transition time from first to full oral feeding. From the first day of oral feeding attempts to the first day of full oral feeding. Similarly, **Jiménez et al. (2022)** reported a reduction in the duration required to attain full oral feeding, with mean durations of 5 ± 4.2 days and 5.9 ± 4.6 days, aligning with our findings. Additionally, **Osman et al. (2021)** observed that adhering to infant-driven feeding guidelines resulted in achieving full oral feeding three days earlier on average. The researchers hypothesized that the innovative nature of the intervention contributed to the shortened time required to achieve full oral feeding in our study.

Nurses' knowledge about oral feeding skills, cue-based feeding, positioning, non-nutritive sucking, and oral-motor development techniques needs enhancement to support preterm infants effectively in feeding. Implementing evidence-based feeding interventions in NICUs is crucial for a safe transition to oral feeding. Before implementation, only about one-fifth of nurses demonstrated good knowledge levels, whereas post-implementation, over two-thirds exhibited good knowledge. Similarly, **Beissel et al. (2022)** found that before training, nurses lacked sufficient knowledge and had inadequate practices concerning oral motor stimulation (p-value < 0.05). Another study by **Naz, Afzal & Mukhtar (2024)** who studied " Effect of Educational Intervention on Neonatal Nurses Practices Regarding Oral Motor Stimulation on Early Transition from Tube to Oral Feeding in Preterm Infants" observed a change in neonatal nurses' pre-and post-test scores from incompetent to competent concerning oral motor stimulation and the transition of preterm infants to oral feeding.

The implementation of evidence-based protocols led to a significant improvement in nurses' competency, with about one-quarter demonstrating competence pre-implementation compared to nearly seventy-two percent post-implementation **(Table 3).** This improvement may be attributed to various educational methods employed by the researchers, such as lectures, audiovisual materials, and discussions, along with the distribution of booklets reinforcing comprehensive scientific knowledge on

transitioning feeding in preterm neonates. Post-implementation, nurses exhibited increased competence, compassion, and mindfulness in their role. These findings align with **Moon et al. (2022)** found that after evidence-based treatments, Turkish nurses in neonatal units improved their knowledge and practices. In a similar with the findings of **Pratiwi et al. (2023),** they reported a statistically significant improvement in nurses' practice scores from ten percent before training to eighty-nine percent after training, underscoring the effectiveness of training interventions.

The findings of this study showed that there were statistically significant differences (P ≤0.001) in glucose levels at 24, 48, and 72 hours after implementation of the evidence-based protocol **(Table 4).** This may indicate a tangible improvement in the management of these critical aspects of neonatal care, suggesting that the evidence-based protocol was effective in optimizing glucose control and ensuring adequate nutritional support of preterm neonate care.

Conversely, while daily volume intake and weight are equally crucial metrics, the study found no statistically significant differences in these parameters at 24, 48, and 72 hours post-implementation of the evidence-based protocol. This finding was contradicted by **Celen et al., (2021)** according to study findings the main effects of the Safe IndividualizedNipple-Feeding Competence (SINC) protocol on the preterm infants' weight gain was found to be statistically significant (P < .001). The present research findings contrast with **Thakkar et al.'s (2018)** study "The Effect of Oral Stimulation on Feeding Performance and Weight Gain in Preterm Neonates" which reported significant improvements in feeding performance, faster transition to independent oral feeding, enhanced weight gain, and reduced hospital stay in the intervention group ($p < 0.001$). Despite the lack of statistical significance in the current study, the researchers emphasize the critical importance of maintaining stable daily volume intake and weight in neonatal care. This underscores the significance of monitoring these parameters closely, regardless of statistical outcomes. Even subtle improvements in these areas can have significant long-term implications for infant health and development. By prioritizing parameters such as glucose control and daily volume intake, healthcare providers can customize their approaches to better address the unique needs of preterm neonates. This, in turn, can enhance their prospects for healthy development and long-term well-being.

Conclusion:

Research findings suggest that knowledge and practices of neonatal nurses about the transition to oral feeding in premature infants improved significantly with the implementation of evidence-based protocols. Infants' outcomes are expected to be improved after the implementation of evidence-based protocol.

Recommendations:

Recommendations derived from this study include:

- Infants should be transitioned from gavage to oral feeding in line with their physiological readiness, rather than relying on weight or gestational age criteria through standard protocol.
- To enable a smooth transition to full oral feeding, healthcare professionals in the neonatal intensive care unit should apply safe, evidence-based practices such as skin-to-skin care, non-nutritive nursing, test weight, alternate feeding modalities, and nipple shields.
- Regular assessments of oral readiness and feeding performance by skilled providers are essential for infants.
- Bottle feeding should not be introduced to infants whose mothers intend to breastfeed through mother class and flyers.

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