



## EFFECTS OF USING POFRAS SCALE IN ESTIMATING ORAL FEEDING COMPETENCE IN PRETERM NEWBORNS

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### ABSTRACT

**Introduction:** The newborn's ability to feed is essential for discharge. The use of scales to assess the acquisition of oral feeding skills allows to identify feeding problems. **Objective:** To identify a tool for assessing nutritional skills in preterm infants that is suitable to be introduced to our neonatal intensive care unit (University Medical Center Sarajevo, Bosnia and Herzegovina) focusing on validity, ease of application and relevance and to apply it to our clinical context. **Materials and Methods.** Between November and December 2024, an extensive literature search was conducted using the PubMed, Cochrane and Cinahl databases. We selected the POFRAS scale because of its structured methodology and applicability. A sample of 10 nurses from our neonatal intensive care unit were divided into two groups of 5 each: nurses trained on the correct use of the POFRAS scale (intervention group) and untrained group. The observed population was 30 preterm infants of a gestational age between 32 and 36 weeks with spontaneous breathing and stable vital signs. All infants with craniofacial deformities, congenital heart anomalies and neurological disorders or syndromes were excluded. The assessments took place 15 minutes before the scheduled time for the first oral feeding. **Results:** Out of 30 preterm infants included in the study, 17 were females and 13 were males, with an average birth weight of 1830 grams. There was a significant difference between the intervention group and the control group. In the intervention group in which the POFRAS scale was used, 53.33% of the newborns (equivalent to 16 newborns) showed readiness for the transition to bottle feeding. In the control group, which did not use the POFRAS scale, only 43.33% (equivalent to 13 newborns) showed readiness to wean from the tube. There was a significant increase of 10% in the number of newborns ready for weaning from tube in the group assessed with POFRAS which is an easy and rapid tool to use in clinical practice. **Conclusion:** Assessment scales are becoming increasingly important because they allow not only an objective and shared assessment among healthcare workers of the state of maturation of the newborn's feeding function, but they also represent a guide for the nurse in determining interventions aimed at facilitating feeding and reducing the length of hospital stay. We found that POFRAS scale is suitable for implementation to our neonatal intensive care unit.

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### INTRODUCTION

Nutritional challenges are often observed in preterm infants, especially those with a gestational age of 32 weeks or less. The predominant feeding difficulties in these preterm infants result from immature or inadequate coordination of the sequence of sucking, swallowing and breathing. In cases where this

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coordination is impaired, aspiration of fluid into the trachea and subsequently into the lung structures may occur. Such aspiration events may occur without observable clinical signs. In some clinical presentations, infants may exhibit episodes of choking, shortness of breath or respiratory distress, and this may be accompanied by a decrease in oxygen saturation, apnea and bradycardia. Achieving adequate nutritional competence, to adequately support neonatal growth, remains a crucial milestone for preterm infants prior to their discharge from the neonatal intensive care unit. A significant proportion of these infants have prolonged hospital stays primarily due to these feeding challenges, often evidenced by their inability to

obtain full oral feedings without assistance. In preterm infants, the transition to full enteral feedings often requires the use of oral-nasogastric tubes. To further support the maturation of their feeding skills, adjunctive techniques such as gravity gavage feeding or mechanically controlled bolus feeding are used in conjunction with these tubes. However, these feeding methodologies have the potential to impede the critical infant-parent bond, which is essential for the well-being of the preterm infant, and may also introduce functional disturbances related to feeding tolerance. The adoption of standardized rating scales is gaining importance as they facilitate objective assessments of feeding function in individual preterm infants and assess the effectiveness of interventions to improve feeding. Therefore, these tools are essential to advance research focused on the most favorable strategies for the development of safe and independent feeding in preterm infants.

## **OBJECTIVE**

The aim of this study was to identify in the literature a tool for assessing nutritional skills in preterm infants and considering the premise described here. We conducted a prospective observational study in order to assist healthcare professionals in determining the initiation of oral feeding in premature infants and to integrate its use within our neonatal intensive care unit.

## **MATERIALS AND METHODS**

In order to determine the most appropriate scale to assess oral feeding skills in preterm infants within our neonatal intensive care unit (University Medical Center Sarajevo, Bosnia and Herzegovina), a comprehensive review of the literature was undertaken. This study aimed to evaluate the available assessment tools, focusing on their validity, ease of application and relevance to our clinical context. Between November and December 2024, an extensive literature search was conducted using the PubMed, Cochrane and Cinahl databases. The string search terms used were “assessment of oral skills in the premature infant” and “scales to assess sucking in the premature infant”. The inclusion criteria included full-text articles published in the last decade, regardless of language. Of 89 articles retrieved, 25 were considered relevant. Further refinement of this selection led to 15 articles that directly address our research question. Several assessment tools emerged from this literature review, including the SOFFI algorithm, LATCH scale, EFS scale, PIBBS scale, NOMAS scale and POFRAS scale. Among these scales, we selected the POFRAS (Preterm Oral Feeding Readiness Scale). The Preterm Oral Feeding Readiness Assessment Scale (POFRAS) was designed to assess the readiness of preterm infants for oral feeding. It includes 18 items distributed in five main categories. Each item within the scale is scored from 0 to 2, allowing for a possible cumulative score of 0 to 36. One study examined the reliability of the scale, and found excellent agreement for categories such as behavioral state, posture and global tone, lip and tongue posture, gag reflex, and ability to maintain an alert state ( $K \geq 0.75$ ). There were satisfactory scores for rooting reflex, sucking and biting actions, jaw movement, sucking effort, and sucking and pausing pattern (with  $K$  values between 0.40 and 0.75). However, some categories such as tongue cupping, sustaining sucking and pausing, and signs of stress had unsatisfactory Kappa scores ( $K \leq 0.40$ ). We decided

to use the POFRAS scale because this tool offers a structured methodology to determine the readiness of a preterm infant for oral feeding by looking beyond their simple gestational age and digging into their behavioral, oral and reflective skills. Between January and March 2025, a sample of 10 nurses from our Neonatal Intensive Care Unit of Pediatric Clinic, University Medical Center Sarajevo were divided into two groups of 5 each: Control group: nurses who did not undergo any training on the use of the POFRAS scale and continued to treat patients based on their previous experience and training. Intervention group: nurses trained on the correct use of the POFRAS scale, including explanations of each item of the scale. The oral readiness of the newborns for feeding was assessed using the POFRAS scale. The assessments were performed on the same days by both groups. The observed population was 30 preterm infants, 17 females and 13 males, with an average birth weight of 1830 grams and all gestational age between 32 and 36 weeks with spontaneous breathing and stable vital signs (blood oxygen level  $>90\%$ , respiration rate of 40-60 breaths per minute, and heartbeat index of 120-160 beats per minute). All infants with craniofacial deformities, congenital heart anomalies and neurological disorders or syndromes were excluded. The infants characteristics are shown in Table 1. The assessments took place 15 minutes before the scheduled time for the first oral feeding. During the assessment, the infants were placed in a supine position, with the upper and lower limbs flexed and the head aligned with the spine. The following aspects were assessed: organization of the behavioral state, oral posture, oral reflexes and non-nutritive sucking. Each item of the protocol was assigned a score between 0 and 2. The feeding assessment began with the introduction of the teat of the bottle into the infant's mouth and lasted a maximum of 10 minutes. Infants were subjected to a single assessment 24 to 48 hours after birth. The primary outcome was the assessment of oral feeding competence using the POFRAS scale. Secondary outcomes included the volume of milk accepted during feeding and the duration of oral feeding.

## **RESULTS**

In our study we found significant differences between the intervention group and the control group. In the intervention group in which the POFRAS scale was used, 53.33% of the newborns (equivalent to 16 newborns) showed readiness for the transition to bottle feeding. Differently, in the control group, which did not use the POFRAS scale, only 43.33% (equivalent to 13 newborns) showed readiness to wean from the tube. This outlined a significant increase of 10% in the number of newborns ready for weaning from tube in the group assessed with POFRAS which is an easy and rapid tool to use in clinical practice that takes into account various aspects, including the level of maturity, the state of consciousness and the oro-motor skills. Based on the analysis of 30 premature infants using the POFRAS scale, its practical applicability and ease of use emerge as a strong point. It is based on well-defined and easily observable criteria, ensuring a uniform and replicable assessment. This translates into greater consistency in the results obtained by different healthcare professionals. The POFRAS scale proves to be a valuable tool for the timely identification of any oral feeding difficulties.

**Table 1.** The clinical characteristics of participated infants (N=30)

Clinical characteristic	Mean $\pm$ SD n (%)
Gender	
boy	17 (56.6%)
girl	13 (43.3%)
A/S 1	7.5 $\pm$ 1.1
<7	4 (13.3%)
$\geq$ 7	24 (86.7%)
A/S 2	9.0 $\pm$ 0.8
<7	0
$\geq$ 7	30 (100%)
GA (weeks)	34 $\pm$ 2
> 34 weeks	20 (66.7%)
32-34 weeks	6 (20%)
< 32 weeks	4 (13.3%)
BBW	1830 $\pm$ 510
$\geq$ 1500	25 (83.3%)
< 1500	5 (16.7%)
Actual situation in assessment	Mean $\pm$ SD n (%)
CGA (weeks)	36 $\pm$ 2
> 34 weeks	26 (86.7%)
32-34 weeks	3 (10.0%)
< 32 weeks	1 (0.03%)
Current weight (g)	2160 $\pm$ 415
$\geq$ 1500 g	29 (96.7%)
<1500 g	1 (0.03%)

## CONCLUSIONS

Seven conditions that contribute to feeding difficulties have been identified in the existing literature: immature coordination between sucking, swallowing and breathing; absent/weak presence of the cough reflex; incontinence of the esophageal sphincter; delayed gastric emptying; reduced intestinal motility; incontinence of the ileocecal valve; alteration of the rectal sphincter reflex. Implementing the POFRAS scale, represents an improvement project for neonatology nurses in order to objectify the feeding capabilities of preterm infants admitted to neonatal intensive care, optimize and personalize oral feeding in order to reduce the length of hospital stay. Assessment scales are becoming increasingly important because they allow not only an objective and shared assessment among healthcare workers of the state of maturation of the newborn's feeding function, but they also represent a guide for the nurse in determining interventions aimed at facilitating feeding and reducing the length of hospital stay.

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