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Validation of the Early Feeding Skills Assessment Scale for the Evaluation of Oral Feeding in Premature Infants

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ABSTRACT

Background: Feeding difficulties are common and important in premature infants. In order to identify neonatal feeding difficulties, clinicians and nurses require assessment tools to conduct an objective evaluation of infant oral feeding (breast/bottle-feeding). Early identification of infants with feeding difficulty is critical to implement appropriate therapies and optimize the infant's nutrition and oral feeding skill development. The aim of this study was to validate the Early Feeding Skills (EFS) Instrument for the Evaluation of Oral Feeding in Premature Infants.
Methods: In this descriptive cross-sectional study, the researcher initially got permission from the designer of the tool through email. Then, the main version of this tool was translated into Persian using the standard backward/forward method. Subsequently, the formal and content validity of the questionnaire was confirmed. After visiting a neonatal specialist, the assessment of preterm infants' oral feeding skills was performed using the EFS Instrument by observing the infants (n=180) during feeding. The exploratory factor analysis and Cronbach's alpha were utilized to determine the construct validity and assess the reliability of the instrument, respectively.
Results: All items of the EFS Instrument had formal validity. Two items were removed from the instrument, based on content validity. On the basis of factor analysis, the items with a minimum factor load of 0.4 were evaluated and according to the factor load of all items (above 0.4), EFS Instrument had the appropriate construct validity. The Cronbach's coefficient of the instrument was obtained 0.88.
Conclusion: The EFS Instrument obtained the required reliability and validity for the evaluation of preterm infants oral feeding.

Keywords: Infant, Oral feeding, Premature, Validity

Introduction

Prematurity of infants is a major health problem (1) and one of the main challenges of the treatment of premature infants is adequate feeding for sufficient growth (2). Feeding problems among premature infants are caused by hypotonia, weakness and inconsistency in motion, decreased consciousness, irritability, inconsistency in behavior, and instability (3, 4). The incidence of feeding problems hinders premature infants'ability to gain independence in oral feeding. Therefore, premature infants require feeding care (5). Inability to suck, lack of inconsistency among sucking reflexes, swallowing, and breathing, and also a restriction in oral feeding among premature infants cause inappropriate weight and prolonged infant hospital stay, delayed discharge, increased costs, decreased emotional relationship with parents, and family stress (6,7). Growth disorder reduces brain growth, and causes mental retardation and decreased intelligence coefficient among infants (8).

The nurse's intervention in the introduction of oral feeding of preterm infants becomes one of the most complex interventions of neonatal care. Feeding has to be based on well-defined protocols, supported by well-structured assessment

instruments that complement other observations in this process. The success of oral feeding will positively influence the development and growth of the infant and family in the short-and long-term. Therefore, it is important to use instruments that facilitate an objective assessment of preterm infants' skills during the process of feeding (e.g., breast or bottle-feeding).

Early Feeding Skills (EFS) Instrument is a checklist used to assess the feeding readiness of infants in terms of primary feeding, feeding tolerance, and feeding skills (i.e., oral and motor function organization, coordination of swallowing and breathing, and fixing of physiological status). The present study aimed to validate the EFS instrument. Accordingly, this tool can be used to check the feeding skills of infants and make timely decisions to resolve feeding problems and leading them to reach independent oral feeding and desirable development.

Methods

This study was a descriptive cross-sectional study. First, an email was sent to Ms. Thoyre, the designer of the tool, to obtain her permission and a positive response was received from her to use the tool. The main tool was then translated from English into Persian by two fluent English translators and an infant specialist, and the initial translated version became a unified form. Afterward, the final Persian version of the scale was retranslated back into English by two translators fluent in both English and Persian languages and the two English translations were unified by the infant specialist. In the next step, the final version was re-emailed to Ms. Thoyre for approval so that the concept corresponded to the original English version. After obtaining the approval by the tool designer, it was retranslated into Persian and the content, formal, and structural validities of the tool were determined.

The item importance score was used to determine quantitative face validity. For this purpose, the items of the questionnaire were examined by 10 infant specialists and their significance was examined using a four-point Likert scale. Subsequently, the comments of the specialists were reported. Then, after the calculation of the score effect of each item according to the formula, the items with scores of higher and lower than 1.5 were, respectively, retained and removed from the questionnaire (9). Content validity index (CVI) and content validity ratio (CVR) were used to determine the content validity (10).

In order to calculate these two indicators, after

the formal validation, the compiled questionnaire was delivered to 10 infant specialists to assess the items in terms of necessity (necessary, useful but not necessary, and unnecessary) and relation (non-related, relevant but requiring serious corrections, relevant but requiring some minor corrections, and totally relevant) and declare their comments. Then, using the formula provided below and the Lawshe table, the items with a ratio of higher than 0.62 were maintained to determine the minimum CVR value (11).

$$CVR = \frac{\text{Number of } \textbf{\textit{necessary}} \text{ responses for each item} - \frac{\text{Number of specialists}}{2}}{\frac{\text{Number of specialists}}{2}}$$

Similarly, the CVI of each item was calculated according to the following formula. The items with CVI values of more than 0.79 were retained in this study (12).

$$CVI = \frac{\text{Number of specialists agreeing with the phrase with scores 3 and 4}}{\text{Total number of specialists}}$$

Then, the scale-level content validity index/ averaging calculation method (S-CVI/AVE) was calculated by dividing the sum of the CVI of the items using the number of items (13).

The EFS checklist was performed and finalized according to the opinion of the infant specialist. Then, the study was conducted in the neonatal intensive care unit (NICU) of Shahid Beheshti and Alzahra hospitals affiliated to Isfahan University of Medical Sciences, Isfahan, Iran, in 2017. The study was performed on 180 infants with the age of 32-36 weeks who were breast or bottle fed according to the physician's order (30 pilot subjects). The subjects were selected using a nonprobability convenience sampling technique.

The study inclusion criteria were: 1) age of 32-36 weeks, 2) admission in the internal and NICU wards, and 3) a physician instruction to start breast or bottle feeding. In addition, the exclusion criteria were the unwillingness of the infant's parents to continue the study and the infant's death or discharge from the hospital. Data were collected using EFS and the physician's clinical checklist. The checklist consisted of the infants' demographic characteristics (i.e., gestational age, infant's age, and infant's gender) and was filled according to the medical record of the infant. The infant's weight was extracted from his/her record in case of a daily measurement; otherwise, it was measured using a calibrated digital scale. The assessment of infants' premature feeding skills

was performed using the EFS by observing the infants during feeding.

The EFS tool contains 31 items. Prior to feeding, respiration, heart, and oxygen saturation rates were recorded in the questionnaire. The first 4 items are related to readiness for starting the oral feeding of the infant, with each item scores either 1 or 0 for Yes and No answers, respectively. Oral feeding could be started and examined if all 4 items were yes. The second section consists of three parts, including items to check the ability to continue feeding (3 items), the ability of the oral motor function (5 items), swallowing coordination (7 items), and the ability to maintain stability and physiological status (10 items). The last section of the tool is related to feeding tolerance after feeding (2 items), which was answered by examining the infant. Each item had three selection criteria with a score range of 1-3. In the final section of the instrument (i.e., feeding tolerance), the infant was placed in an upright position after feeding and evaluated after 5 minutes by observing the infant's response to the feeding. This section describes the infant's behavioral response to the feeding.

The data related to the skills of feeding, heart rate before and during feeding, feeding type, feeding by nasogastric tube, volume of milk, positioning of the infant during feeding, support activities used by the feeder for infants, and finally, suggestions for the improvement of infant feeding were recorded at the end of the questionnaire (14).

The permission of the university research deputy, the consent of the hospital authorities and the internal and NICU wards were obtained. Moreover, the purpose of the study was explained and the specialist visited the infants and completed the checklist. Afterwards, the researcher and research assistant started sampling. They performed sampling from May 11, 2017, to October 17, 2017, for 4 days weekly. Then, the eligible infants were identified and selected to enter the study. In the next step, after explaining the purpose and method of procedure and obtaining written consent from their parents, the breastfeeding of infants was observed in one lactation period. Data were analyzed using descriptive statistics in SPSS software (Version 18.0, SPSS Inc., Chicago, IL, USA).

Cronbach's alpha coefficient was used in order to investigate the internal reliability of the EFS tool. Moreover, the exploratory factor analysis (EFA) method, which is one of the most important methods for determining the validity of the structure, was exploited in order to determine the structural validity of the tool. For this purpose, the Kaiser-Meyer-Olkin (KMO) test was performed to examine the sufficiency of sampling.

Bartlett's test of sphericity was used to ensure that the correlation matrix, which is the basis of the factor analysis, was not 0 in the study population. For EFA, the principal component analysis (PCA) method with varimax rotation was used. In order to determine the number of main factors of the questionnaires, the 3 indices of the eigenvalue of the scree plot were used and the contribution of each factor in explaining the sum of variances of all items was determined. A turning point of 0.4 was considered as the minimum factor load needed to maintain each statement in the factors extracted from factor analysis. Then, the Pearson correlation coefficient was calculated between the physician's checklist and EFS tool to calculate concurrence validity.

Results

In total, 180 premature infants (30 pilot cases) aged 32-36 weeks and admitted to internal and NICU wards were evaluated in this study. In a randomly selected sampling, 37 infants had a history of illness. The infants then were divided into two groups of healthy and ill infants to determine the discrimination validity and the data were analyzed between the two groups. Of the 150 infants, 83 (55.3%) and 67 (44.7%) were males and females, respectively. In addition, 113 and 37 infants were healthy and ill, respectively. Moreover, among these 113 healthy infants, 53 (46.9%) and 60 (53.1%) cases were males and females, respectively. Similarly, among the 37 ill infants, 23 (62.2%) and 14 (37.8%) cases were males and females, respectively. The 37 ill infants diagnosed with pneumonia, congenital heart disease, pulmonary artery stenosis, hydronephrosis, and history of esophageal atresia, history of necrotizing enterocolitis, chronic pulmonary diseases, and history of sepsis. The mean values of gestational age, age, weight, and time of reaching oral feeding of the infants were 32.02 weeks/day, 34.94 weeks /Day, 2056.60 g, and 13.94/Day, respectively.

Face validity

The results of face validity obtained by calculating the item effect index indicated that the impact score of all items was more than 1.5.

Content validity

In the content validity process, the results obtained by calculating CVI showed that the score of the items was more than 0.79. In addition, the

calculation of CVR showed that items 12 (No high pitched "yelping" sound so that the airway opens after swallowing again) and 15 (throat clearing sounds) obtained scores of less than 0.62. Therefore, these two items were eliminated from the questionnaire. The results of content validity were obtained at 0.9 and 0.8 using CVR and CVI, respectively.

Reliability

For reliability evaluation, a Cronbach's alpha coefficient of 0.83 was obtained with internal consistency method in 30 pilot subjects, and Cronbach's alpha coefficient for all items was above 0.82. The internal reliability of the final version of the primary EFS tool was calculated using Cronbach's alpha coefficient of 0.88. The internal reliability of each item was obtained with a minimum and a maximum Cronbach's alpha of 0.86 and 0.88, respectively. The correlation coefficient of these items was 0.72-0.91 (CI: 95%).

Cohen's kappa coefficient (κ)

First, the questionnaire was completed for 5 premature infants selected by the research assistant and researcher so that an agreement could be achieved among them on how to complete it. A κ of 0.8 was calculated between the researcher and research assistant.

Structural validity

The 4 primary items of the EFS Instrument (start of oral feeding) are associated with the criteria of the start of oral feeding of infants, and all items require a score of 1 so that the infant can start oral feeding. Therefore, they had the same score for all infants participating in the study. Accordingly, they were not used in EFA. The KMO index and Bartlett's test confirmed the data sufficiency and capability for factor analysis. The KMO test was suitable for testing the sufficiency of the sample size (KMO=0.79). Similarly, Bartlett's test with a value of 2233.215 also confirmed the EFA suitability (P<0.0001). Using the varimax rotation method in EFA, the factor load of above 0.4 was considered for each item. In this study, according to the scree plot, the breakdown point was clear on 4 factors (Figure 1) and 4 factors of the EFS tool with eigenvalue of higher than 1 with a 59% prediction ability were extracted and selected (Table 1). Based on the results obtained from the implementation of factor analysis with varimax rotation, the factor load of all items was higher than 0.4 (Table 2).

The correlation coefficient between Early Feeding Skills tool and the physician's clinical checklist

Since all items were given the same and complete scores for all infants in the clinical checklist completed by the infant specialist at the visit time, the correlation coefficient between the EFS tool and the checklist was not significant.
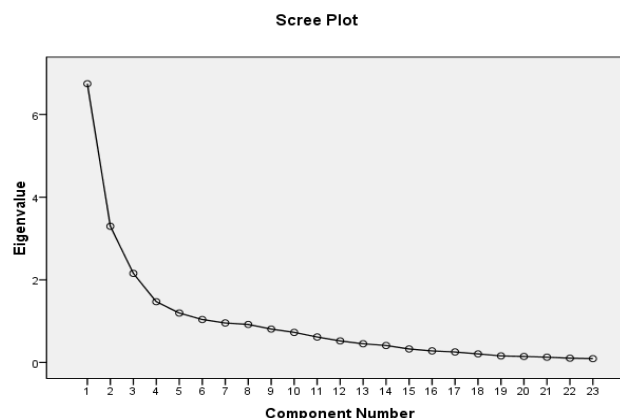

Figure 1. Scree plot

Table 1. Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6.7	29.3	29.3	6.7	6.7	29.3	5.5	5.5	24.2
2	3.2	14.3	43.6	3.2	3.2	43.6	3.3	3.3	38.8
3	2.1	9.3	53	2.1	2.1	53	2.7	2.7	50
4	1.4	6.3	59.4	1.4	1.4	59.4	1.9	1.9	59.4

Table 2. Rotated component matrix

Items	Component			
	1	2	3	4
The body is calm, no behavioral stress cues (i.e., eyebrow raise, eye flutter, worried look, movement from side to side or away from the nipple, and finger play)	0.53			
No behavioral stress cues, loss of fluid, or cardiorespiratory instability in the first 30 seconds after each feeding	0.5			
When the infant stops sucking to breathe, a series of full breaths is observed (sufficient in number and depth)	0.78			
When the infant stops sucking to breathe, it is well timed (before a behavioral or physiologic stress cue)	0.86			
The infant integrates breaths within the sucking	0.87			
Long sucking of bursts (7-10 sucks) observed without behavioral disorganization, loss of fluid, or cardiorespiratory instability	0.84			
Breath sounds are clear with no grunting breath sounds (prolonging the exhale and partially closing glottis on exhale)	0.84			
No color change during feeding (pallor, circumoral or circumorbital cyanosis)	0.67			
The stability of oxygen saturation	0.83			
The infant opens mouth promptly when lips are stroked		0.7		
The infant's tongue descends to receive the nipple		0.4		
The infant initiates sucking correctly		0.8		
The infant sucks with steady and strong suction, nipple stays seated in the mouth		0.7		
The swallows are quiet, no gulping or hard swallow			0.5	
The infant's tongue maintains steady contact with the nipple does, not slide off the nipple with sucking creating a clicking			0.4	
The infant manages fluid during swallow (i.e., no "drooling" or loss of fluid at lips)			0.5	
Pharyngeal sounds are clear, no gurgling sounds created by fluid in the nose or pharynx			0.8	
A single swallow clears the sucking bolus, multiple swallows are not required to clear fluid out of the throat			0.5	
Coughing or choking sounds			0.7	
Predominant state				0.7
The infant maintains motor tone/energy for eating				0.5
Breath sounds are clear with no grunting breath sounds (prolonging the exhale, partially closing glottis on exhale)				0.4
Stability of heart rate				0.4

Table 3. Mean score of the ability to continue feeding, organize the oral motor function, coordinate swallowing, maintain the physiological stability, and the mean feeding tolerance of healthy as well as ill infants

Item	Healthy group			Patient group			Independent samples test	
	N	Mean	SD	N	Mean	SD	t	P
Ability to maintain engagement in feeding	113	2.6	0.3	37	2.5	0.2	1.8	0.06
Ability to organize oral motor function	113	2.6	0.3	37	2.6	0.2	0.2	0.80
Ability to coordinate swallowing	113	2.9	0.1	37	2.8	0.2	1.7	0.08
Ability to maintain physiological stability	113	2.8	0.2	37	2.4	0.3	8	< 0.01
Oral feeding tolerance assessment (post-feeding)	113	4.8	0.7	37	4.4	0.9	2.2	0.02
Total	113	69.4	5	37	64.4	3.8	5.5	<0.01

Information regarding the score of the Early Feeding Skillstool

The 4 primary items of the EFS tool (start of oral feeding) are associated with the criteria of the start of oral feeding of infants, and all items require a score of 1 in order to start oral feeding by the infant. Therefore, they had the same score for all infants participating in the study, and as a result, these items were not considered in the calculation of the mean EFA score. Mean score of

the ability to continue feeding was 2.6±0.3 and 2.5±0.2 among healthy and ill infants, respectively. Moreover, the mean values of the ability to organize the oral motor function were 2.6±0.3 and 2.6±0.2 among healthy and ill infants, respectively. The mean values of swallowing coordination were 2.9±0.1 and 2.8±0.2 among healthy and ill infants, respectively. Furthermore, the mean scores of the physiological stability of healthy and ill infants were 2.8±0.2 and 2.4±0.3, respectively. Similarly,

the mean feeding tolerance scores were 4.8±0.7 and 4.4±0.9 among healthy and ill infants, respectively. The mean total EFS scores were 69.4±5.0 and 64.4±3.8 among healthy and ill infants, respectively (Table 3).

Independent t-test showed that there was no significant difference between infants in the two groups in terms of the mean score of ability to continue feeding, ability to organize oral motor function, and ability to coordinate swallowing (P<0.05). In addition, based on the independent t-test, a significant difference was observed between the two groups in terms of the mean scores of physiological stability, feeding tolerance assessment, and total score of infants (P<0.05) (Table 3).

According to the data analysis through visual binningin SPSS software (Version 22, IBM Corporation, Armonk, NY, USA), the infants with a total score of less than 62.60, 62.65-67.41, 67.42-72.10, and 72 showed poor, moderate, good, and excellent feeding skills, respectively.

Discussion

Face validity and content validity (i.e., quantitative), structural validity (i.e., EFA), and internal consistency (Cronbach's alpha coefficient) of the EFS tool was confirmed in this study. The tool was relatively applicable and the nurse was able to extract feeding problems through accurate observation, complete the questionnaire during the breastfeeding of the infants, and could help the physician to make timely and correct decisions. Moreover, with a rational tool, parents can be convinced to use this tool in family-based care.

The item impact method was used in the face validation phase. Since the score of the impact of all items of the tool was higher than 1.5, all items were retained, and accordingly, the EFS tool had face validity. To determine the content validity based on the Lawshe table, the tool was given to 10 experts who had experience in this field. The CVI and CVR were calculated and 2 items were eliminated. The mean CVI value of the tool was 0.9. Based on the findings, the S-CVI/AVE of the tool was desirable. Polit and Beck have recommended a score of 0.9 or higher for accepting S-CVI/AVE (15). In addition, according to the content validity results, the EFS tool was valid in terms of content.

In the study conducted by Dacosta Curado and Thoyre in Portugal, the views of a group of specialists (nurses and physicians with experiences in the field of infants) were used for face validation and localization of the EFS tool.

The results of this study indicated that the items of this tool were clear as well as in accordance with the culture of Portugal. Then, through content validation, 6 items out of 28 ones were removed and the final tool was approved with 22 items (16).

In the present study, the structural validity of the EFS tool was first examined through factor analysis on 23 items of this tool. The results of KMO and Bartlett's test confirmed the factor analysis model and its appropriateness. Since the minimum factor load required to include an expression in a factor was dependent on the number of the instrument expressions and eigenvalue, the breakdown point of 0.4 was considered as the minimum factor load required for maintaining each expression. Then, based on the fact that each expression had the highest rate of factor load on each factor, it was considered as the corresponding expression. In this study, according to the scree plot, the breakdown point was apparent in 4 factors; therefore, four factors of the EFS tool with eigenvalues of higher than 1 were extracted and selected with a prediction ability of 59%. Given that the minimum load factor for all tool items was higher than 0.4, all items were retained in this study.

The EFS tool included four factors of the ability to continue feeding, organize oral motor function, coordinate swallowing, and maintain physiological status. The results of factor analysis showed that the items of ability to continue feeding (first factor), organize oral motor function (second factor), coordinate swallowing (third factor), and maintain physiological status (fourth factor) were almost consistent.

With regard to the first (ability to maintain feeding), second (the organization of oral motor function), third (coordinate swallowing), and fourth factors (preservation and stability of the physiological status) 4, 4, 6, and 9 items were extracted, respectively. Based on the consistency of the expressions in the factors resulted from the factor analysis with the definition and dimensions of the concept of EFS, the structural validity of the tool structure was verified using factor analysis. In the validation and localization of the EFS tool carried out by Dacosta Curado and Thoyre in Portugal, EFA was used to determine the structural validity of the EFS tool. According to the factor analysis, 7, 5, and 10 items were, respectively, extracted in the first (ability to organize oral motion), second (coordinate swallowing), and third factor (physiological coordination ability) (16).

In the present study, the internal consistency method was used to determine reliability. In the performed study by Dacosta Curado, Cronbach's alpha coefficient was reported to be 0.85. Cronbach's alpha coefficient of 0.7 and higher is the standard for the reliability of a tool (17, 18). In the present study, Cronbach's alpha coefficient of the tool was 0.88, indicating the high internal consistency of the tool items and confirmation of the reliability of the EFS tool.

The correlation coefficient obtained between items was 0.72-0.91 (95% CI), which was more than 0.8% (19). In the present study, the κ coefficient was 0.8. According to the table of κ, values greater than or equal to 0.8 were ideal for the determination of the level of agreement among the observers (20). The mean total score of the EFS Instrument of ill infants was lower than that of healthy infants, which indicates the discrimination validity of the EFS tool for premature infants. In a study conducted by Williamson and Thoyre on 199 healthy and ill infants in the United States, the mean score of ill infants was lower than those of healthy infants (21), which is consistent with the results of the present study.

Conclusion

With respect to the incidence of feeding problems among preterm infants, the evaluation and diagnosis of their feeding problems are of great importance to implement effective action, eliminate feeding problems, and prevent the adverse effects of incorrect feeding and other developmental disorders. The results showed that the EFS tool included desirable psychometric properties. Moreover, it is a user-friendly tool. Therefore, nurses can use it as a valid and reliable tool for the evaluation of feeding problems in infants, following the development of the feeding skills of infants and assessing the skills required by the infants for safe and effective feeding support. Accordingly, considering the assessment of these outcomes, the nurses can perform effective interventions with the assistance of a qualified physician for the efficient feeding of infants and their timely discharge to prevent the adverse effects of incorrect feeding.

Study limitations

Since all items were given the same and complete scores for all infants in the clinical checklist completed by the infant specialist at the visit time, there was not significant correlation between the Early Feeding Skills Assessment Scale and the checklist.

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Conflicts of interests

There are no conflicts of interest.

References

1. Soleimani F, Zaheri F, Abdi F. Long-term neurodevelopmental outcomes after preterm birth. Iran Red Crescent Med J. 2014; 16(6):e17965.
2. Iranmanesh S, Shamsi A, Pour Aboli B, Movahedi Z. The effect of breast milk odor on transition time from gavage to oral feeding and hospital stay in premature infants. ICAN. 2015; 7(1):5-11.
3. Fucile S, Gisel EG, McFarland DH, Lau C. Oral and non-oral sensorimotor interventions enhance oral feeding performance in preterm infants. Dev Med Child Neurol. 2011; 53(9):829-35.
4. Mahmoodi N, Zareii K, Mohagheghi P, Eimani M, Rezaei-Pour M. Evaluation of the effect of the oral motor interventions on reducing hospital stay in preterm infants. Alborz Univ Med J. 2013; 2(3):163-6.
5. Sankar MJ, Agarwal R, Mishra S, Deorari AK, Paul VK. Feeding of low birth weight infants. Indian J Pediatr. 2008; 75(5):459-69.
6. Lau C, Smith EO. A novel approach to assess oral feeding skills of preterm infants. Neonatology. 2011; 100(1):64-70.
7. Barlow SM. Oral and respiratory control for preterm feeding. Curr Opin Otolaryngol Head Neck Surg. 2009; 17(3):179-86.
8. Pados BF, Park J, Estrem H, Awotwi A. Assessment tools for evaluation of oral feeding in infants less than six months old. Adv Neonatal Care. 2016; 16(2):143.
9. Heravi-Karimooi M, Anoosheh M, Foroughan M, Sheykhi MT, Hajizadeh E. Designing and determining psychometric properties of the Domestic Elder Abuse Questionnaire. Iran J Age. 2010; 5(1):25-34.
10. Newman I, Lim J, Pineda F. Content validity using a mixed methods approach: its application and development through the use of a table of specifications methodology. J Mixed Methods Res. 2013; 7(3):243-60.
11. Lawshe CH. A quantitative approach to content validity. Personnel Psychol. 1975; 28(4):563-75.
12. Amaizu N, Shulman R, Schanler R, Lau C. Maturation

of oral feeding skills in preterm infants. Acta Paediatr. 2008; 97(1):61-7.

13. Mohammadbeigi A, Mohammadsalehi N, Aligol M. Validity and reliability of the instruments and types of measurments in health applied researches. J Rafsanjan Univ Med Sci. 2015; 13(12):1153-70.

14. Thoyre SM, Shaker CS, Pridham KF. Manual for administration of the early feeding skills assessment (EFS). North Carolina Neonatal Nursing and Hospital Early Intervention Institute, Chapel Hill, NC: University of North Carolina–Chapel Hill; 2012.

15. Polit DF, Beck CT. Essentials of nursing research: appraising evidence for nursing practice. Philadelphia: Lippincott Williams & Wilkins; 2009.

16. Dos Santos Curado MA, Maroco JP, Vasconcellos T, Gouveia LM, Thoyre S. Validation of the early feeding skills assessment scale for the Portuguese population. Rev Enfermagem Ref. 2017; 4(12):131.

17. DeVellis RF. Scale development: theory and applications. California: Sage Publications; 2016.

18. DeVon HA, Block ME, Moyle-Wright P, Ernst DM, Hayden SJ, Lazzara DJ, et al. A psychometric toolbox for testing validity and reliability. J Nurs Scholarsh. 2007; 39(2):155-64.

19. Najafi F, Kheiry B. Investigating the impact of country of origin on customer behavior: investigation of the moderating roles of product involvement and product familiarity on product evaluation and customer behavioral intentions. J Market Maneg. 2013; 7(17):37-60.

20. Gwet KL. Handbook of inter-rater reliability: the definitive guide to measuring the extent of agreement among raters. Chicago: Advanced Analytics, LLC; 2014.

21. Williamson LR. Early feeding skills assessment in preterm infants. Lawrence, Kansas: University of Kansas; 2013.