Construction and Validation of an Evaluating Instrument on Child Feeding

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Research Article

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ABSTRACT

Objective: To build, validate and apply a questionnaire to verify nurses' knowledge about infant feeding.

Material and methods: A cross-sectional, descriptive and analytical study conducted with a sample of 231 nurses, in the year 2017. The study was developed in three stages: construction and validation of the instrument, and application of the instrument to the population. The data were analyzed by Content Validity Index - CVI, statistical tests of association/correlation, Linear-by-Linear Association and averages tests.

Results: The instrument was validated with 21 multiple choice questions, and reached an I-CVI equal to or above 0.80 in all questions. It was evidenced that nurses were mostly female, with an average age of 38.7 years and had worked for more than 10 years in the Family Health Strategy. The knowledge of the majority (65.4%) fell into the medium level category, between 51% to 80% of correct answers on the questions.

Conclusion: The instrument was validated in content in the three aspects: language clarity, practical relevance and theoretical relevance. After its application, it was found that the knowledge of the study population about infant feeding needs to be improved.

INTRODUCTION

The World Health Organization recommends Exclusive Breastfeeding (EBF) until the child's six months of life and complementary breastfeeding until the age of two, as from that period the infant's nutritional demand is no longer promptly attended by EBF, becoming necesserary the introduction of complementary feeding [1]. The proper introduction of food in the first years of life is able to have a beneficial influence on the child's nutritional status and will directly reflect on their physical, psychomotor and neurological development [2]. At the same time, the early introduction of other nutritional sources, in addition to human milk, has no nutritional advantages and its consumption can lead to the appearance of diseases, increased incidence of infant morbidity and mortality and the chances of early weaning. On the other hand, late introduction may have the consequences of stunting and the risk of malnutrition [3]. Even though its advantages over other ways of feeding the child in the first two years of life have been proven, breastfeeding rates in Brazil are much lower than recommended, as well as the introduction of other foods at an early stage [1]. Corroborating with the previous research, a study carried out in Porto Alegre with 631 mothers showed that approximately 50% of them stated that they did not follow the guidelines of health professionals regarding eating practices in the first year of life. However, the author brings as a limitation the lack of knowledge about the frequency and quality of dietary guidelines provided by health professionals [4]. It is noteworthy that in view of the constant need for updating by professionals, in recent years, new concepts and recommendations on infant feeding have emerged, and new guides and manuals have been released by the Ministry of Health (MS) of Brazil [5,6] in order to update and consolidate information regarding dietary guidelines, which has been showing a positive impact on infant feeding practices [7]. In view of the above, the continuous and systematic assessment of the health professional's knowledge is relevant, especially through the use of valid, reliable, and up-to-date instruments, so that there is an effective intervention in search of their qualification. Thus, the present study aimed to build,

validate and apply a questionnaire to verify the knowledge of nurses working in primary care on feeding children under two years of age, based on the recommendations of the current Ministry of Health.

MATERIALS AND METHODS

This is a cross-sectional, descriptive and analytical study, developed in 2017, which followed three stages: instrument construction, instrument validation and application with nurses working in primary care in Fortaleza-Ceará. Initially, an integrative review was carried out to confirm the lack of an assessment instrument on infant feeding aimed at nurses, as well as to learn about the most recent theoretical references used on infant feeding [1,5]. The only Brazilian questionnaire found dates from 2010 and assesses the knowledge of primary care professionals about the child's diet, but it does not specifically address issues about breastfeeding [8].

Thus, the instrument entitled: Knowledge of nurses about feeding children under two years of age was prepared, following the guidelines in the Manual: "Ten steps to healthy eating: a feeding guide for children under two years of age" [5] as well the Primary Care Notebook: "Child Health: Breastfeeding and Complementary Food" of the Health Ministry [1], these being the most updated documents of the Health Ministry available during the period of data collection. It is worth mentioning that the Ministry of Health recently launched the new Food Guide for Brazilian children under 2 years old, dated 2019 [6]. This document has as its main modification the removal of the nomenclature of "sweet and savory porridge" used until then in previous manuals. The Health Ministry, however, makes it clear in the previous manual [5] that the expression "porridge" aims to highlight only the consistency (crushed or scraped) with which the children's food should be offered, which is still a recommendation of the Health Ministry, and, therefore, it does not invalidating the questionnaire proposed in this study. The instrument was structured in two parts: 1st part - personal data of the participant, academic training and acting as a professional and 2nd part - Questionnaire with objective questions about the children feeding of children under two years old. The questionnaire contains 21 questions, with four answer options, in which only one answer would be correct. After the instrument construction, the validation process was carried out. For this, it was stipulated that the content judges attended at least two criteria [9] having the skill/knowledge acquired by the experience; possess specialized skills/knowledges that make the professional an authority on the subject; possess special ability in a particular type of study; pass a specific test to identify judges and have a high rating given by an authority. Thus, an intentional analysis of the Lattes curricula was carried out on the website of the National Council for Scientific and Technological Development (CNPq), and 25 invitation letters explaining the research objectives were sent via e-mail. In case of acceptance by the researcher, the following attachments were sent: Free and Informed Consent Form (ICF) and the validation instrument. Judges were given a period of 15 days in order to respond to the assessment of the questionnaire. For participants who did not attend this period, the deadline was extended for another 10 days, being excluded from the survey those who did not send the material until the second stipulated deadline, obtaining a final sample of 15 judges. The questionnaire's validation instrument was performed using a Likert-type scale, with the question texts being evaluated according to three criteria: language clarity, practical relevance and theoretical relevance. According to the degree of agreement with the criteria, the judges should mark items 1 (very little), 2 (little), 3 (average), 4 (very) or 5 (very much) for each question, and they could add suggestions if they considered it pertinent. To analyze the Content Validity Index (CVI), the criteria of variation from -1 to +1 were used, through the sum of the CVI assigned by each judge divided by the total number of judges. Thus, the values marked on the Likert scale were converted to -1 (items 1 and 2), 0 (item 3) or +1 (items 4 or 5) [10]. It is worth mentioning that a global agreement index between the judges (sum of language, practice and theoretical relevance) greater than 0.80 is desirable; and that the CVI equal to 1 indicates full agreement and serves as a criterion for the pertinence decision and/or acceptance of the evaluated item [11]. Finally, after the instrument construction and validation, it was applied with 231 nurses working in Primary Health Care Units located in the six Regional Executive Secretariats (SER) in Fortaleza-Ceará. The sample was determined by the sample calculation for finite populations, and attended the following inclusion criteria: working in the Family Health Strategy and conduct childcare consultations. The nurses were selected randomly according to the stratification for each SER, having representatives from all Fortaleza-Ceará. After the nurse's consent to participate in the research, the meeting was scheduled in order to provide the self-application questionnaire, which should be answered in the presence of the researcher, and without consultations in literature. For the questionnaire analysis, which ranged from zero to 21 points (after validation by the judges), the level of knowledge was classified through cohort groups: Regular Level: less than or equal to 11 points (less than or equal to 50%); Medium Level: between 12 and 16 points (51% to 80%); and High Level: greater than or equal to 17 points (greater than or equal to 81%). Ethical recommendations and principles foreseen in research involving human beings were obeyed, and the project was approved by the ethics committee under the opinion of No. 1.529.117. The collected data were exported to the Statistical Package for the Social Sciences Program (SPSS Inc., Chicago, United States) version 22.0, statistical tests of association/correlation, Linear-by-Linear Association and the averages test, being fixed a 95% confidence level and a relative sample error of 5%, considering statistically significant p < 0.05.

RESULTS

The instrument contains 21 questions, distributed among the following themes: breastfeeding (4 questions), complementary feeding routine (4 questions), recommendations for preparation/storage and quantity/texture of food (4 questions), infant formula and milk dilution (3 questions) and complementary feeding general aspects (6 questions) (energy content; iron supplementation and facilitators of iron absorption; volume and number of dairy meals; food hygiene and consumption of fruits and natural

juice) (Annex). Among the 15 content judges selected according to the criteria of Jasper, it was found that 93.33% attended the requirement of having skill/knowledge acquired through experience, 40% attended the requirement to have skill/specialized knowledge that makes the professional an authority on the subject, and 80% attended the requirement to have special skills in a particular type of study. The judges had an average age of 38.8 years, beeing all of them females. The majority predominated with a nursing degree (93.3%) and a completed doctorate (66.7%). The child's health experience ranged from three to 26 years (mean = 12.5 years) and complementary feeding from two to 24 years (mean = 8.5 years). After calculating the CVI for each item evaluated in the questionnaire, values of 0.72 were obtained for language clarity, 0.91 for practical relevance and 0.92 for theoretical relevance. The overall CVI was 0.86 and is considered fully valid, as shown in **Table 1**.

Table 1. The CVI Distribution of each question, according to the judges analysis in relation to language clarity, practical relevance, theoretical relevance and the instrument's global CVI. Fortaleza, 2017.

Langua	age	Pratical	Theoretical	0
Clarity		Relevance	Relevance	General CVI
Question 01	0,93	0,93	0,93	0,93
Question 02	0,53	0,8	0,86	0,73
Question 03	0,86	1	1	0,96
Question 04	0,8	1	1	0,93
Question 05	0,6	0,86	0,8	0,58
Question 06	0,6	0,93	0,93	0,82
Question 07	0,8	1	1	0,93
Question 08	0,46	0,93	1	0,80
Question 09	0,73	0,8	0,8	0,78
Question 10	0,86	0,93	0,93	0,91
Question 11	0,93	1	1	0,98
Question 12	0,46	0,93	0,93	0,78
Question 13	0,8	0,93	0,86	0,87
Question 14	0,53	0,8	0,93	0,76
Question 15	0,8	0,93	0,93	0,89
Question 16	0,8	1	1	0,93
Question 17	1	0,93	0,93	0,96
Question 18	0,73	0,8	0,86	0,80
Question 19	0,73	0,86	0,86	0,82
Question 20	0,73	1	0,93	0,89
Question 21	1	0,93	0,93	0,96
General CVI	0,72	0,91	0,92	0,93
Overall CVI	-	-	-	0,86

It can also be seen in Table 1 that some questions had an overall CVI lower than 0.8, this value being related to a lower assessment of language clarity. Among these, we can highlight question 5, which obtained the lowest General CVI (0.58), which was revised after the judges' suggestions, following the suggestion of placing the age between 6 and 7 months, as well as addressed by the manual itself. I. In addition, it was requested to add to the question that the meals were described sequentially, since not only the type of meal, but the time at which it is eaten is also important. A total of 41 suggestions were made related to language clarity throughout the instrument, the majority (28/68%) being accepted, and the judges were not asked to add or remove content. In order to detect the level of knowledge of nurses in Fortaleza-Ceará, the questionnaire with 231 nurses was applied. The average of 38.73 years of age (SD = 8.28) predominated and the female gender (92.2%). As for the professional aspect, 70.6% of nurses have the highest degree in specialization/residency and 51.9% have worked in the Family Health Strategy for over ten years. The majority (83.5%) reported not having received training on food for children under two years old during their professional practice. 30.3% do not know the Ten Steps Manual for Healthy Eating and 40.3% do not know the Primary Care Notebook - "Child Health: Breastfeeding and Complementary Food". In addition, most professionals (67.5%) say they do not use educational instruments during childcare consultations. Regarding the answers to the questionnaire, among the 21 questions, a percentage above 50% of correct answers was reached in 16 of them (Table 2). It is noteworthy that the issue that obtained the lowest percentage of correct answers was how to correctly reconstitute powdered milk (38.1%). After stratifying the results, only 18.2% of nurses showed high performance, followed by 65.4% of average performance and 16.5% of regular performance.

Table 2. Survey participants' scores according to a questionnaire on infant feeding for children under two years. Fortaleza, 2017.

Evaluation Instrument Questions	N	%
1. Should breast milk be the child's only food source until which period ()*?	230	99,6
2. When, in addition to breast milk, the child receives water or water-based drinks (sweet water, teas, infusions), fruit juices and ritual fluids, breastfeeding is no longer		30,3
exclusive and becomes ()?		

3. How should the milked milk be stored and how should it be offered to the child appropriately? 4. Breast incomplete emptying favors the appearance of breast engorgement. To avoid it, mothers should be instructed to act as follows () 5. The complementary feeding routine for children aged 6 to 7 months must follow the following sequence () * 6. Upon completing 7 months, one more meal is added to the child's eating routine. Which should be included? 7. Regarding the preparation and storage of food for children's consumption, it is correct to state () * 8. Which food groups should be present in the lunch meal of a child's feeding routine from 6 months of age onwards? 9. What is the quantity and texture of the food offered in a child's lunch meal from 6 months of age onwards? 10. Which of these recommendations should be given to the mother in order to prepare an adequate lunch meal? 12. Upon completing 12 months, the breastfed child should follow the following sequence for the feeding routine () * 13. In order to increase the diet energy content of the children under 1 year of age with low weight, the following measures must be taken () * 14. Three potent facilitators of iron absorption () * 15. For children who cannot be breastfed, what volume and number of dairy meals, respectively, are recommended from birth until 30 days of life? 16. In case it is impossible to breastfed, what volume and number of dairy meals, respectively, are recommended from birth until 30 days of life? 16. In case it is impossible to breastfed, what volume and number of breast milk is: 17. The appropriate guidance for dilluting the infant formula (Nan®, Nestogeno®, Aptamil®, etc.) is () * 18. About the correct dilution of whole milk powder (Ex: Ninho®, Itambé®, 101®, and 101®, a			
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of age onwards, would you advise that () *		88	38,1
20. What is the correct way to use Hypochlorite for food hygiene? 127 55,0		175	75,8
	20. What is the correct way to use Hypochlorite for food hygiene?	127	55,0
21. From 6 months onwards, how should Iron supplementation be prescribed?	21. From 6 months onwards, how should Iron supplementation be prescribed?	148	

Table 3 shows that knowing the 10 steps manual for healthy eating (p = 0.006) and having training on infant feeding (p = 0.005) were favorable to the increase in the level of knowledge of nurses. However, although the other variables do not present a statistically significant correlation, there is a directly proportional relationship between them regarding high knowledge.

Table 3. Level of nurses' knowledge about infant feeding related to social and professional data. Fortaleza, 2017.

Variables Crossing	Regular Knowledge	Average Knowledge	High Knowledge	P value *
Age				0,984
<= 35	11(14,3%)	53 (68,8%)	13 (16,9)	
36-42	15 (17,6%)	55 (64,7%)	15 (17,6%)	
43+	12 (17,4%)	43 (62,3%)	14 (20,3%)	
Titration				0,071
Graduation	5 (20,8%)	14 (58,3)	5 (20,8%)	
Specialization/Residence	30 (18,4)	108 (66,3%)	25 (15,3%)	
Master/Doctorate	3 (6,8)	29 (65,9%)	12 (27,3%)	
Performance time FHS				
< 10 years	21 (18,9%)	73 (65,8%)	17 (15,3%)	
> 10 years	17 (14,2%)	78 (65%)	25 (20,8%)	
Training on infant fee	eding			0,005
Yes	34 (17,6%)	131 (67,9%)	28 (14,5%)	
No	4 (10,5%)	20 (52,6%)	14 (36,8%)	
Jse of educational material				0,867
Yes	23 (14,7%)	108 (69,2%)	25 (16%)	
No	15 (20%)	43 (57,3%)	17 (22,7%)	
Knowing the Manual				0.006
Ten steps to a healthy diet"	1			0,006

No	16 (22,9%)	48 (68,6%)	6 (8,6%)	
Yes	22 (13,7%)	103 (64%)	36 (22,4%)	
Knowing the "Child Health				0.714
Primary Care Notebook"				0,714
No	14 (15,1%)	65 (69,9)	14 (15,1%)	
Yes	24 (17,4)	86 (62,3)	28 (20,3%)	

DISCUSSION

The research showed that the process of constructing, validating and applying an instrument to assess nurses' knowledge about infant feeding was satisfactory in that the validated instrument is unprecedented and can diagnose the situation of professionals, regarding to knowledge appropriation and updating in infant feeding. The built instrument has 21 questions addressed to the professional nurse and addresses themes related to breastfeeding and complementary feeding. Another Brazilian study built a questionnaire also based on the Food Guide for Children Under Two Years, with 34 questions, to verify maternal knowledge and considered it pertinent to address the same themes, confirming the need for nurses to be up to date on these issues, since only 53, 5% of mothers presented satisfactory knowledge [12]. Questionnaires are instruments that are part of clinical practice, health assessment and research, and have a significant influence on decisions about care, treatment and/ or interventions [13]. Thus, the recognition of its quality is an essential aspect to confirm its legitimacy and reliability. The content validation process used an acceptable agreement rate criterion greater than or equal to 80%, as in other studies [14,15], showing that the instrument really measures the variable it proposes, as it obtained a global CVI of 0.86. Although the overall CVI was higher than desired, it is recalled that some questions obtained lower than desired CVI related to language clarity, so it was pertinent to analyze and consider the judges' suggestions in favor of improving the instrument. Corroborating with our results, a study carried out by nurses who developed and validated an educational booklet on the prevention of childhood diarrhea also found a CVI below 0.80 in relation to the clarity of language on some pages of the material, with the necessary changes being made [14]. After construction and validation, the questionnaire was applied to the target population, which detected that nursing has female hegemony, as in other studies [16]. Regarding professional qualification, there is a need for improvement, since many professionals have only the title of specialization/residency and did not participate in training/permanent education on infant feeding. Permanent education should address issues-problems that professionals are familiar with and be based on a pedagogical process that contemplates the acquisition and updating of knowledge and skills appropriate to the real situation experienced and not just utopia [17]. This research found that the use of educational materials was performed by a small part of the professionals. However, in their professional practice, nurses must exercise, in addition to the role of caregiver, that of educator, developing educational strategies that facilitate learning [18], as well as the use of educational technologies that favor behavioral changes [19]. In relation to infant feeding, more than half of the nurses were unable to distinguish the varieties of types of breastfeeding, and 30% had difficulties regarding the guidance on milking and methods to avoid breast engorgement. Guidance on milking, storage of milk and how to offer it to the child is essential, as it ensures the mother the possibility of not interrupting breastfeeding after returning to the job market [20]. A percentage of satisfactory correct answers was verified regarding to the introduction of complementary food after six months, as well as about the quantity and texture of the foods offered in a child's lunch meal from six months onwards. As for the food groups present in complementary feeding, only 46.8% guide mothers correctly about the introduction of meat in meals, which should occur from the age of six months and the consumption of kids once a week, as they are important sources of iron [1]. This finding shows similarity with a survey carried out in southern Brazil, in which it was observed that mothers introduce meat late into the child's diet, on average between the seventh and eighth month of life [21]. It is known that there are exceptional clinical situations in which breastfeeding is not indicated [22]. In these cases, the use of breastmilk substitutes is recommended and the health professional must be able to guide a milk diet appropriate to the family's clinical, social and cultural situation, with the use of infant formula being the most indicated [1], as stated by 98.7% of the participants. The use of other types of milk, be it infant formula or cow's milk, requires guidance, especially with regard to the dilution of milk. However, in the present study, only 68.8% of professionals knew the correct dilution of infant formula and 38.1% knew about the reconstitution of powdered cow's milk. Going according the findings, it was detected in Curitiba, São Paulo and Recife that among children under six months of age who were no longer breast-feeding, only 12% used infant formula to replace breast milk, and only 23.8% of these were diluted properly, which constitutes a risk to children's health [23]. The prescription of iron supplementation is essential in childcare consultations, since the use of ferrous sulfate for more than 180 days may be associated with a lower prevalence of anemia in children under two years old [24]. However, it was shown that only 64.1% correctly guided this supplementation and 37.2% knew the potent facilitators in iron absorption. In summary, the results showed that the knowledge of these professionals is below the desired level, since only 18.2% of the sample had a high level of knowledge and most of them were classified in the medium level category, that is, they obtained success among 12 and 16 points out of a total of 21. To act in this reality, aiming at improvements, the professional has the responsibility to raise awareness about this process. This fact is confirmed in Porto Alegre [7] by a Multiprofessional Updating Program on Infant Feeding for Primary Health Care professionals, which showed a positive impact on exclusive breastfeeding rates until the third month of life and in the higher meat consumption of children of mothers who were guided by these professionals.

On a complementary basis, it was considered pertinent to relate the professionals variables with the nurses' knowledge

levels. It was found that the variables "conducting training on infant feeding" and "knowledge of the Ten Steps Manual for Healthy Eating" were the only ones that were relevant, showing the training importance, as well as updating with support from the Ministry of Health. Recent studies [25,26] confirm that positive results are obtained and known by professionals who participated in permanent education programs in numerous health contexts. Thus, nursing is configured as a profession that requires constant updating because it is inserted in a context of recurrent changes due to technological and scientific evolution.

CONCLUSION

The questionnaire developed proved to be reliable and valid for verifying nurses' knowledge about infant feeding, and it was also found that the professionals knowledge in this study is below the desired level, requiring the elaboration of strategies, such as training and investments in education programs that allow essential support for nursing practice. The results evidenced the construction of a questionnaire that contributes to expand the academic community knowledge, and especially to nurses from the Family Health Strategy, becoming a tool that supports the decision making of health managers regarding the implementation of measures aimed at professional advancement in search of the child's well-being, growth and healthy development. This study has the limitation of not having evaluated the instrument respecting to construct validation, which may be a suggestion for future research.

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