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Original articles

Introduction of complementary feeding in premature children

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ABSTRACT

Purpose: to describe the characteristics of complementary feeding introduced to preterm children.

Methods: an exploratory, descriptive, cross-sectional, quantitative research. Data collection took place in February 2020 and between May and July 2021 in an outpatient follow-up clinic for high-risk newborns. To participate in the research, children had to have food introduced at least 30 days before and be 24 months corrected gestational age, at the most. The research instrument, developed by the researchers, was applied to the children's parents/guardians on the day of routine visits. The information they did not know was verified in the patient's institutional medical record.

Results: the sample comprised 29 mothers/babies, 55.2% (16) of whom were males, with a mean gestational age of 13 months. Most mothers introduced complementary feeding at 6 months corrected gestational age; 25% of them introduced it late and 17.9%, early. Almost 100% of the babies received fruits and/or vegetables as their first foods.

Conclusion: more than half of the preterm children's mothers started complementary feeding at the recommended time with adequate consistencies and utensils.

Keywords: Infant Nutrition; Infant, Premature; Child Nutrition

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INTRODUCTION

Complementary feeding (CF) encompasses every food and liquid other than breast milk given to children after 6 months old[1]. After this age, breast milk is no longer enough to provide for their nutritional needs, which is why it is important to introduce CF while maintaining breastfeeding, if possible, up to 2 years old or more[2]. Introducing high-quality CF, in due time, is essential to child growth and development[3].

Preterm birth is the main cause of death in the first year of life in Brazil, and this preterm population is more likely to have neurological disorders and developmental changes[4]. Moreover, prematurity is an obstacle to exclusive breastfeeding (EBF) up to 6 months old[5], due to biological, psychological, sociocultural, and other hindrances[6].

It is understood that when treating prematurity, CF must be introduced to preterm children according to their neurological maturity. Hence, the corrected gestational age (CGA) is used as a parameter[7]. Preterm newborns may have greater feeding transition difficulties than full-term children; therefore, these children must be included early in a specialized support network to ensure their development[8].

The scarcity of references on CF in preterm children reveals the need for further research in this field. Feeding is essential to these children's growth and nutrition, as they belong to the risk group for developmental changes. Thus, knowing this population better contributes to the clinical team practice and facilitates family care for these babies. This study aimed at describing the characteristics related to the introduction of CF to preterm children.

METHODS

This study was approved by the Research Ethics Committee of the Climério de Oliveira Maternity Hospital, Brazil, under CAAE 26733119.1.0000.5543 and evaluation report no. 3.768.089. This study is an integral part of an umbrella project named "Complementary feeding in preterm children" and was conducted in the prematurity follow-up outpatient center at the Climério de Oliveira Maternity Hospital of the Federal University of Bahia (UFBA).

The sample was selected by convenience, encompassing preterm children followed up at the said outpatient center, who had been introduced to CF at least 30 days before, and whose CGA was 24 months at the most on the data collection day. All children had to be in exclusive oral feeding. The researchers established a minimum 30-day period to obtain more consistent and homogeneous responses, considering that CF is gradually introduced.

The exclusion criteria were as follows: children with neurological, cardiac, or respiratory diseases, craniofacial or aerodigestive malformations, or any other clinical situation that directly interfered with safe swallowing and effective oral feeding.

This is exploratory, descriptive, cross-sectional, and quantitative research.

Data collection

The researchers involved in the project and the speech-language-hearing therapists who work in the said outpatient center collected data in February 2020 and between May and July 2021, due to the COVID-19 pandemic.

The children's parents/guardians were invited to participate in the study and were informed of the research objectives and methodology. Those who agreed to participate signed an informed consent form. They were individually interviewed once in their routine visits.

The collection instrument was a semi-structured form developed and applied by the researchers. This investigation used prematurity classification, maternal sociodemographic data, breastfeeding duration, artificial nipple use, and CF introduction data.

The information the parents/guardians did not know was collected by consulting the patients' institutional medical records.

Data analysis

The data bank was created in Microsoft® Excel 2010. Descriptive analysis was conducted, with mean, standard deviation, and absolute and relative frequencies.

RESULTS

The sample comprised 29 children, of whom 55.2% (16) were males. The sample's prematurity classification data regarding gestational age (GA), weight, and classification with the percentile curve at birth are shown in Table 1.

Maternal data regarding their age and educational attainment are described in Table 2.

Table 1. Prematurity classification data regarding gestational age, weight, and classification, according to the percentage curve at birth

Neonatal variables		N	%
GAB	Moderate PTNB	11	37.9
	Very premature PTNB	7	24.2
	Extremely premature PTNB	11	37.9
Weight	LW	7	24.2
	very LW	8	27.6
	Extremely LW	13	44.8
	Adequate	1	3.4
Classification according to the percentage curve	AGA	20	69.0
	SGA	8	27.6
	BGA	1	3.4

Captions: GAB - gestational age at birth, PTNB – preterm newborn, LW – low weight, SGA – small for gestational age, AGA – adequate for gestational age, BGA – big for gestational age

Table 2. Data on sample mothers

Variables	N	%
Age		
14 to 18 years	1	3.4
19 to 25 years	8	27.6
26 to 35 years	13	44.8
36 to 45 years	7	24.2
Educational attainment		
Illiterate or incomplete elementary school	1	3.4
Complete elementary school or incomplete middle school	7	24.2
Complete middle school or incomplete high school	3	10.3
Complete high school or incomplete higher education	16	55.2
Complete higher education	2	6.9

Concerning breastfeeding history, 58.6% (17) of the children were discharged from the hospital in EBF – which was achieved by 31% (9) of them by 6 months CGA.

Table 3 described information on the CF introduction. One mother did not know when it was introduced.

Table 3. Information on the introduction of complementary feeding

Variables	N	%
Initial CGA		
Before 6m CGA	5	17.2
After 6m CGA	7	24.2
At 6m CGA	16	55.2
Not known	1	3.4
Professional guidance		
No guidance received	3	10.3
Pediatrician	8	27.6
Nutritionist and Pediatrician	18	62.1
Utensil used		
Spoon	21	72.5
Baby bottle	1	3.4
Spoon and sippy cup	3	10.3
Spoon and baby bottle	4	13.8
Who offered the food		
Mother	24	82.8
Mother and father	1	3.4
Mother and other relatives	4	13.8

Captions: 6m – 6 months, CGA – corrected gestational age.

Fruits and/or vegetables were the first foods offered to babies, mentioned by 28 mothers. The types of foods initially offered are described in Table 4. Food consistencies used in the CF introduction are presented in detail in Table 5.

Table 4. Foods introduced in complementary feeding

Foods	N	%
Porridge and milk	1	3.4
Vegetables	1	3.4
Fruits and vegetables	7	24.2
Fruits	7	24.2
Fruits and/or vegetables + others	13	44.8

Table 5. Food consistencies introduced in complementary feeding

Consistencies	N	%
Crushed + pieces	1	3.4
Crushed + grated	1	3.4
Sliced	1	3.4
Thickened liquid	1	3.4
Pureed and liquid	2	6.9
Pureed	8	27.6
Mashed	15	51.8

DISCUSSION

In the sample of premature babies followed up at the outpatient center of a Child-Friendly Hospital, more than half the babies had CF introduced by 6 months CGA. There is yet no consensus in the literature on the ideal moment to introduce CF to premature babies[1,9,10]. Some authors describe that premature babies exposed to CF by 4 months old were hospitalized more often than those introduced to it by 6 months CGA[11]. However, another study verified that early CF introduction had benefits for this population's growth and nutrition[12].

Delaying CF introduction may have negative impacts on babies, such as growth deficits and a lack of micronutrients, energy, and proteins[1]. On the other hand, this population was born before 33 weeks' GA, often with extremely low weight; hence, the late introduction may be due to neurological immaturity, oral-motor conditions, neuropsychomotor development, or other difficulties preventing CF introduction. The GA at birth influences global motor and oral motor sensory development. The lower the GA at birth, the greater the risks of developmental delay in the oral motor sensory system and consequently in the functions it performs[13].

Before introducing CF to preterm children, two aspects must be considered: the baby's CGA and signs of readiness[1]. In other words, these children's global and oral motor maturity and organization must be assessed. The following motor development parameters must be analyzed before introducing CF: holding their head and neck up; sitting up without support; having reduced tongue protrusion reflex; manipulating objects, and so forth[14]. A cohort of children followed up at outpatient centers until 2 years old verified that most premature children had adequate milestones and the expected neuropsychomotor development for their age[15].

According to a study, more than 95% of preterm babies had already received solid foods by 6 months CGA[16]. Another study conducted in Rio Grande do Sul showed that premature babies received pureed foods at the ideal moment (by 6 months old) but liquids and solid foods before the recommended time[17].

As for breastfeeding – a topic closely related to CF –, more than half of the mothers/babies were discharged from the hospital in EBF, and more than half of these maintained EBF until the baby was 6 months old. Interrupting breastfeeding and consequently introducing CF to these babies before the recommended time is associated with countless biological, psychological, sociocultural, and other factors[6]. The most common motives are the sensation of insufficient milk, the belief in the benefits of tea, and the need for water[18]. A study verified a 68.6% prevalence of breastfeeding by 6 months in Brazil[19]. This number drops substantially in the preterm population; other authors described a 22% prevalence of EBF by 6 months in premature babies, of which 33.3% were in mixed breastfeeding[20]. These numbers are below those found in this study.

This study probably found higher EBF percentages because the mothers/babies were followed up in an outpatient center and received guidance from the multiprofessional team. Almost all participants reported they had been instructed by both nutritionists and pediatricians at the outpatient center regarding CF introduction. Less than 1/4 of the sample had other foods introduced to their diets before 6 months CGA. Some authors found CF introduction to be associated with low maternal educational attainment and male babies[16]. In this regard, 79.2% of the mothers had a high school degree or incomplete higher education, which may have also contributed to the favorable EBF rates in the present study. Early weaning is associated with low educational attainment in the country and the early introduction of other types of milk or infant formulas[21].

However, other authors have reported many mothers with at least a high school degree who weaned early[22].

The literature demonstrates the importance of a plan involving mothers/babies and the multidisciplinary team on different healthcare levels to effectively promote and follow up breastfeeding after hospital discharge since discontinuing it too early is rather common[18]. The present study encompassed mothers/babies followed up at an outpatient center of a Child-Friendly Hospital, which may have been decisive to the quite positive breastfeeding rates.

The type of milk given to babies may be associated with feeding difficulties when CF is introduced. Some researchers addressed this issue and reported that food refusal occurred mainly in preterm newborns who were receiving formula[23].

Regarding recommended consistencies and utensils, CF should be introduced by offering babies crushed or grated fruits and at least one main meal, with cereals or tubers, proteins, legumes, and vegetables. A spoon must be used, and the quantities must be gradually increased over time[2]. Most mothers in this sample gave their babies crushed fruits or vegetables with a spoon, as recommended by the Brazilian Society of Pediatrics and the Ministry of Health. Research conducted in Salvador, Brazil, revealed that all premature children who had CF introduced with liquidized foods had defensive behaviors, arching their bodies during the CF introduction process[24].

This study did not find any indications of poor eating habits. No mother reported giving their babies processed foods, with high levels of sugar, sodium, caffeine, and so forth. These foods are associated with the development of chronic diseases such as diabetes, obesity, and cardiovascular diseases[2]. A study conducted in Italy with late premature babies, with 34 to 36 weeks' GA, showed that the first foods that more than half of them received had low nutritional values, although they needed foods rich in protein and energy to ensure this population's adequate growth[25]. In Belém, Brazil, children from 4 months CGA also received nonnutritive foods, with high levels of sugar, such as soft drinks, sandwich cookies, coffee, crackers, and chocolate milk[26].

The limitations of the study include the few participants, due to difficulties collecting data during the COVID-19 pandemic, and a possible information bias, with incomplete data on artificial nipple use – which the researcher could not discuss.

CONCLUSION

More than half of the premature children's mothers, in this study, introduced CF at the recommended time, with adequate consistencies and utensils. Moreover, breastfeeding by 6 months CGA was considered successful. This is a vulnerable group that needs multiprofessional follow-up after hospital discharge to encourage breastfeeding and promote safe and healthy CF introduction.

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