

## COMPLEMENTARY FOODS FOR INFANTS ATTENDED IN A FAMILY HEALTH CENTER IN THE NORTH EAST OF BRAZIL

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**ABSTRACT:** Objectives: To identify the offering of complementary foods to children aged below two years old, and the conformity of this with the Ministry of Health's recommendations. Method: a study undertaken with 52 children in a Primary Healthcare Center in the North East of Brazil, between December 2015 and February 2016. Interviews were held with the mothers, who were given a socioeconomic questionnaire which was also related to the children's dietary profile. The data were analyzed using the statistical program R<sup>®</sup>. The foods consumed were classified as either "not appropriate" or "appropriate", according to the Ministry of Health. Results: of the children older than one year, one (3.3%) was receiving complementary breastfeeding, while those younger than one year old (n=22/100%) were eating baby porridge ('mingau') and 20 (90.9%) had already drunk soda. Soda, mingau, salted snacks and cookies were the foods consumed most. "Inappropriate" food was prevalent in the children younger than one year old. Conclusion: most of the food given consisted of industrialized products, and is thus a problem of food insecurity for the study population.

**DESCRIPTORS:** Nursing; Complementary Feeding; Infant; Health Education; Infant Nutrition.

### ALIMENTAÇÃO COMPLEMENTAR DE LACTENTES ATENDIDOS EM UMA UNIDADE BÁSICA DE SAÚDE DA FAMÍLIA NO NORDESTE BRASILEIRO

**RESUMO:** Objetivos: identificar a oferta de alimentos complementares às crianças com idade inferior a dois anos, e sua conformidade com o Ministério da Saúde. Método: estudo realizado com 52 crianças em uma Unidade Básica de Saúde do Nordeste brasileiro, entre dezembro/2015 e fevereiro/2016. Realizou-se entrevistas com as mães aplicando-se um questionário socioeconômico e relacionado ao perfil alimentar infantil. Analisou-se os dados no programa estatístico R<sup>®</sup>. Classificou-se os alimentos consumidos em "não adequado" e "adequado" segundo o Ministério da Saúde. Resultados: dos maiores de 1 ano, uma (3,3%) estava em aleitamento complementar, já os menores de 1 ano (n=22/100%) faziam uso de mingau e 20 (90,9%) haviam consumido refrigerantes. Refrigerante, mingau, salgadinhos e biscoitos foram os alimentos mais consumidos. A alimentação "inadequada" prevaleceu nos menores de 1 ano. Conclusão: a alimentação é em sua maioria de produtos industrializados, tornando-se um problema de insegurança alimentar para a população do estudo.

**DESCRIPTORES:** Enfermagem; Alimentação complementar; Lactente; Educação em Saúde; Nutrição do Lactente.

### ALIMENTACIÓN COMPLEMENTARIA DE LACTANTES ATENDIDOS EN UNA UNIDAD BÁSICA DE SALUD DE LA FAMILIA EN NORDESTE DE BRASIL

**RESUMEN:** Objetivo: Identificar la oferta de alimentos complementarios a los niños con edad inferior a dos años, y su conformidad con el Ministerio de la Salud. Método: estudio realizado con 52 niños de una Unidad Básica de Salud de Nordeste brasileño, entre diciembre/2015 y febrero/2016. Se realizaron entrevistas con las madres por medio de cuestionario socioeconómico asociándolo al perfil alimentar infantil. Se analizaron los datos por medio del programa estadístico R<sup>®</sup>. Se clasificaron los alimentos consumidos en "no adecuado" y "adecuado" de acuerdo al Ministerio de la Salud. Resultados: De los niños con más de 1 año, un (3,3%) estaba en amamantamiento complementario; ya los con menos de 1 año (n=22/100%) usaban papilla y 20 (90,9%) habían consumido sodas. Soda, papilla, snacks y biscochos fueron los alimentos más consumidos. La alimentación "inadecuada" prevaleció para los menores de 1 año. Conclusión: Predomina la alimentación con productos industrializados, constituyendo un problema de inseguridad alimentar para la población del estudio.

**DESCRIPTORES:** Enfermería; Alimentación complementaria; Lactante; Educación en Salud; Nutrición del Lactante.

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## ● INTRODUCTION

The World Health Organization (WHO) and Brazilian Ministry of Health stipulate that children should be exclusively breast-fed until they are six months old<sup>(1-2)</sup>. After the six month, it is necessary to introduce food which complements breast milk, as, in this period, breastmilk on its own is not sufficient to meet the child's needs<sup>(2)</sup>.

Complementary feeding is defined as the period in which other foods or liquids are offered in addition to breastmilk<sup>(2)</sup>. Any food offered to the breast-feeding child besides breastmilk, during this period, is termed complementary feeding<sup>(3-4)</sup>. However, one may observe that some of the mothers resort to other methods of feeding which are easy to access and prepare during the process of the baby's dietary adaptation<sup>(5)</sup>.

Studies have shown that the feeding of infants in Brazilian society is of poor quality, presenting the frequent consumption of cow's milk, flours, foods with chocolate, sugars, salty snacks, sodas and sweets, which have negative repercussions for early childhood<sup>(6)</sup>. The Brazilian Institute of Geography and Statistics (IBGE) noted in 2015 that infant obesity had tripled (9.7% to 33.5%) in the last 40 years<sup>(7)</sup>. In Brazil, one in three children suffers with this disease and WHO projections indicate that, by 2025, the number of children with overweight and obesity may reach 75 million, should nothing be done<sup>(1)</sup>.

Obesity entails organic-functional complications, such as chronic-degenerative diseases (diabetes, arterial hypertension, coronary diseases), and psychosocial diseases – such as withdrawing from social relationships, shame, exclusion and disorders of body-awareness<sup>(8)</sup>. Obesity is considered a worldwide public health problem; in the case of children, in the last 10 years, there has been an increase of 40% in the rates of infant obesity<sup>(9)</sup>. In 2015, 28.1% of children between 2 and 5 years old, in the North East of Brazil, were overweight<sup>(7-9)</sup>.

In order to classify the children's nutritional status, the Ministry of Health has adopted the WHO's child growth and development curves, which classify children between 0 and 5 years old by their weight-age relation, through percentiles: low weight (BMI<P3), normal weight (P3<BMI<P85), overweight (85 ≤ BMI< P97) and obesity<sup>(1)</sup>.

At the time of writing, obesity is one of the biggest challenges posed to public health, including in pediatrics, from infants through to adolescents. In this context, it is known that the first months of life are indicated as crucial for the development of obesity<sup>(10)</sup>. For this reason, healthy complementary feeding has become a priority in public policies on diet and health in Brazil<sup>(11)</sup>.

In order for complementary feeding to be applied in the most appropriate way, the mothers need guidance on the topic<sup>(5)</sup>. Misinformation and guidance provided in a dis-satisfactory way can significantly compromise the process of introducing complementary food to the child and keeping up breast-feeding until the child is two years old or over, as called for by the WHO and Brazilian Ministry of Health<sup>(1-2)</sup>.

The professionals must seek strategies for investigating better changes in behavior deriving from the mothers themselves, improving and integrating actions of healthy dietary practices, mainly in the primary care services, with a view to preventing worse nutritional harm, such as overweight or obesity, through interventions which prioritize and improve the quality of complementary feeding of the child from the sixth month of life<sup>(5,11)</sup>.

For this reason, the following questions arose: which complementary foods are being offered to the infants under the care of the Primary Healthcare Service in a municipality in the North East of Brazil? This study is relevant, as it has been observed that various studies have indicated the phase of transition/complementary feeding, and, as a result, the increase of weight in infancy, as something which deserves great attention, both on the part of family members, and on the part of health professionals who care for the child<sup>(4-5)</sup>.

Diet in childhood is one of the essential aspects for maintaining infant health, it being essential that

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<sup>1</sup>'Mingau' is usually made from cornmeal starch, milk and a significant amount of sugar. It is sometimes made thin enough to be offered in a baby bottle. Translator's note.

– in the first two years of life – healthy dietary habits should be adopted. The act of being fed in the beginning of one's life is delicate, and must be taken into account, as it is these dietary habits that will last for the rest of the person's life<sup>(1)</sup>.

In the light of the above, this study aimed to identify the complementary foods offered by the breast-feeding mothers in a Family Healthcare Center in accordance with what is stipulated by the Ministry of Health, as well as to establish the relation of risk for overweight/obesity in these children.

## ● METHOD

A descriptive, transversal, quantitative study undertaken in a Family Healthcare Center in Canindé, a municipality in the rural region of the State of Ceará, in the North East of Brazil, which has a population of 74,486 inhabitants<sup>(12)</sup>. This Center was selected as it is the center in the municipality's health network with the largest number of families registered (6,273) in 2016.

For the sample calculation, data was considered from the Primary Care Information System (SIAB). The universe of children in the age range selected – from 6 months to less than 2 years old – made up a total of 98 individuals. The following inclusion criteria were established: children who were receiving complementary food and mothers who were responsible for preparing the food for the child during the day. The exclusion criteria were: mothers who did not have direct contact with the child or who did not care for the child during the day, or who had not breast-fed for health reasons or other reasons which stopped them from breast-feeding. Due to the criteria established, the sample was made up of 52 mother-child binomials.

The data were collected between December 2015 and February 2016, through a semistructured interview held with the mothers, administered by the study's researcher in the above-mentioned Health Center, during the child-rearing consultations. An instrument validated and published in 2015<sup>(3)</sup> was used. It is made up of 58 closed questions, which cover sociodemographic data of the mother/main caregiver and of the child, as well as questions related to the child's dietary habits and dietary consumption in a 24 hour period.

Of the questions addressed which were part of the interview administered to the mothers, in the part referring to the child's food, a total of 11 questions were selected, which dealt with the main foods consumed by those younger than two years old in their day-to-day. Foods were classified as appropriate or not appropriate, according to the Ministry of Health's reference manual, which deals with breast-feeding and feeding infants<sup>(2)</sup>. The data were classified according to the children's age, separated by age group: below 1 year old, and greater than 1 year old; the foods were classified according to what each one could consume in their age group. A total of 22 children were younger than 1 year old, and 30 children were older than 1-year-old.

In the analysis of the data, the following foods were selected as appropriate: breastmilk, fruits, greens, legumes, foods rich in proteins, calcium and low-fat milk derivatives. The following were selected as not appropriate: fried foods, sodas, foods rich in fats, carbohydrates, colorings and sugars, and ultra-processed foods<sup>(2)</sup>.

After the categorization of the foods used, a re-categorization was undertaken in two variables: risk for overweight/obesity as present or absent, being defined as follows: risk present – when the mothers offered six or more foods classified as not appropriate in the above-mentioned classification; risk absent – those who had been offered fewer than six non-appropriate foods in the 24 hours investigated, in accordance with the classification above. It is emphasized that one of the criteria was the factor 'present' with more than six responses, taking as a basis the number of questions plus one – thus following the premise of bivariate variables.

The data were compiled in a database using an electronic spreadsheet in the Microsoft Excel 2007 program. They were later allocated and analyzed using R®, version 64.1. Absolute and relative frequencies were analyzed, in order to observe the percentage of foods offered to the children. The test for the difference in the proportion of means was undertaken, in order to establish the risk of overweight/obesity. For the calculation of the correlation between the study variables, the Pearson

Chi squared test was used and  $p < 0.05$  was adopted as the level of significance. The intervals were calculated with 95% confidence.

The mothers signed the terms of free and informed consent. The study was approved by the Research Ethics Committee of the School of Public Health of Ceará via the Plataforma Brasil, under Opinion N. 1,350,061.

## ● RESULTS

Of the children, 29 (53.8%) were female. The mean age was  $11.9 \pm 5.02$  months, the mean current weight being  $9.5 \pm 1.99$  kilograms. On analyzing the weight curves, according to the WHO percentiles, 25 children were already classified as overweight/obese. The mean duration of exclusive breast-feeding was 3.7 months, predominant in 19 of those below 1 year of age (83.4%).

The mean maternal age was  $26.8 \pm 7.32$  years old, with 27 of the mothers being over 25 years old, and 30 having studied for 8 years or more (57.7%). Regarding the mothers' occupation, 14 (26.9%) mothers worked outside the home and 45 (86.5%) cohabited with a partner. Of the mothers, 26 (48.8%) were primiparous, and 43 (82.7%) stated that they had breast-fed the child in the first hour of life.

Tables 1 and 2 present the percentages of the foods consumed by the children in the age ranges below 1 year old and over 1 year old. The test for the difference in proportions of means was undertaken in order to observe the degree of significance between the data below.

Table 1 – Food consumption of the infants below 1 year old, in accordance with the recommendations of the Ministry of Health. Canindé, CE, Brazil, 2016

Dietary variables	Appropriate		Not appropriate		p value
	N	%	n	%	
Breastmilk	19	83.4	3	13.6	<b>0.001</b>
Tea	15	68.2	7	31.8	0.135
Powdered or liquid cow's milk	3	13.4	19	83.4	<b>0.001</b>
Industrialized juice	11	50	11	50	1
Soda	2	9.1	20	90.9	<b>&lt;0.001</b>
Mingau (baby porridge)	0	-	22	100	<b>&lt;0.001</b>
Sugar and its derivatives	10	45.4	13	59.1	0.831
Fruit <i>in natura</i>	19	83.4	3	13.6	0.001
Sweets and treats (lollies/sweets)	4	18.2	18	81.8	<b>0.005</b>
Cookies with fillings and salted snacks	7	31.8	15	68.2	0.135
Ultra-processed foods (wieners, sausages, nuggets)	13	59.1	9	40.9	0.522
Instant noodles	10	45.5	12	54.5	0.831

Table 2 - Dietary consumption of the infants older than 1 year old, in accordance with the recommendations of the Ministry of Health. Canindé, CE, Brazil, 2016 (continues)

Dietary variables	Appropriate		Not appropriate		p value
	N	%	n	%	
Breastmilk	1	3.3	29	96.7	<b>&lt;0.001</b>
Tea	14	46.7	16	53.3	0.855
Powdered or liquid cow's milk	29	96.7	1	3.3	<b>&lt;0.001</b>
Industrialized juice	16	53.3	14	46.7	0.855
Soda	14	46.7	16	53.3	0.201

Mingau (baby porridge)	19	63.3	11	36.7	0.001
Sugar and its derivatives	24	80	11	36.7	0.001
Fruit <i>in natura</i>	4	13.3	26	86.7	<b>&lt;0.001</b>
Sweets and treats (lollies/sweets)	20	66.7	10	33.3	0.100
Cookies with fillings and salted snacks	29	96.7	1	3.3	<b>&lt;0.001</b>
Ultra-processed foods (wieners, sausages, nuggets)	7	23.3	23	76.7	0.006
Instant noodles	19	63.3	11	36.7	0.201

The test presented a prevalent significance for risk of overweight/obesity in those younger than 1 year old, in relation to food described as not appropriate. Even with breast-feeding being predominant in both age ranges, the mean for offering other milks was 3.25 bottles per day, and for mingau, 2.71 bottles. Fruit *in natura* was one of the foods offered most in both age ranges; however, its consumption did not reach two portions per day (1.53 portions). Attention should also be drawn to the use of teas for medicinal purposes in 16 of the 30 children older than 1 year old (46.7%). Of the total sample, 28 children consumed powdered fruit drinks (53.3%), and 27 drank fruit drinks from cartons (51.9%).

In relation to the risk for obesity/overweight correlating with the maternal variables, the single mothers with children aged below 1 year old had a significant statistical analysis for risk ( $p/x^2 = 0.012$ ). Upon analyzing only the percentage of risk present, the variables of age, marital status, educational level and number of children presented a homogenous risk (27.27%).

For the other variables, statistical significance was not observed when the risk of developing overweight/obesity was assessed among the children below 1 year old, according to the Chi-squared p-value.

Table 3 - Risk of obesity/overweight in infants below 1 year old, according to the maternal sociodemographic variables. Canindé, CE, Brazil, 2016

MATERNAL VARIABLES	TOTAL		RISK ABSENT		RISK PRESENT		x <sup>2</sup>
	N		N	%	n	%	
AGE							
< 25 years old	10		7	31.8	3	13.6	1
>25 years old	12		9	40.9	3	13.6	
MARITAL STATUS							
Single	4		1	4.5	3	13.6	<b>0.012</b>
Married	18		15	68.2	3	13.6	
EDUCATIONAL LEVEL							
Primary/junior high	5		4	18.2	1	4.5	0.057
Senior high	17		12	54.5	5	22.7	
MATERNAL OCCUPATION							
Works outside the home	6		4	18.2	2	9.1	0.190
Not working	16		4	18.2	12	54.5	
NUMBER OF CHILDREN							
First child	11		7	31.8	4	18.2	0.230
2 or more children	11		9	40.9	2	9.1	

x<sup>2</sup>= chi-squared (p-value)

The maternal variables of the children older than 1 year old did not present any statistically significant association for the risk of developing overweight/obesity. Upon analyzing the sample's simple mean alone, the largest percentage of risk present was in the variables of age and maternal occupation (50%), followed by number of children (46.67%).

Table 4 - Risk of overweight/obesity in the infants older than 1 year old, in accordance with the maternal sociodemographic variables. Canindé, CE, Brazil, 2016

MATERNAL VARIABLES	TOTAL		RISK ABSENT		RISK PRESENT		x <sup>2</sup>
	N	n	%	n	%		
AGE							
< 25 years old	15	8	26.7	7	23.4		1
>25 years old	15	7	23.4	8	26.7		
MARITAL STATUS							
Single	3	1	3.3	2	6.7		0.138
Married	27	17	56.7	10	33.3		
EDUCATIONAL LEVEL							
Primary/junior high (<8 <sup>th</sup> year)	17	12	40.0	5	16.7		0.601
Senior high (>8 <sup>th</sup> year)	13	8	26.7	5	16.7		
MATERNAL OCCUPATION							
Works outside the home	7	5	16.7	2	6.7		0.387
Not working	23	10	33.3	13	43.3		
NUMBER OF CHILDREN							
First child	14	7	23.4	7	23.34		0.613
2 or more children	16	10	33.3	6	20.0		

x<sup>2</sup>= chi-squared (p-value)

Source: Author's research

## ● DISCUSSION

The maintaining of breast-feeding was more prevalent in children below 1 year old. Similar data have been found in other studies, where the prevalence of breast-feeding was greater in children below 12 months: 46.7%, 77.27% and 59%<sup>(5,12)</sup>. More recent studies have presented percentages for breast-feeding in children older than 1 year old of 65.5% and 58.1%<sup>(14-15)</sup>.

Both age ranges presented lower rates if compared with the mean for the Brazilian population, which is of 7.6 months for breast-feeding<sup>(15)</sup>. Stopping breast-feeding predisposes to the appearance of obesity and chronic diseases, such as diabetes type I or arterial hypertension, besides morbidities such as diarrheal diseases, infectious diseases, and diseases of the respiratory tract<sup>(13,16-17)</sup>.

The percentage of consumption of other milks (powdered or liquid cow's milk) was prevalent in the children > 1 year old, while the use of mingau was of 78.8% in the total sample. Of the children below 1 year old, all consumed mingau (100%). Both presented statistical significance (p<0.001). One study undertaken in five European countries, with 746 children aged between 6 and 24 months, observed that the milk components are the most common in the diet, and are the main source by which proteins are offered<sup>(18)</sup>.

The introduction of full-fat cow's milk and of mingau prior to the age of 1 year old is contraindicated, as these are responsible for 20% of dietary allergies, and can trigger atopic diseases, such as asthma, intestinal micro-hemorrhages, overloading of the immune and renal system, and early weaning. Besides this, they present low levels of vitamins C, D and E, and inappropriate quantity of carbohydrates, besides the addition of other sugars. From the age of 12 months onward, the introduction of these foods must be viewed with caution<sup>(13-14)</sup>.

The use of sodas is significant as a risk factor for developing overweight/obesity in the children over 1 year old (p<0.001). In the State of Rio de Janeiro, 38% of children younger than one year old drink sodas and first consumption began prior to the age of three months in 66.7%, in one study undertaken<sup>(19)</sup>. Other studies have indicated the significant consumption of sodas in children younger

than 1 year old (55.4%, 69.5%, 37.6% and 53.8%)<sup>(13,18-20)</sup>. These data converge with the data from the study undertaken here.

The consumption of soft drinks can lead to deficiency in the absorption of non-heme iron and can adversely affect the calcium-phosphorus relation. The majority of the parents are unaware of these drinks' actual energy density and sugar content<sup>(20)</sup>. It is necessary to alert them, during the childrearing consultation, that these foods should be excluded from the diet of the children due to the high quantity of sugars, colorings and substances prohibited by the WHO, which present allergenic potential and contribute to excess weight and the appearance of caries<sup>(13)</sup>.

The use of sugar and its derivatives was present in the majority of the sample of the infants, with consumption being more evident in those older than 1 year old (80%). Similar data have been found in other studies<sup>(21-22)</sup>.

The study evidenced high consumption of cookies with fillings and salted snacks, reaching a percentage of 84.6% of the total sample studied, being more prevalent in those older than 1 year old (96.7%). These foods can irritate the gastric mucosa, induce allergies, and lead to obesity<sup>(4-6)</sup>. In other studies, the percentages were 64% and 71.7% for consumption among those younger than 2 years old, converging with the present study. The consumption of these foods is more common in families with lower purchasing power<sup>(20-21)</sup>.

Cookies with fillings can trigger hyperactivity, irritability and allergies. Industrialized foods are not recommended by the WHO for children younger than 2 years old. Studies suggest that from 12 months onward, children are more susceptible to unhealthy eating practices, and, as a consequence, to obesity, due to excessive advertising in the media for the consumption of industrialized foods, and to a "false practicality"<sup>(19)</sup>.

The consumption of ultra-processed foods (processed meats and instant noodles) is a worrying factor in this age range. A study undertaken in public crèches in São Paulo shows that 58.2% of children in this age range consume these foods in the lunch offered in the institution<sup>(21)</sup>. A study undertaken in Minas Gerais demonstrates the association between risk for cardiovascular diseases (CVD) in children who constantly consume these foods. Besides the CVDs, dyslipidemias, arterial hypertension and hyperglycemia have also been observed<sup>(22)</sup>. These foods contain a high content of sodium and lipids, and add nothing to children's foods, besides bringing increase in weight and iron-deficiency anemia as consequences<sup>(8,20-21)</sup>.

Finally, upon evaluating the maternal variables and the risk factors for overweight/obesity according to the children's diet, we found a significant risk for those who were children of single mothers, who had lower educational levels, and who were younger than 25 years old. In other Brazilian and international studies, inappropriate dietary practices in infancy were present among mothers with low educational level and maternal age below 25 years old<sup>(21-23)</sup>.

Mothers who have studied for fewer than 8 years tend to offer foods with higher caloric content with greater frequency. Children of mothers with lower educational levels tend to present weight curves which are stagnating or rising<sup>(5,24)</sup>.

The woman's insertion in the job market, and role as head of the family, converge towards inappropriate dietary standards, with an impact on the early introduction of industrialized and ultra-processed foods in the infant's diet<sup>(23)</sup>. One study undertaken in Florianópolis shows that economic activity outside the home is a risk factor for overweight/obesity<sup>(25)</sup>, while an Australian study also demonstrated that children of mothers who work outside the home tend to develop obesity at an early point, due to the consumption of junk food<sup>(22)</sup>.

The introduction of these foods in the children's diet is a decisive factor for predisposing to obesity and developing chronic noncommunicable diseases in adult life<sup>(26)</sup>. The data presented describe a high prevalence of early consumption of industrialized foods. Emphasis is placed on the need to discourage the consumption of these foods and reinforce the consumption of fruits and vegetables<sup>(27)</sup>.

As a limitation of the study, there is the fact that the sample had a small number of participants, besides the recall bias of the mother, as in many occasions she may omit or forget a fact.

## ● CONCLUSION

The prevalence of inadequate dietary consumption was more visible in the population aged below 1 year old. The non-appropriate foods consumed most by the population were powdered or liquid cow's milk, mingau, soft drinks, filled cookies and salted snacks. This diet, allied with the low maternal educational level and mothers who work outside the home was shown to be a factor for the risk of developing overweight/obesity.

Related to the appropriate dietary practices, there is the prevalence and maintenance of breast-feeding in a complementary mode and the consumption of fruit *in natura*. Most of the food consumed by the group studied is industrialized products, which is a problem of food insecurity for the study population, related to the Nutrition and Food Security stipulated by the Ministry of Health and WHO.

Due to this, one can observe the importance of action on the part of health professionals, particularly the nurse, given that this has – in her framework of knowledge – theoretical bases and practices for health promotion regarding the child's complementary feeding and monitoring child health, involving strategies of education and health, evaluation of growth and development, and guidance considering the context of the families in their cultural and socioeconomic context.

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