

The community health worker as interlocutor in complementary feeding in Pelotas, Rio Grande do Sul, Brazil

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Abstract *This paper evaluates the knowledge of community health workers in complementary feeding and their association with sociodemographic characteristics, work routines and describes the resources available in primary care facilities to master this topic. We applied questionnaires to the responsible for health services and to community health workers, the latter consisting of a knowledge test that allowed the calculation of scores according to the number of correct answers in multiple-choice questions. There was a positive association with age, length of service, home visits to children under 24 months, providing guidance or seeking information about complementary feeding with the knowledge in feeding in the first 24 months of life. There were discrepant responses by health services and the community health workers regarding training, government materials and child growth monitoring. Greater mastery was noted in breastfeeding in relation to complementary feeding. Therefore, primary care facilities should provide support and resources to increase knowledge in complementary feeding through training and access to government materials.*

Key words *Infant nutrition, Community health workers, Family health strategy, Child health services*

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Introduction

Food is a fundamental human right as it is the basis for survival¹ and is an essential factor in providing full growth, health and development during childhood². Inadequate dietary practices in the first years of life are strongly related to children's morbimortality³⁻⁵. According to recommendations, breastfeeding should be exclusive in the first semester and food should be introduced after six months, complementing breast milk⁶.

It is estimated that breastfeeding and healthy complementary feeding promotion actions can reduce the occurrence of deaths in children under five years of age to 13% and 6%, respectively, in the world⁷. Studies have shown that campaigns to promote breastfeeding have shown positive results over the last decades^{5,8,9}. A similar progress has not been made in relation to complementary feeding worldwide⁶. Research reports that the introduction of food in Brazil occurs early and is of low quality⁸⁻¹¹. On the other hand, food with high bioavailability of iron, which is extremely necessary in complementary food, are introduced late¹¹⁻¹³. Whether late or early, the introduction of food occurs incorrectly and is harmful to children's health.

Responding to this situation are reports of poor guidelines on infant feeding by health professionals^{14,15}, including community health workers (CHWs) who, even with increased responsibilities, focus their practice on breastfeeding^{14,16-18} for children in the first two years of life. Thus, the promotion of healthy complementary food has become a priority of food and health public policies¹⁹, and Brazil's Breastfeeding and Feeding Strategy "*Amamenta e Alimenta*", which proposes to promote breastfeeding and healthy complementary feeding for children under two years of age and improve the skills and abilities of health professionals in primary care⁴ is one of these state policies.

Within the scope of primary care, the Community Health Workers Strategy (EACS) has existed since the early 1990s and was established and regulated in 1997²⁰. These professionals are in charge of visiting families at least once a month, developing health promotion, disease and illness prevention and health surveillance activities through home visits and individual and/or group educational actions²¹. The EACS is a transition to the Family Health Strategy (ESF)²² or a way to aggregate CHWs to other primary care organization types²¹. Promotion has an important role¹⁶ in this

model, where CHWs are the main professionals for strengthening integration between basic health services and the community²³.

In this context, this study is justified considering the characteristics and attributions of CHWs that assign them a fundamental role in the promotion of healthy complementary feeding, engaging with the community in a practical way, in simple and accessible language, since no study that evaluated the knowledge about complementary feeding of these professionals was identified in the literature review. To contribute to this debate, this paper aims to evaluate the knowledge of community health workers in complementary feeding and its association with sociodemographic characteristics, work routines, as well as to describe the resources available in the primary care facilities so that they have mastery in this topic.

Methods

This is a descriptive, quantitative study, with a census of community health workers (CHWs) in the urban area of Pelotas, which is located in the southern region of Rio Grande do Sul, Brazil. All of the city's primary care facilities (UBSs) with Family Health Strategy (ESF) or the Community Health Workers Strategy (EACS) participated in the survey, totaling 29 locations. Only one UBS had an EACS team, while another facility had two ESF teams and one EACS team. In the remaining 27 UBSs, all the teams were of ESF. As of October 2015, there were 67 ESF teams and 329 CHWs enrolled in the Ministry of Health (MS) system, providing an estimated population coverage of 57.4%²⁴ of 329,435 inhabitants²⁵. Eligible CHWs should be in full exercise of their professional activities in the urban area; therefore, those who were in any type of leave and who worked in the rural area of the municipality were excluded.

The application of the questionnaire was conducted from October 2015 to March 2016 at the UBSs by 24 undergraduate students of the Nutrition course selected and trained to apply the tool, and a nutritionist supervising fieldwork that attended all locations at least once during the data collection period. If any CHW was not available on the scheduled date or was on vacation, the research assistant himself made further attempts to apply the questionnaire, or, in cases of refusal, the supervisor was advised to make at least one reversal attempt.

Characterization of CHWs

Sociodemographic data and data related to complementary feeding (CF) in the work routine were obtained through a standardized questionnaire applied by CHW research assistants. Variables were gender, age in full years, self-reported skin color²⁶, length of service, schooling (considering the highest completed level), area of knowledge for those who have completed technical or higher education, home visits in the last month for children under 24 months old and to provide CF guidance in these visits and information about CF (sources of information that could contribute to the orientation of the CF, besides training and/or the materials of the Ministry of Health). For those last questions that referred to the month prior to the application of the tool, we considered the last month of work of CHWs who returned from leave.

Knowledge score

The outcome for this study was the knowledge score, evaluated by a self-administered questionnaire and prepared based on scientific literature^{27,28}. Responses of all questions were available on MoH's material intended for primary health care professionals to provide guidance to the population on the healthy eating of Brazilian children under two years of age²⁸. The tool contained 25 propositions, to which participants should point out (*right, wrong or don't know*) according to what they considered to be MoH's recommendation. The score was the product of the ratio between the questions correctly answered and the number of questions, ranging from 0.00 to 1.00 (0.00 – no correct answers and 1.00 – 25 correct answers)²⁷. The affirmations marked as “*don't know*” were considered wrong answers in the calculation of the score. To describe results, the tool was divided into two modules: a breastfeeding module, with five questions and a complementary feeding module, with twenty questions, six of them about macro and micronutrients, and fourteen about health and behavior, which together made the overall knowledge module.

In order to ensure that there was no exchange of information between the participants or reading of educational materials, the research assistants remained present until all the participants completed the self-completion of the questionnaire.

A first pilot study was conducted out with students of the Nutrition course of the first and sixth semesters only with the knowledge test, and a second, in a UBS with ESF of the rural area of the municipality. Analyses and considerations regarding the tool's reliability, besides the criticisms and suggestions of the participants in these two sub-studies were used for adjustments in the knowledge test to allow a better understanding by the target public.

Characterization of UBSs

The study supervisor applied a standardized questionnaire to the senior manager / professional of the UBS where the following variables were investigated: the profession of the participant, UBS work shifts to serve the population; group of pregnant women or mothers in the UBS; CF approach for the participants of these groups; childcare consultations, CF protocol of attendance in place; responsibility for drafting the protocol when referred to; human resources with technical qualification to provide guidance on CF and availability of infantometer and portable scale in the UBS.

Information from CHWs and responsible for the UBS

The questionnaires applied to CHWs and the UBS head contained questions with similar objectives, such as: difficulty in providing guidance on CF; conducting CF training; responsible for training when referred to; training workload, time since the last training. If the participant had referred more than one training, the following order was considered: idealized by governmental institution, the longest or most recent for each of the variables previously related. As for the MoH materials, we checked with CHWs only whether they were aware of any of them (they were not questioned about their frequent reading and/or use), while for the UBS responsible, we considered the availability of each of the five publications that contained the theme CF²⁸⁻³². In order to facilitate the identification of the information material, their covers were printed and plastified, and they were shown to both at the time of application of the questionnaires. Regarding the follow-up of the child growth, CHWs were questioned as to whether they assessed weight and height of infants up to 24 months, and those responsible for the UBS, whether these professionals performed the described task.

Statistical analysis

The data collected were included in the Epi-Data software (3.1), with double entry by different people, to check inconsistencies in data entry, allowing due corrections to obtain the final database for analysis. Stata 12.0 package was used for statistical analyses. Descriptive measures of frequency, mean and standard deviation are shown for the continuous variables and proportions for the categorical variables.

The knowledge score was evaluated continuously, evidencing a normal distribution; thus, in the crude analysis, the t-test was used for the associations with the dichotomous independent variables. The analysis of variance (ANOVA) or Kruskal-Wallis test in the lack of assumptions for the adoption of ANOVA was used to study the association of the outcome with the polytomous variables, and in the identification of pairs of means that differed, we used Bonferroni or Mann Whitney, respectively. The level of significance was set at 5% ($p < 0.05$).

Ethical aspects

The study protocol was approved by the Research Ethics Committee of the Faculty of Medicine of the Federal University of Pelotas. The written informed consent was obtained from the Municipal Health Secretariat of Pelotas and all participants signed the informed consent form (ICF). Authors declare that there is no conflict of interest in this study.

Results

Characterization of CHWs

Of the 267 CHWs in the urban area of Pelotas, 21 did not respond to the questionnaire. Of these, twelve were on leave (exclusion criterion), four refused and five were considered losses after more than one contact attempt, in addition to the supervisor's visit. Thus, 246 participants or 96.6% of the total number of CHWs that monitor the urban population were included.

Table 1 shows the characterization of CHWs, with 90% women, mean age 36 years and SD \pm 8.6 (data not shown in table). There was a similar distribution by age categories, with prevalence in the age range of 30-39 years (39.0%). Seventy-one percent were self-declared white, and most (54.9%) had been working for two years

as CHWs, with a mean length of service of 41.5 months, ranging from zero to 240 months (data not shown in table).

As for schooling, more than half finished secondary school and eight completed only elementary school. Among those who completed technical education ($n = 76$), about one-third were in the health area. In relation to higher education ($n = 33$), approximately 20% completed graduation in the area of health sciences. The most mentioned technical courses were nursing (23.4%) and accounting (19.5%), and the same was not observed with regard to the undergraduate program, whose main highlights were social work (18.2%) and pedagogy (15.2%) (data not shown in table).

Table 1. Characterization of community health workers. Pelotas. Rio Grande do Sul, Brazil, 2016 ($n = 246$).

Variable	N	%
Gender		
Male	28	11.4
Female	218	88.6
Age (in full years)		
19-29	74	30.1
30-39	96	39.0
≥ 40	76	30.9
Skin color		
White	175	71.1
Black	52	21.1
Brown	19	7.7
Length of service (months)		
< 12	40	16.3
12-24	95	38.6
25-59	78	31.7
≥ 60	33	13.4
Schooling		
Elementary or Secondary School	137	55.7
Technical Course Completed	76	30.9
Higher Education Completed	33	13.4
HV for child less than 24 months		
No	15	6.1
Yes	231	93.9
Guidance in HV*		
No	144	62.3
Yes	87	37.7
Information on CF		
No	83	33.7
Yes	163	66.3

HV: home visit in the last month; CF: complementary feeding. *Considering those that made a HV in the last month ($n = 231$).

Table 1 also shows that, in the month prior to the application of the questionnaire, almost all CHWs (93.9%) made a home visit for children under two years of age in their area of coverage. However, only a little more than one-third (37.7%) reported having conducted counseling on CF during these visits, while the search for information on CF was reported by about two-thirds of workers. This information could have been retrieved both in the media (45.4%) and by health professionals (46.7%) (data not shown in the table).

Knowledge score

Table 2 shows that, of the five questions related to breastfeeding, four evidenced a proportion of correct answers greater than 90%, and the length of exclusive breastfeeding had the second highest prevalence of correct answers (98.0%), just below the question on hygiene and adequate handling of food provided to the infant (99.6%). On the other hand, the highest proportion of wrong answers was in CF guidelines, such as including water between meals, in which only 17.1% of participants were correct.

Table 3 shows the overall knowledge scores and for each module. On average, the participants reached almost the 7th grade, that is, they had a 68% success rate for all questions in the self-administered tool. Thus, the mean and median knowledge score was 0.68 (SD \pm 0.11), with an amplitude of 0.20 to 0.88 correct answers, showing a normal distribution. In Table 3, the mean scores of knowledge in each module can be observed, emphasizing that the breastfeeding module (BF) showed the highest proportion of correct answers (88.0%), while for complementary feeding (CF), this figure was 62.0%.

In Table 4, when analyzing these scores in relation to the characteristics of CHWs, we observed higher means among older CHWs with differences between the categories of 19-29 and 30-39 years, who work longer, with differences in the categories of under 12 and 60 or more months, who conducted a home visit in the last month to a child under 24 months, who reported receiving information about CF and provided guidance to households.

While the knowledge score mean was higher for women, this difference was not statistically significant ($p = 0.05$ for the overall score and $p = 0.10$ for the CF score) and having received training was statistically significant only in the overall score ($p = 0.04$).

Characterization of UBSs

All 29 UBSs eligible for this study were included, since no responsible (or other non-CHW higher education professionals) refused to participate. The questionnaires with questions related to the health services were applied mainly to nurses (72.4%). Most UBSs (82.8%) serve the population in morning and afternoon shifts.

With regard to mother and child care, all the sites had childcare consultations and more than half (51.7%) had a group of pregnant women or mothers. However, CF was addressed in only 46.7% of the groups of those UBSs. Of the health services evaluated, 20 sites (69.0%) reported having a protocol to provide guidance to the population served in place. Of these, most ($n = 12$ or 60%) originated from government institutions. However, in nine UBSs, it was reported that the served population care protocol was elaborated by the service's health professionals. Thus, in one of the facilities where a protocol from a governmental institution was also mentioned, another protocol was self-developed.

As for the permanent staff of all UBSs, the nutritionist appeared in 15 of them, representing 51.7% of the total, although no association was found between the availability of this professional in the health services and the scores of overall and CF knowledge of CHWs. Pediatricians were found in only six UBSs, representing 20.7% of the total. Regarding the availability of resources for CHW to monitor children's growth in home visits, the infantometer was found in 28 sites (96.5%), while the portable scale was identified in only 11 UBSs (37.9%).

Information from CHWs and responsible for the UBS

Table 5 shows the distributions of the variables evaluated in both the questionnaire applied to CHWs and those applied to the professional responsible for the UBS. CHW training was more frequently reported by CHW (37% of participants) than in the UBS, where only three reported CF training for CHWs. However, responses were consistent with the main responsible for the training of the CHWs, since all reported more frequently receiving training from higher education institutions, that the training was short (up to four hours) and occurred more than 12 months earlier.

Another striking result is that it was reported that CHWs monitored child growth in 12

Table 2. Frequency of responses for each of the twenty-five questions of the knowledge test involving community health workers in Pelotas, Rio Grande do Sul, Brazil, 2016 (n = 246).

Questions themes	Frequency of alternatives per questions		
	Correct	Incorrect	Did not know
	n (%)	n (%)	n (%)
1. Length of EBF	241 (98.0)	03 (1.2)	02 (0.8)
2. Don't include water, tea or juice in EBF	225 (91.5)	14 (5.7)	07 (2.8)
3. CF introduction period	222 (90.2)	17 (6.9)	07 (2.9)
4. Length of BF	172 (69.9)	52 (21.1)	22 (9.0)
5. Water consumption between meals, in CF	42 (17.1)	189 (76.8)	15 (6.1)
6. Introduction of CF to formula-fed	66 (26.9)	112 (45.5)	68 (27.6)
7. Period for introducing family food	134 (54.5)	75 (30.5)	37 (15.0)
8. Period for introducing legumes (beans)	124 (50.4)	101 (41.1)	21 (8.5)
9. Frequency of intake of viscera and giblets	86 (35.0)	97 (39.4)	63 (25.6)
10. Vitamin C source food	202 (82.1)	23 (9.3)	21 (8.6)
11. Avoid liquid foods to start CF	58 (23.6)	164 (66.6)	24 (9.8)
12. Use of blender and sieve	127 (51.6)	92 (37.4)	27 (11.0)
13. Avoid insisting that the child eat the whole meal	178 (72.3)	59 (24.0)	09 (3.7)
14. Variability of fruits and vegetables in the diet	230 (93.5)	09 (3.7)	07 (2.8)
15. Iron source food	199 (80.9)	12 (4.9)	35 (14.2)
16. Benefits of vitamin A source food	144 (58.5)	14 (5.7)	88 (35.8)
17. Contraindication of honey	134 (54.4)	40 (16.3)	72 (29.3)
18. Non-nutritive food in the first year of life	238 (96.7)	05 (2.0)	03 (1.3)
19. Non-nutritive foods and relationship with diseases	225 (91.4)	11 (4.5)	10 (4.1)
20. Meal Re-use	226 (91.8)	10 (4.1)	10 (4.1)
21. Hygiene in proper handling and storage	245 (99.6)	01 (0.4)	0 (0.0)
22. Distractions (e.g. TV) during meal	191 (77.6)	31 (12.6)	24 (9.8)
23. Amount of food given to a sick child	130 (52.8)	77 (31.3)	39 (15.9)
24. Can guide extra meal to convalescent child	90 (36.6)	111 (45.1)	45 (18.3)
25. Guidelines for working mother to continue breastfeeding	222 (90.2)	10 (4.1)	14 (5.7)

EBF: Exclusive Breastfeeding; BF: Breastfeeding; CF: Complementary feeding and TV: television.

Table 3. Scores of correct answers in the knowledge test of the community health workers according to the question module. Pelotas, Rio Grande do Sul, Brazil, 2016 (n = 246).

Variables	Nº of questions	Score	CI 95%
Overall score	25	0.68	0.66 – 0.69
Breastfeeding Module	05	0.88	0.86 – 0.90
Complementary Feeding Module	20	0.62	0.61 – 0.64
Macro and Micronutrients	06	0.67	0.64 – 0.69
Health and Behavior	14	0.60	0.59 – 0.62

UBS. On the other hand, only five CHWs reported collecting anthropometric measurements of children monitored, disagreeing with the report made by UBSs' heads.

Among the five MoH CF-related publications, the “*Caderno de Atenção Básica, Saúde da criança: nutrição infantil, nº 23*” was the material

most identified by the CHWs, and was reported by only 15.4% of the participants and the most available in the UBSs, found in 20 of the 29 facilities (69.0%).

More than half of CHWs (57.7%) reported having some difficulty in providing guidance on CF, while almost all of the UBSs (96.5%) report-

Table 4. Knowledge scores according to the characteristics of the community health workers. Pelotas. Rio Grande do Sul, Brazil, 2016 (n = 246).

Variable	Overall Score		CF Score	
	Mean	CI 95%	Mean	CI 95%
Gender	0.05*		0.10*	
Male	0.64	0.58 - 0.69	0.59	0.53 - 0.64
Female	0.68	0.67 - 0.69	0.63	0.61 - 0.64
Age (in full years)	0.03***		0.01**	
19-29	0.64	0.61 - 0.67	0.59	0.56 - 0.62
30-39	0.69	0.68 - 0.71	0.64	0.62 - 0.67
≥ 40	0.68	0.66 - 0.71	0.63	0.60 - 0.66
Skin color	0.72**		0.70**	
White	0.68	0.66 - 0.70	0.63	0.61 - 0.65
Black	0.66	0.63 - 0.69	0.61	0.58 - 0.64
Brown	0.68	0.63 - 0.72	0.62	0.56 - 0.67
Length of service (months)	0.03***		0.03***	
< 12	0.64	0.60 - 0.68	0.58	0.54 - 0.63
12 - 24	0.68	0.66 - 0.70	0.63	0.61 - 0.65
25-59	0.67	0.64 - 0.70	0.62	0.59 - 0.65
≥ 60	0.72	0.69 - 0.75	0.67	0.64 - 0.70
Schooling	0.61**		0.53**	
Elementary or Secondary School	0.68	0.66 - 0.70	0.63	0.61 - 0.65
Technical Course Completed	0.67	0.64 - 0.69	0.61	0.58 - 0.64
Higher Education Completed	0.69	0.66 - 0.72	0.63	0.60 - 0.67
HV for child less than 24 months	0.02*		0.02*	
No	0.61	0.52 - 0.70	0.56	0.47 - 0.64
Yes	0.68	0.67 - 0.69	0.63	0.61 - 0.64
Orientação na VD	<0.001*		0.004*	
No	0.66	0.64 - 0.68	0.61	0.59 - 0.63
Yes	0.71	0.69 - 0.73	0.65	0.63 - 0.67
Informação sobre AC	0.01*		0.002*	
No	0.65	0.62 - 0.67	0.59	0.56 - 0.62
Yes	0.69	0.67 - 0.70	0.64	0.62 - 0.66
Training	0.04*		0.06*	
No	0.66	0.65 - 0.68	0.61	0.59 - 0.63
Yes	0.69	0.67 - 0.71	0.64	0.62 - 0.66

CF: complementary feeding; HV: home visit in the last month. *p-value t-test. **p-value ANOVA. ***p-value Kruskal-Wallis

ed some difficulty. However, CHWs associated this hardship with their own limitations, while 21 (75.0%) of heads attributed it to the families' constraints in providing adequate CF to children.

Discussion

Considering that CHWs are responsible for primary care because they are the link between families and the health service²¹, the knowledge of these professionals regarding adequate family guidance can have important repercussions to improve the practice of CF in his community.

The results of this study conducted through the collection of primary data, with approximately all the CHWs operating in the urban area of a medium-sized city in the southern region of the country bring relevant inputs to be considered in the implementation of CHWs' activities and their primary care actions, in Brazilian municipalities with characteristics similar to Pelotas, Rio Grande do Sul.

The studied population consisted almost exclusively of women, as well as in research with the same professionals, in which females represented more than 80% of the samples evaluated³³⁻³⁵, possibly due to the historical aspects of

Table 5. Community health workers and primary care facilities, description of similar variables analyzed, Pelotas, Rio Grande do Sul, 2016.

Variable	CHWs	UBS
	(N = 246) N (%)	(N = 29) N (%)
Training		
No	155 (63.0)	26 (89.7)
Yes	91 (37.0)	03 (10.3)
Responsible for training ⁺		
Governmental institution	34 (38.6)	0 (0.0)
Higher education Institution	37 (42.0)	02 (66.7)
Other	25 (28.4)	01 (33.3)
Training workload (hours) **		
1-4	55 (67.1)	02 (66.7)
> 4	27 (32.9)	01 (33.3)
Training period (months) ***		
1-12	35 (47.9)	01 (33.3)
> 12	38 (52.1)	02 (66.7)
Growth monitoring		
No	241 (98.0)	17 (58.6)
Yes	05 (2.0)	12 (41.4)
Materials [†]		
CAB	38 (15.4)	20 (69.0)
GA	16 (6.5)	13 (44.8)
AS	10 (4.1)	05 (17.2)
DEZPA	13 (5.3)	07 (24.1)
RECREG	08 (3.3)	04 (13.8)
Guidance difficulties		
No	104 (42.3)	01 (3.5)
Yes	142 (57.7)	28 (96.5)
Type of guidance difficulty ^{§+}		
Related to CHWs/ HT	90 (63.4)	09 (32.1)
Related to families	58 (40.8)	21 (75.0)

CHWs: Community Health Workers; UBS: Primary Care Facilities; CAB: Caderno de Atenção Básica, Saúde da criança: nutrição infantil, nº 23; GA: Guia alimentar para crianças menores de dois anos; AS: Alimentação Saudável para crianças menores de dois anos – ÁLBUM SERIADO; DEZPA: Dez passos para uma alimentação saudável - Guia alimentar para crianças menores de dois anos; RECREG: Receitas regionais para crianças de 6 a 24 meses; HT: Health Team. *03 CHWs were ignored (n = 88). **09 CHWs were ignored (n = 82). ***18 CHWs were ignored (n = 73). § Considering CHWs (n = 142) and UBS (n = 28) that reported guidance difficulties. + Variable that admits more than one alternative as an answer.

this profession and the type of work developed by the CHWs³⁶. The highest level of education of most of the participants was complete secondary school level, corroborating with Florin-

do *et al.*³⁴ and Ferraz and Aerts³⁷, who demonstrated a higher prevalence of CHWs with 9-11 years of schooling. A survey³⁸ that evaluated CHWs' schooling level found an increased level of schooling in this professional category, which can be noted considering that about 45% of individuals studied have a professional schooling level. An interesting result was that, among those who reported having completed higher education, the most prevalent courses did not belong to the health sector, and as described by Musse *et al.*³³, human and social areas' courses predominated. This construction shows a trend towards humanistic education among these professionals, which could indicate their potential to articulate policies of a social and economic nature³³ and/or work temporarily as CHWs as an employment opportunity³⁵.

The outcome of this research identified that little more than a third (35%) of CHWs knew the frequency of iron-rich food supply and 58.5% knew about the benefits of vitamin A-rich food, a result of concern considering that anemia and vitamin A deficiency are two of the main problems related to inadequate complementary feeding³. When analyzing the CHWs' knowledge on the feeding of children up to two years of age, it was verified that the module score with questions about breastfeeding (0.88) was higher than the score of complementary feeding module (0.62). In an intervention study²⁷ with health professionals attending children enrolled in the ESE, except CHWs, and in another study³⁹ with pediatricians and nutritionists, knowledge about breastfeeding was also higher when compared to complementary feeding. It should be noted that both studies were carried out in the state of São Paulo and evaluated the effectiveness of the Integrated Course on Counseling Infant Feeding (WHO / UNICEF). The results of this study can still be corroborated with two other studies^{14,16}, which pointed out that the work of the ESF and CHW teams' professionals regarding infant feeding has been focused on breastfeeding, with little emphasis on complementary feeding.

Regarding the different means found in the two scores (overall and complementary feeding) in relation to the age categories and the length of service of participants, this result corroborates with the national literature, which shows greater learning according to the experience accumulated in the health activity and increased information about the community³⁵, referring to a higher level of knowledge derived from CHWs' professional and personal experiences^{40,41}, although

no information on their maternity/paternity was obtained. With respect to positive associations found between scores and the following variables, namely, home visit to children under two years old, complementary feeding guidance and search of information sources, no previous studies were found that could help explain these results, but it is possible to suggest greater motivation of professionals who effectively provided guidance to the families in their area of activity. Thus, they could be seeking more information that would assist them in the assignments with guidance to the families and, therefore, obtaining greater knowledge.

According to the results, it was possible to observe that the CHWs reported training more frequently than reported by the UBSs' heads. It should be noted that means of knowledge scores were higher for CHWs who received training. However, although it is known that training health professionals in order to promote dietary recommendations is essential to improving maternal knowledge and behavior⁴², only about four out of ten CHWs reported having received training. In a review paper, Campos et al.¹⁵ noted that there is still a need to train health professionals to provide counseling for children under two years of age. As an alternative to the qualification of health professionals, the most recent policy of the Brazilian government in this area is the Brazilian Breastfeeding Strategy, whose one of the main objectives is the training of human resources in primary care to provide healthy eating guidance for children in the first 24 months of life⁴.

It is worth pointing out that approximately all the CHWs (98.0%) do not follow up on child growth, although some UBSs' heads reported believing that this task would have been performed by these professionals. A qualitative study carried out in the city of Uruburetama, Brazil, followed home visits of 15 CHWs to 16 families for a year and showed that the professionals were not adequately trained to monitor the weight of children in the first year of life and could not recognize nutritional risk situations¹⁶.

Although those UBSs' heads reported on the availability of government publications on the feeding of children under the age of two at the facility, few CHWs reported knowing them, possibly because this material is not accessible and/or because they have sought other sources of information, as reported by most of them. This finding should be highlighted, noting that at least one of the publications was available in more than two-thirds of the UBSs, while only

about one in six CHWs has reportedly informed knowing its existence. Thus, while it is known that these documents are designed to qualify the health care teams, this study found that these materials are not available to CHWs and, at the same time, no information on the availability of materials to health teams was found.

It should be noted that, in the same month that the field research began, the Ministry of Health published a new version of the publication *Caderno de Atenção Básica, Saúde da Criança: nutrição infantil, nº 23*³. However, considering that there would be no time for this new material to be distributed in the UBSs of the municipality, the cover figure of the previous publication³⁰ was used to show to the participants. Thus, in the knowledge analysis, only one recommendation of the complementary feeding module - health and behavior - was changed. As a result, the score shown considered the most current reference³. Analyses excluding this question from the tool or using the previous recommendation were performed, but results were similar.

Finally, it should be pointed out that this research aimed to evaluate the CHWs' knowledge on complementary feeding, not reflecting on behavioral changes, whether in the behavior of the professional or of the families. However, it should be emphasized that knowledge is the first step toward behavioral change⁴³. Thus, results may contribute to the implementation of interventions that can influence the qualification of professionals' actions, mainly related to complementary feeding of children up to two years of age, corroborating with intervention research in Porto Alegre (RS), which identified a positive impact of refreshing primary care professionals in relation to the Ten Steps of Healthy Eating for Children Under Two Years of Family Eating Practices in the first year of life⁴⁴. In addition, no CHWs were studied in the rural area of the municipality.

This study enabled us to verify that CHWs have a better mastery of information about breastfeeding than about complementary feeding, and that receiving training improves the knowledge score about feeding children in the first two years of life and this should be stimulated in primary basic care, since only a little more than a third of the participants reported having received training to advise on complementary feeding. It should be pointed out that most of the UBSs have at least one copy of institutional publications containing guidelines on feeding children under two years of age. Efforts should be made to

ensure that CHWs actually have access to these materials and encourage reading, understanding and appropriation of the contents, insofar as few mentioned knowing about the existence of the institutional materials, which in a way could be seen in the low scores of knowledge about CF found in this study. In view of these results, we can conclude that CHWs should assist in the promotion of adequate infant feeding, possibly due to their characteristics of proximity to families, frequent contact and understanding of socio-economic and cultural barriers that prevent the introduction of adequate food. However, to ensure their effective role of interlocutors on complementary feeding in the households, the UBS

must provide the necessary support and resources to obtain better and more updated knowledge on the subject. For this to happen effectively, the work process must be reviewed and improved, so that continued, quality education about CF for CHWs becomes a priority in the service. As such, it is an important factor in community food and nutrition education, stressing that one cannot expect families to have correct practices during complementary feeding if they are not adequately informed. Finally, we believe that further studies should be carried out with rural professionals to identify their constraints and that, at the same time, a training for CHWs working in the urban area of the municipality should be implemented.

Collaborations

FS Santos, GC Mintem and DP Gigante equally participated in all the stages involved in the development of the research and in the writing of the paper.

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