Artículo Original / Original Article

Determinants of food and nutrition actions in primary healthcare clinics in the State of São Paulo, Brazil

Determinantes de las acciones de alimentación y nutrición en las clínicas de atención primaria en el estado de São Paulo, Brasil

ABSTRACT

The objective of the study was to test the link between the preparation of professionals and the operational conditions of food and nutrition actions in primary healthcare in the state of São Paulo, Brazil. This cross-sectional study involved 220 primary healthcare clinics in 65 municipalities of the state. Of the 1873 participating healthcare professionals, 71.8% reported having provided guidance on food and nutrition to different groups, ranging from 56% for pregnant women to 17% for families. Only 19% of the primary healthcare clinics employed nutritionists. Primary healthcare clinics with fewer than two partnerships with other institutions reported 28% and 41% fewer of food and nutrition actions for adults and for families, respectively. Among the variables applied to evaluate professional preparation and operational conditions, work guidance and community partnerships were important for food and nutrition actions, which remains incipient in primary healthcare.

Keywords: Food and nutrition; Food and Nutrition Education; Health education; Health promotion; Primary health care.

RESUMEN

El objetivo del estudio fue contrastar la asociación entre preparación profesional y condiciones operacionales de actuación con el ofrecimiento de acciones de alimentación y nutrición en la Atención Primaria a la Salud en el Estado de São Paulo, Brasil. Estudio transversal, incluyendo 220 unidades de Atención Primaria a la Salud de 65 municipios del Estado. De los 1873 profesionales de salud participantes, 71,8% relataron haber realizado acciones de alimentación y nutrición, variando de 56% para gestantes a 17% para las familias entre las unidades de salud. Apenas 19% de las unidades de salud contaban con nutricionistas. En unidades de salud con menos de dos convenios hubo prevalencia de 28% y 41% menos de oferta de acciones de alimentación y nutrición para adultos y familias, respectivamente. Entre las variables utilizadas para evaluar la preparación profesional y las condiciones operacionales, la orientación para el trabajo y los convenios en la comunidad fueron determinantes para la oferta de acciones de alimentación y nutrición, aun incipientes en la Atención Primaria a la Salud.

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INTRODUCTION

Food and nutrition actions (FNA) can be summarized as food and nutrition education, promotion of autonomy and food sovereignty and social protection to guarantee the human right to healthy and adequate food, including the diagnostic and monitoring of nutritional conditions^{1,2}. These actions are intersectoral and strongly linked to primary healthcare (PHC), which have proved effective as a health strategy^{2,3,4}.

Of 185 countries researched in 2010, 60% had

developed policies aimed at reducing modifiable risk factors for chronic diseases, especially those related to lifestyle changes, but 85% had not implemented them due to infrastructure problems, insufficient resources and teams, lack of partnerships with other institutions and lack of information that could improve the cost-effectiveness of the services⁵. Health education empowers individuals and communities to develop skills to prevent disease and promote health^{6,7,8}. In the context of health education, FNA are recommended in the PHC context of most countries^{2,9,10}. However, although globally encouraged, FNA in PHC, especially food and nutrition education practiced by health professionals are still uncommon¹¹.

In Brazil, since 1999, a National Food and Nutrition Policy was implemented to “promote and provide human rights to health and food”¹². After two decades, it is important to know how much food and nutritional education has been implemented. Food and nutritional education is defined as a continuous and permanent, transdisciplinary, intersectoral and multi-professional practice that aims to promote healthy eating habits in all phases of life in an autonomous and voluntary manner¹. Ensuring social participation, strengthening intersectoral relationships, training of professionals and the inclusion of the nutritionist in PHC were identified as challenges for this practice to be effective². In this respect, variables related to the healthcare team and working conditions in PHC, which influence the coverage and the context of FNA, have not been thoroughly studied. This study aimed to investigate the association between the preparation of professionals and operational conditions with respect to providing guidance on food and nutrition in PHC in the state of São Paulo, Brazil.

MATERIALS AND METHODS

Setting

The state of São Paulo is the richest of the 26 Brazilian states, with the largest industrial complex, the second highest Human Development Index and the largest number of inhabitants (more than 45 million in 2017). In 2010, São Paulo had 645 municipalities¹³ distributed in a territory of 248,222.8 km².

Study design

A cross-sectional study was performed between 2011 and 2012 to collect data from 65 (10%) municipalities of the state of São Paulo. Municipalities were stratified by region and chosen at random. Samples of 10% were calculated for large and medium-sized municipalities. However, at least 10 and 5 clinics were surveyed in large and medium-sized municipalities, respectively. These large municipalities have more than 500,000 inhabitants and medium-sized municipalities have between 100,000 to 500,000 inhabitants. All clinics of small municipalities were included. This resulted in 220 PHC or 30% of the state's total. The purpose of the study was to analyze

the Food and Nutrition Surveillance System in the state of São Paulo¹⁴. This study was approved by the Ethics Committee of the Faculty of Medicine of the Paulista State University “Júlio de Mesquita Filho” with the approval registered by protocol no. 3728-2010. Written informed consent was obtained from each health professional.

Data collection

The questionnaire used for data collection was validated in a pilot study after evaluation by ad hoc researchers¹⁴. Data collection was performed by 44 undergraduate students, trained by a nutritionist on how to apply the questionnaires, and supported by a detailed manual to guide training and data collection¹⁵. The quality control of the collected data was carried out by means of a plausibility check of the data, double data entry and confirmation by telephone of 5% of the questionnaires.

The field study was organized according to the flow chart shown in figura 1. The first stage involved randomization of the municipalities and PHC. The second stage consisted of selection and training of data collection personnel. The third stage was the data collection. Analyses are presented according to the target population of the care provided by the professionals in the PHC, stratified as parents, pregnant women, children, adolescents, adults, elderly, family, and others (hypertensive and diabetic patients).

Independent variables

The following independent variables were assessed:

- Schooling¹⁶: according to the complete teaching cycles: up to 96 months of study, elementary school; up to 36 months, high school; between 18 and 24 months, technical secondary education; between 24 and 36 months, higher education; between 36 and 48 months, postgraduation; Profession: doctor, nurse, nutritionist, social worker, dentist and other; Time since graduation: in years, ranked as 10 or less and more than 10 years.
- Qualifications: specialization, advancement, master's degree, doctorate and post-doctoral, considering the most recent; Recycling course on food and nutrition: courses, workshops and/or training on the science of nutrition in the two years prior to the study.
- Nutritionist on the staff: professional with graduation in nutrition, with or without registration; Trained staff: receiving professional guidance from someone trained in food and nutrition (nutritionist, medical specialist, nutrologist or domestic economist).
- Function performed in the last decade: last job position of the professional, limited to ten years prior to data collection.
- Workload for FNA: in hours dedicated to work with FNA.
- Printed leaflets: availability of folders, booklets and

teaching pamphlets in the PHC.

- Infrastructure: existence of waiting room, yard or patio, and consultation room in the PHC.
- Multi-disciplinary team: presenting three or more professionals from different areas.
- Partnerships in the community: joint work with two or more institutions (Center of Reference for Social Assistance, Community Center, church/pastoral for the child, universities and schools, among others)¹⁴.
- Technical manual: availability in the clinic of one or more guidance documents (Food Guide for Brazilian Population, and other technical manuals)¹⁷.

Outcomes

The outcome was the FNA for each group of the target population. Actions considered included anthropometry, individual guidance, group educational activities, lectures, cooking workshops, meetings for debates and experience exchange, vegetable gardens, physical activity, walking groups and any other programmed action related to the area of interest. The frequency of activities was recorded as daily (except Saturday and Sunday), weekly, biweekly, bimonthly, quarterly, half-yearly and not carried out. The frequencies were converted into the total number of actions per semester ranging from 0 to 720 actions. The FNA were classified in two categories: yes, when they were offered three or more times per semester; and no, when there was no offer or they were offered less than three times per semester.

Statistical analysis

When the outcome was analyzed as a binary variable, the association between the FNA and the independent variables was tested using Poisson regression. The model for each target population included robust estimator covariance matrix, scale parameter estimated by Pearson's Chi-square and Fisher's score for maximum interaction. The Akaike information criterion (AIC) was used as the adjustment parameter of the statistical model. The results of the association tests for the binary endpoint variable are presented as prevalence ratio (PR) and 95% confidence interval (95% CI), considering a p-value less than or equal to 0.05 as significant.

The difference in the mean number of FNA provided in the PHC per semester was tested according to the presence of a nutritionist on staff. A generalized linear regression model was used for Tweedie distribution using Fisher estimation parameters with maximum number of interactions, robust covariance matrix, and comparison between the means adjusted using the Bonferroni method. Unadjusted analysis was tested, followed by adjusted analysis models. As linear regression models to test for differences between means are more sensitive than regression models with binary outcomes, specific statistical models were constructed to test each association according to sensitivity analyses of the models

used, and on analyzing the impact of included variables on the estimated means, significance of the statistical model and the AIC. All analyses were stratified by target population. Analyses were performed using the SPSS statistical program, version 24 (IBM, Chicago, USA).

Sensitivity analysis

Unadjusted and adjusted analyzes were performed to avoid confounding factors. The correlation between predictor variables (independent variables) and outcomes were tested using Pearson's Correlation Coefficient to assist decision-making on the inclusion of variables thereby reducing the chance of multi-collinearity or over-adjustments. The observed correlations were weak ($r \leq 0.33$) but statistically significant for most variables.

Exceptions included the variables education of the health professional in respect to the family, elderly and adult populations and function performed in the last decade for the adolescent population.

The use of a logistic regression model was also tested. However, the effect was overestimated with excessively broad confidence intervals, indicating low accuracy. Therefore, we chose to use the Poisson regression model¹⁸.

RESULTS

Of the 1873 health professionals who participated in the study, 73% performed FNA in their work. About a quarter of health professionals had a college degree, and just under a quarter of them had post-graduation degrees (Figure 1 and Table 1). Of those with higher education, 2.3% were nutritionists in 19% of PHC. A fifth of the professionals had performed some kind of refresher course to bring them up to date with respect to FNA within the previous two years (Table 1).

The proportion of health professionals participating in FNA varied from 4.0% with families to 15% with pregnant women. FNA for pregnant women was provided in 56% of the clinics, compared to 17% for families. The PHC that offered the most FNA were not exactly the same ones that had the highest proportion of professionals involved in providing FNA (Figure 2).

The lack of specialized counseling was associated with a lower probability of providing FNA for pregnant women, children, adults, the elderly, and hypertensive and diabetic patients (Table 2). Professionals who had only graduated in high school were associated with a lower frequency (42%) of actions for hypertensive and diabetic patients (Table 2). The lack of printed leaflets was associated with a lower frequency of actions for parents (Table 2). PHC with less than two partnerships with other institutions reported 28% and 41% fewer FNA for adults and for families, respectively.

The significance in the mean number of FNA was lost when adjusted for confounding factors in most of the target populations. A significant difference was observed between the mean number of FNA when there was no nutritionist on the staff in respect to adults and the elderly (Table 3).

Figure 1. Flowchart of the field research stages, São Paulo, Brazil (2011-2012).

Figure 2. Percentage of health clinics that provided food and nutrition actions and the professionals involved in these activities stratified by the target population - São Paulo, Brazil (2011-2012).

Table 1. Description of the characteristics of health professionals in the primary health clinics of the state of São Paulo (2011-2012).

Characteristic	n (%)
<i>Schooling</i>	
Primary school	25 (1.3)
High school	584 (31.2)
Technical secondary education	339 (18.1)
College	486 (26)
Post-graduation	439 (23.4)
<i>Profession</i>	
Physician	313 (16.7)
Nurse	162 (8.7)
Nutritionist	43 (2.3)
Social assistant	24 (1.3)
Dentist	132 (7.1)
Other	135 (7.2)
Not applicable*	1064 (56.8)
<i>Time since graduation</i>	
10 years or less	453 (24.2)
More than 10 years	357 (19.1)
Not applicable	1063 (56.8)
<i>Degree type</i>	
Specialist or advanced	420 (22.4)
Master	24 (1.3)
PhD	10 (0.5)
Post doc	8 (0.4)
Not applicable **	1411 (75.3)
<i>Refresher course on food and nutrition</i>	
Yes	428 (22.9)
No	1445 (77.2)
Total	1873 (100)

* Healthcare Professionals without degree;

** Health professionals without a specialized degree.

Table 2. Factors that influenced the provision of food and nutrition actions to target populations in the health clinics – São Paulo, Brazil (2011-2012). PR (95%CI).

	Pregnant women	Parents	Children	Adolescent	Adults	Elderly	Family	Other groups
Nutritionist on staff	0.74 (0.53-1.01)	0.98 (0.58-1.67)	0.71 (0.5-1.02)	1.19 (0.33-4.33)	1.00 (0.63-1.59)	1.04 (0.64-1.71)	0.56 (0.29-1.09)	1.19 (0.62-2.28)
p-value	0.06	1.0	0.06	0.8	1.0	0.9	0.1	0.6
Refresher course on food and nutrition	1.07 (0.84-1.37)	0.9 (0.66-1.23)	1.16 (0.87-1.55)	1.15 (0.62-2.14)	1.16 (0.87-1.55)	1.09 (0.81-1.47)	1.05 (0.75-1.46)	0.9 (0.59-1.36)
p-value	0.6	0.5	0.3	0.7	0.3	0.6	0.8	0.6
Trained staff	0.69 (0.53-0.89)	0.88 (0.63-1.24)	0.53 (0.36-0.79)	0.6 (0.29-1.22)	0.71 (0.51-0.98)	0.64 (0.45-0.91)	0.82 (0.53-1.29)	0.44 (0.26-0.76)
p-value	0.004	0.5	0.002	0.2	0.04	0.01	0.4	0.003
Professional with high school education	0.87 (0.66-1.15)	1.05 (0.72-1.53)	1.26 (0.89-1.78)	1.42 (0.64-3.16)	0.99 (0.68-1.44)	1.13 (0.76-1.69)	1.13 (0.72-1.76)	0.58 (0.33-1.01)
p-value	0.3	0.8	0.2	0.4	0.9	0.5	0.6	0.05
Professional who graduated within the last 10 years	1.02 (0.77-1.34)	1.16 (0.79-1.69)	1.02 (0.7-1.5)	0.48 (0.18-1.28)	0.79 (0.56-1.13)	0.69 (0.46-1.02)	0.73 (0.49-1.08)	0.97 (0.6-1.58)
p-value	0.9	0.5	0.9	0.1	0.2	0.06	0.1	0.9
Degree type	0.92 (0.72-1.19)	0.93 (0.63-1.36)	0.74 (0.54-1.02)	0.91 (0.43-1.96)	0.87 (0.63-1.19)	0.77 (0.55-1.07)	0.8 (0.55-1.17)	0.89 (0.56-1.44)
p-value	0.5	0.7	0.06	0.8	0.4	0.1	0.2	0.6
Job performed in the last decade	0.87 (0.64-1.19)	0.66 (0.42-1.06)	1.01 (0.71-1.42)	1.15 (0.34-3.87)	0.64 (0.4-1.03)	1.03 (0.68-1.55)	0.8 (0.5-1.29)	0.79 (0.41-1.5)
p-value	0.4	0.09	0.9	0.8	0.07	0.9	0.4	0.5
Time allotted for food and nutrition actions	1.21 (0.98-1.5)	0.75 (0.53-1.05)	0.99 (0.76-1.3)	0.95 (0.49-1.86)	1.19 (0.92-1.55)	1.08 (0.82-1.43)	1.08 (0.72-1.64)	1.41 (0.91-2.17)
p-value	0.078	0.096	0.96	0.886	0.178	0.579	0.706	0.122
Printed leaflets	0.98 (0.79-1.23)	0.68 (0.47-0.98)	0.88 (0.66-1.16)	1.28 (0.72-2.28)	1 (0.75-1.32)	0.76 (0.56-1.03)	0.83 (0.59-1.18)	1.43 (0.94-2.18)
p-value	0.9	0.04	0.4	0.4	1	0.1	0.3	0.1
Infrastructure	1.06 (0.62-1.82)	0.91 (0.43-1.93)	0.39 (0.11-1.45)	2.05* (0.51-8.33)	0.84 (0.44-1.59)	1.73 (0.89-3.36)	0.41 (0.06-2.85)	1.35 (0.7-2.59)
p-value	0.8	0.8	0.2	0.3	0.6	0.1	0.4	0.4
Multi-disciplinary team	0.9 (0.55-1.48)	0.84 (0.33-2.15)	0.89 (0.34-2.32)	0 (0-0)*	1.36 (0.81-2.29)	1.1 (0.6-2.02)	1.19 (0.61-2.33)	1.37 (0.3-6.24)
p-value	0.7	0.7	0.8	-	0.3	0.8	0.6	0.7
Community partnerships	0.84 (0.65-1.08)	1.06 (0.73-1.54)	1.08 (0.81-1.43)	1.3 (0.75-2.26)	0.72 (0.52-0.99)	0.97 (0.72-1.32)	0.59 (0.35-1)	1.14 (0.63-2.04)
p-value	0.2	0.8	0.7	0.4	0.04	0.9	0.056	0.7
Technical manual	0.86 (0.67-1.1)	1.01 (0.72-1.42)	0.86 (0.6-1.23)	0.77 (0.37-1.59)	1.11 (0.85-1.45)	0.88 (0.65-1.19)	0.86 (0.53-1.4)	0.86 (0.56-1.33)
p-value	0.2	1	0.4	0.5	0.5	0.4	0.5	0.5

Note: The analysis was adjusted for all the variables included in the model. The 'other' target population included diabetic and hypertensive patients.

* In subgroup analyzes the sample number of each group was very small thus affecting the statistical power and reducing the reliability of this result.

Table 3. Average number of food and nutrition actions provided per semester according to the presence of the nutritionist in the health clinic – São Paulo. Brazil (2011-2012). Mean (95% CI).

		Nutritionist / dietitian on staff		P-value
		No	Yes	
Pregnant women	Unadjusted	5 (4-6)	26 (16-43)	0.001
	Adjusted by ^{1,3,7}	7 (5-9)	16 (9-27)	0.04
	Adjusted by ^{4,5,6}	3 (2-5)	15 (7-35)	0.06
Parents	Unadjusted	3 (2-4)	13 (7-24)	0.02
	Adjusted by ¹	3 (2-4)	13 (6-26)	0.05
	Adjusted by ^{2,3,4,5,6,7}	2 (1-5)	0 (0-2)	0.24
Children	Unadjusted	2 (1-3)	14 (8-27)	0.01
	Adjusted by ⁸	2 (1-3)	10 (5-20)	0.02
	Adjusted by ^{2,3,4,5,6,7}	2 (1-3)	4 (2-8)	0.11
Adolescents	Unadjusted	1 (0-2)	10 (4-23)	0.04
	Adjusted by ^{1,2,8}	0 (0-0)	0 (0-1)	0.04
	Adjusted by ^{4,5,6,7}	0 (0-0)	0 (0-0)	0.45
Adults	Unadjusted	6 (5-7)	37 (23-58)	< 0.001
	Adjusted by ^{1,2}	7 (4-13)	29 (16-53)	0.03
	Adjusted by ^{3,4,5,6,7}	1 (0-2)	5 (3-9)	0.008
Elderly	Unadjusted	6 (5-8)	30 (20-47)	<0.001
	Adjusted by ^{1,2,3,5}	8 (7-10)	18 (11-28)	0.03
	Adjusted by ^{4,6,7}	2 (1-3)	5 (3-9)	0.02
Families	Unadjusted	2 (1-3)	3 (1-9)	0.41
	Adjusted by ^{5,6}	2 (1-3)	2 (1-9)	0.63
	Adjusted by ^{2,4}	0 (0-0)	1 (0-2)	0.448
Other Groups	Unadjusted	2 (1-3)	10 (5-21)	0.03
	Adjusted by ¹	2 (1-3)	10 (5-20)	0.03
	Adjusted by ^{2,3,4,5,7,8}	0 (0-1)	1 (0-2)	0.21

Note: List of variables used for the adjustment for confounders: 1) Job carried out in the last decade; 2) Refresher course on food and nutrition; 3) Printed leaflets; 4) Multi-disciplinary team; 5) Trained staff; 6) Technical manual; 7) Infrastructure; 8) Professional with completed high school education. Mean and 95% confidence interval (95% CI).

DISCUSSION

The Brazilian Ministry of Health has provided guidelines for FNA in PHC, which can be identified in specific strategies and programs¹⁹. However, municipalities, governed by federal agreement, have autonomy to implement these actions, and may not prioritize them, even when they receive financial support from the central government²⁰. This phenomenon is still poorly understood, it involves management capacity, care organization, resource availability and community mobilization, and empowerment strategies^{21,22}.

Latin American countries have progressed in a varied way with respect to FNA²³. In countries such as Colombia,

Ecuador, Guatemala, Mexico and Peru, the lack of services or the lack of access to them, for example, compromises the rights to health and food, which are not recognized by some of these countries²³.

In Brazil, the lack of indicators on the effectiveness of FNA may be contributing to its lack of priority in PHC. The results of this study showed that training interventions of the teams result in greater coverage of actions, indicating the need for studies that evaluate the effectiveness of these actions for the health of the population.

In addition, access to information and community partnerships also interfered positively on the provision of

FNA to the population. On the other hand, this study calls attention to the low coverage and frequency of FNA in PHC as a whole, the lack of nutritionists and the low amount of training on food and nutrition of the staff.

FNA were more common for pregnant women, as explained by the historical mission of PHC in relation to maternal and child care. National health policies began to implement maternal and child health measures in the 1920s²⁴. The educational groups for pregnant women in PHC have shown to be effective to improve maternal and child health, however, they require adequate training of health professionals²⁵. This has been sought in the context of the "Brazilian Breastfeeding and Feeding Strategy"²⁶, even though this study found that these actions were present in little more than 50% of the PHC visited and performed by only 15% of the respondents.

Other studies have shown the influence of continuing education on health education actions^{27,28}, as well as the influence of printed leaflets on the quality of care²⁹. The articulation between health and education is essential for health services, and it is increasingly necessary to carry out permanent health education measures to address the health problems of the population^{27,28}. However, the need to innovate these processes has been pointed out in order to ensure their effectiveness³⁰.

There was no difference in the supply of FNA when there were one or more guidance documents (Food Guide for Brazilian Population, and other technical manuals) in the PHC. A similar finding was presented by Neves, Zangirolani and Medeiros, who showed that the use of technical manuals in PHC in a municipality of São Paulo state was unimportant³¹. The professionals interviewed by these authors emphasized the need for an adequate work space to carry out group activities and to favor multi-professional practice. However, the current study found no influence of the PHC's infrastructure, such as waiting room, yard, patio and/or attendance room in the provision of FNA³¹.

The lack of partnerships with institutions in the community was related to fewer FNA for adults and families. This may be because the health sector does not respond to the health needs of the population in isolation and thus there is a need to articulate health actions with other sectors of society, to strengthen and qualify health care^{32,33}.

In a study carried out in Brazil between 2013 and 2015 it was found that actions related to food and nutrition in the Health Unit System focused on individual clinical care of the patient and was often performed by a nutritionist³¹. However, the integration of the nutritionist in PHC is not enough to satisfy demand^{34,35}. In this study, the presence of the nutritionist in the PHC significantly increased the diversity of actions for most of the target populations. With a professional nutritionist inserted in health teams, there is a greater possibility of providing integral care and a broader approach to health³⁶. The presence of the nutritionist in the team or at least supporting the work of the teams in the Family Health Support Centers, improves the care, giving

support to the work of the team and providing a diversity of activities. One of the ways to alleviate the low number of nutritionists in PHC is to intensify multi-professional practice in FNA. This requires adequate training in food and nutrition for all health system professionals and greater intersectoral dialogue³¹.

As has been seen, access to FNA is still very restricted, with access to varied and continuous actions being even more restricted. One limitation of this study was the inability to evaluate the impact of FNA on health indicators, thus not identifying the scope of actions in order to seek their expansion in PHC.

In conclusion, this research shows that the provision of FNA is very low in PHC in the State of São Paulo. The preparation of the team, the presence of a nutritionist and partnerships with institutions within the community made significant differences in the provision of FNA to the population. This indicates that investments in training and information are effective, resulting in a greater provision of FNA in PHC. The presence of the nutritionist significantly favored the diversity of FNA developed in PHC regardless of confounding factors.

REFERENCES

1. Ministério do Desenvolvimento Social e Combate à Fome. Secretaria Nacional de Segurança Alimentar e Nutricional. Framework Reference of Food and Nutritional Education for Public Policies. Brasília (DF); 2012. http://www.mds.gov.br/webarquivos/arquivo/seguranca_alimentar/caisan/Publicacao/Educacao_Alimentar_Nutricional/1_marcoEAN.pdf
2. Jaime PC, Silva ACF da, Lima AMC de, Bortolini GA. Food and nutrition actions in basic care: the experience of organization in the Brazilian Government. *Rev Nutr* 2011 Dec; 24(6): 809-24. doi: 10.1590/S1415-52732011000600002.
3. Recine E, Vasconcellos AB. National policies and the field of Food and Nutrition in Collective Health: current scenario. *Cien Saude Colet*. 2011; 16(1): 73-79. doi: 10.1590/S1413-81232011000100011.
4. Hone T, Rasella D, Barreto M, Atun R, Majeed A, Millett C. Large Reductions In Amenable Mortality Associated With Brazil's Primary Care Expansion And Strong Health Governance. *Health Aff* 2017; 36(1): 149-158. doi: 10.1377/hlthaff.2016.0966.
5. World Health Organization. World Heal Organ. Assessing National Capacity for the Prevention and Control of Non-Communicable Diseases: Report of the 2010 Global Survey. Geneva; 2012. https://www.who.int/cancer/publications/national_capacity_prevention_ncds.pdf?ua=1
6. Beard TC, Redmond S. Declaration of Alma-ata. *The Lancet*. 1979 Jan 27; 313(8109): 217-218. doi: 10.1016/S0140-6736(79)90622-6
7. World Health Organization. World Heal Organ. Global action plan for the prevention and control of non-communicable diseases 2013-2020. Geneva; 2013. https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf;jsessionid=42E647BF9882C3DDF9189F224F78CC1B?sequence=1
8. World Health Organization. World Health. Global status report on noncommunicable diseases 2014. Geneva; 2014. <https://>

- www.who.int/nmh/publications/ncd-status-report-2014/en/
9. Kumar S, Preetha G. Health promotion: an effective tool for global health. *Indian J Community Med* 2012 Jan; 37(1): 5-12. doi: 10.4103/0970-0218.94009
10. Bhattarai N, Prevost AT, Wright AJ, Charlton J, Rudisill C, Gulliford MC. Effectiveness of interventions to promote healthy diet in primary care: systematic review and meta-analysis of randomized controlled trials. *BMC Public Health* 2013 Dec 20; 13: 1203. doi: 10.1186/1471-2458-13-1203
11. Hawkes C. Promoting healthy diets through nutrition education and changes in the food environment: an international review of actions and their effectiveness. *Food Agric Organ United Nations. Rome*; 2013. <http://www.fao.org/3/i3235e/i3235e.pdf>
12. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Política Nacional de Alimentação e Nutrição. Brasília: Ministério da Saúde; 2013. http://bvsms.saude.gov.br/bvs/publicacoes/politica_nacional_alimentacao_nutricao.pdf
13. Instituto Brasileiro de Geografia e Estatística. 2010 Demographic Census. [Cited 2018 Mar 23]. <https://www.bcb.gov.br/pec/GCI/PORT/readout/readout.asp>
14. Oliveira MRM de, Vieira CM, Galesi LF. O tecido da Rede-SANS: History, narratives and reflections. São Paulo: Cultura Acadêmica, 2016. p. 298. doi: 10.7476/9788579837517.
15. Negri F, Ferreira MCS, Martins RCB, Oliveira MRM de. Calibration of anthropometrists for food and nutritional surveillance research. *Nutrire* 2015; 40(2): 111-119. doi: 10.4322/2316-7874.28714
16. Presidência da República. Guidelines and Bases for teaching 1st and 2nd grades. Pub. L. No. 5692. Brasil (Aug 11, 1971). <https://www2.camara.leg.br/legin/fed/lei/1970-1979/lei-5692-11-agosto-1971-357752-publicacaooriginal-1-pl.html>
17. Ministério da Saúde. Portal of the Department of Basic Attention [Internet]. [Cited 2018 Apr 3]. Available from: <http://dab.saude.gov.br/portaldab/biblioteca.php>
18. Francisco PMSB, Donalizio MR, Barros MB de A, Cesar CLG, Carandina L, Goldbaum M. Association measures in cross-sectional studies with complex sampling: odds ratio and prevalence ratio. *Rev Bras Epidemiol* 2008 Sep; 11(3): 347-355. doi: 10.1590/S1415-790X2008000300002.
19. Ministério da Saúde. Portal of the Department of Basic Attention. [Cited 2018 Apr 3]. http://dab.saude.gov.br/portaldab/ape_promocao_da_saude.php
20. Campos GW, Barros RB de, Castro AM de. Evaluation of national health promotion policy. *Ciênc Saúde Coletiva*. 2004; 9(3): 74599. doi: 10.1590/S1413-81232004000300025.
21. Cervato-Mancuso AM, Vincha KRR, Santiago DA. Food and Nutritional Education as intervention practice: reflection and possibilities for strengthening. *Physis*. 2016; 26(1): 225-249. doi: 10.1590/S0103-73312016000100013.
22. Lindemann IL, Mendoza-Sassi RA. Guidelines to healthy eating and associated factors among users of primary health care in Southern Brazil. *Rev Bras Promoç Saúde* 2016; 29(1): 34-42. doi: 10.5020/18061230.2016.p34
23. Botelho FC, França Junior I. Como a atenção primária à saúde pode fortalecer a alimentação adequada enquanto direito na América Latina? *Rev Panam Salud Publica* 2018; 42: e159. <https://doi.org/10.26633/RPSP.2018.159>
24. Ministério da Saúde. Secretaria de Atenção à Saúde. National policy of integral attention to women's health: principles and guidelines. Brasília: Ministério da Saúde; 2004. http://bvsms.saude.gov.br/bvs/publicacoes/politica_nac_atencao_mulher.pdf
25. Pio DAM, Oliveira MM de. Health education to care for pregnant women: parallel experiences between Brazil and Portugal. *Saúde e Soc*. 2014; 23(1): 313-324. doi: 10.1590/S0104-12902014000100025.
26. Ministério da Saúde. Secretaria de Atenção à Saúde. National strategy for the promotion of breastfeeding and complementary healthy diet in the Unified Health System. Brasília: Ministério da Saúde; 2015. http://bvsms.saude.gov.br/bvs/publicacoes/estrategia_nacional_promocao_aleitamento_materno.pdf
27. Miccas FL, Batista SHS da S. Permanent education in health: a review. *Rev Saude Publica* 2014; 48(1): 170-185. doi: 10.1590/S0034-8910.2014048004498
28. Ministérios da Saúde. Secretaria de Atenção à Saúde. Guidelines for the care of people with chronic diseases in Health Care Nets and in priority lines of care. Brasília: Ministério da Saúde; 2013. http://bvsms.saude.gov.br/bvs/publicacoes/diretrizes%20_cuidado_pessoas%20_doencas_cronicas.pdf
29. McClinchy J, Dickinson A, Barron D, Thomas H. Practitioner and lay perspectives of the service provision of nutrition information leaflets in primary care. *J Hum Nutr Diet*. 2011; 24(6): 552-559. doi: 10.1111/j.1365-277X.2011.01200.x.
30. Bispo Júnior JP, Moreira DC. Permanent education and matrix support: training, experiences and practices of the professionals of the Support Groups for Family Health and of the teams supported [Internet]. *Cad Saude Publica*. 2017; 33(9): e00108116. doi: 10.1590/0102-311X00108116.
31. Neves JA, Zangirolani LTO, Medeiros MAT. Evaluation of nutritional care of overweight adults from the perspective of comprehensive health care. *Rev. Nutr* 2017; 30(4): 511-524. doi: 10.1590/1678-98652017000400010
32. Ferreira VA, Magalhães R. Nutrition and health promotion: current perspectives. *Cad Saude Publica* 2007; 23(7): 1674-1681. doi: 10.1590/S0102-311X2007000700019.
33. Lanzoni GMM, Meirelles BHS. The network of relationships and interactions of the health team in Primary Care and implications for nursing. *Acta Paul Enferm* 2012; 25(3): 464-670. doi: 10.1590/S0103-21002012000300023.
34. Cervato-Mancuso AM, Tonacio LV, Silva ER da, Vieira VL. The participation of the nutritionist in Primary Health Care in a large urban center. *Cien Saude Colet*. 2012; 17(12): 3289-3000. doi: 10.1590/S1413-81232012001200014.
35. Boog MCF. Nutritionist performance in public health to promote healthy eating. *Ciência & Saúde* 2008; 1(2008):33-42. doi: 10.15448/1983-652X.2008.1.3860.
36. Ministério da Saúde. Secretaria de Atenção à Saúde. Actions matrix of food and nutrition in primary health care. Brasília: Ministério da Saúde; 2009. http://bvsms.saude.gov.br/bvs/publicacoes/matriz_alimentacao_nutricao.pdf