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Characteristics of the production processes of meals in the implementation of NutriSus in municipalities of Rio Grande do Norte

Características dos processos produtivos de refeições na implantação do NutriSus em municípios do Rio Grande do Norte

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Abstract

This is a descriptive, cross-sectional survey which aims to evaluate the characteristics of the productive processes of meals in the implementation of NutriSus in four municipalities of Rio Grande do Norte. For the data collection, interviews and visits were carried out to the daycare centers and to the Technical Manager of each participating municipality, to make the observation and the approach of questions to evaluate how NutriSus was implemented, as well as the recordings of the interviews and transcription of the obtained audios. These data made possible the knowledge about the strategies used in each city for the implementation of the Program, in order to know if it was necessary to carry out new menu planning, implementation or adjustments in some preparations, besides verifying how is the acceptability. To achieve the expected result of the Program, it is necessary to follow the recommended administration schedule: two months of supplementation with a three or four-month interval. In the visited municipalities, it was identified that the implementation of the strategy occurred only as a pilot project, happening in some months of 2014 or 2015, not completing the cycle, without progression in 2016 and with a limited number of children. This discontinuity was due to the insufficient number of sachets sent to the municipalities by the Ministério da Saúde (Ministry of Health). It is concluded that nationalized programs that involve the three governmental spheres in their moment of implementation, such as Nutrisus, require a consistent planning, with the participation of the involved actors, which encompasses the factors necessary for its correct execution and full coverage of the target population.

Keywords: National Health Programs. Public Policies. School Feeding.

Resumo

Trata-se de uma pesquisa descritiva, de levantamento e transversal, que objetiva avaliar as características dos processos produtivos de refeições na implementação do NutriSus em quatro municípios do Rio Grande do Norte. Para a coleta de dados, foram realizadas visitas e entrevistas às creches e ao Responsável Técnico de cada município participante, para observação e abordagem de questionamentos a fim de avaliar como foi a implantação do NutriSus, além de gravações das entrevistas e transcrição dos áudios obtidos. Esses dados possibilitaram o conhecimento sobre as estratégias utilizadas em cada cidade para a implantação do Programa, no intuito de saber se foi necessária a realização de novos planejamentos de cardápios, implantação ou ajustes em algumas preparações e de se verificar como está sendo a aceitabilidade. Para atingir o resultado esperado do Programa, é imprescindível seguir o esquema de administração recomendado: dois meses de suplementação com intervalo de três ou quatro meses. Nos municípios visitados, foi identificado que a implantação da estratégia se deu apenas como um projeto-piloto, acontecendo em alguns meses do ano de 2014 ou 2015, não completando o ciclo, sem progressão em 2016 e com um número limitado de crianças. Essa descontinuidade deu-se devido ao número insuficiente de sachês enviados aos municípios pelo Ministério da Saúde. Conclui-se que programas nacionalizados que envolvem as três esferas governamentais em seu momento de implementação, como o Nutrisus, precisam de um planejamento consistente, com participação dos atores envolvidos, que englobe os fatores necessários a sua correta execução e abrangência total da população-alvo.

Palavras-chave: Programas Nacionais de Saúde. Políticas Públicas. Alimentação Escolar.

Introduction

An adequate diet in the first years of life is essential for healthy growth and development.[1] Inadequate nutrient intake may affect nutritional status and lead to nutritional deficiencies or excesses.[2]

Nutritional deficiencies increase the susceptibility of children to diarrhea and infections, as well as impair the maturation of the nervous, visual, mental and intellectual systems.[3] In Brazil, the most frequently observed micronutrient deficiencies that represent a public health problem are deficiencies of iron and vitamin A.[4,5]

Moreira[6] reported that in the last two decades, deficiency anemia, mainly iron-deficiency anemia, was recognized as the most prevalent nutritional deficiency in the world, behaving as an endemic disease. This author also cites an estimate made by the Organização Pan-Americana de Saúde (Pan American Health Organization - PAHO), which points out that Peru is the country with the highest prevalence of anemia in all of Latin America and the Caribbean, in which 57% of children aged 1 to 4 are anemic. Shortly thereafter is Brazil, with 35% of children of the same age presenting anemia, which consists of almost 5 million anemic children in Brazil.

Vitamin A demand in preschool children is high to meet the body's increased needs, however, the body's stores of vitamin A in this age group tend to be low and the consumption of food sources of vitamin A is insufficient, causing the deficiency of this vitamin.[7] In Brazil, the prevalence of this vitamin deficiency is estimated to be between 16 and 74% in children under 6 years old, and according to PAHO and the Organização Mundial de Saúde (World Health Organization - WHO), this country is considered an area of severe subclinical deficiency for this nutritional deficiency.[8]

The supplementation strategy of infant diet with micronutrient powder - NutriSus, launched in 2014 by the Ministério da Saúde (Ministry of Health), in partnership with the Ministério da Educação (Ministry of Education) and the Ministério do Desenvolvimento Social (Ministry of Social Development), consists in the addition of a mixture of vitamin and mineral powder in one of the meals offered for children from 6 to 48 months of age, daily. Its aim is to promote the full development of children through the prevention and control of vitamin and mineral deficiencies in childhood. The 15 micronutrient powders are individually packaged in the form of sachets (1 g) and must be added and mixed with food preparations, obligatorily at the time the child will eat.[9]

WHO recommends the articulation between the public sectors of health and education for the adoption of complementary measures that may support and contribute to the reduction of nutritional deficiencies in Brazil. In this sense, many children take their main meals at school, which constitutes an opportunity to develop action and guarantee access to the strategy to prevent anemia and other nutritional deficiencies. Therefore, the supplementation strategy for

micronutrient feeding is initially implemented in daycare centers participating in the Health in School Program (PSE).[10]

For the administration of the NutriSus supplement, the following is recommended: the sachet must be added to the child's common diet, which may be of pasty consistency (fruit or vegetables pap/purée) or rice and beans. In addition to these guidelines, the sachet cannot be mixed in liquids (water, milk or juice) nor placed in hard foods or heated.[10]

Regarding the maintenance of the safety of processed food and of the health of the ones who eat, it is incumbent upon the so-called food handlers, who are all those who prepare, distribute and/or sell foodstuffs, to be aware of their responsibility in the progress of the process.[11] In this sense, among the items that may affect the quality of food, the role of these professionals stands out. In schools, e.g., the school's cook is the main connection between what was planned by the Technical Manager nutritionists and the students.[12]

Thus, the Technical Manager should evaluate the existing preparations, verifying if they fit the norms of the Program or if it is necessary to implement new preparations, and the people chosen by the school to include the contents of the sachet in the food should be trained to ensure the proper functioning of this strategy.

The lack of studies in this area is perceptible, since it is a recent theme and is still in the implementation phase. Hence, this study will be of great value to those cities that are still planning to implement NutriSus, as they will be able to analyze the strategies used by the participating municipalities and, thus, make adaptations for their city.

With the above in mind, a qualitative, exploratory study is necessary which intends to present a reflection on the implementation of NutriSUS in feeding and nutrition school units of four municipalities of Rio Grande do Norte, about which we will deal with throughout the present study.

Methodology

In methodological terms, this is a descriptive, cross-sectional survey. According to Gil,[13] this type of research may aim at raising the opinions, attitudes and beliefs of a population, by asking direct questions to people whose behavior one wishes to know, during a certain period of time.

In 2014, to implement the NutriSus strategy, only daycare centers that were part of the PSE were able to choose to join and implement the strategy. The number of municipalities that wanted to join was higher than the capacity of attendance in terms of availability of the input, thus it was necessary to use the following criteria: priority daycare centers of the municipalities of the North

and Northeast regions and daycare centers that have more than 95% of the children between the ages of 6-48 months.[14]

According to the Secretaria de Saúde Pública do Estado (SESAP - State's Secretariat of Public Health), in 2015, a total of 109 of the 167 municipalities of Rio Grande do Norte participated in the strategy, with 10,793 children, aged 6 to 48 months, included in the first phase.

In this context, the present research was carried out in the cities of Cerro Corá, Japi, Serra Caiada and Tenente Laurentino Cruz, because they are from the countryside of the State of Rio Grande do Norte, due to population size, which in 2015 estimates a variation from 5,366 to 11,318 inhabitants,[15] since they were not in a metropolitan area and had implemented the strategy of supplementation of infant diet with micronutrient powder, the NutriSUS.

The visits to the municipalities took place in April 2016. Table 1 shows the participating municipalities, their reference number quoted in the course of the text and other information pertinent to the research.

Table 1. Particularities of the municipalities from Rio Grande do Norte participating in the research, in 2015.

Municipalities	Reference number in the text	Population[15]	Total number of schools[15]	Number of public schools with preschool education[15]	Number of schools with NutriSus	Total number of children benefited by NutriSus	GTI
Cerro Corá	1	10,916	28	11	1	18	Yes
Japi	2	5,222	31	13	1	83	Yes
Serra Caiada	3	9,814	23	10	1	30	Yes
Tenente Laurentino Cruz	4	5,557	10	3	1	26	Yes

Source: Own authorship.

Data collection

The data collection process for this research was performed through the elaboration of an integrated project, which was approved by the Ethics and Research Committee of the Universidade Federal do Rio Grande do Norte (UFRN - Federal University of Rio Grande do Norte), Santa Cruz *campus* (FACISA - Faculty of Health Sciences of Trairí), under CAAE number: 54099616.8.0000.5568, for the year 2016.

The interview script was developed based on the standardization of the program, based on the Operational Manual.[9]

For the correct execution of the Program, it is necessary to pay attention to some regulations approached in the abovementioned Manual,[9] that recommends the following norms:

a) the sachet should be added in the food ready to be served to the child, which may be in rice and beans, paps/purées and fruit vitamin;

b) the contents of the sachet should not be mixed in liquids (e.g., water, milk or juices), because the dilution will not be complete and the child may reject the food, and in hard foods (e.g., breads and biscuits), because it is not possible to mix the contents with the food;

c) after adding the powder to the food, it is important not to heat it, because some of the components (vitamins and minerals) are sensitive to very high temperatures and, in case of heating, they may lose their properties.

In order to evaluate how NutriSus was implemented, visits were made to the daycare centers and to the Technical Manager of each participating municipality, in order to make the observation and the approach of questions. The semi-structured interviews were carried out with the nutritionists from the educational and health areas, when this person was present at the implantation, and with the participating school's cooks. These professionals were chosen because they are directly linked to the Program.

These data made possible the knowledge of the strategies used in each city with a view to the introduction of the Program, whether it was necessary to carry out new menu planning, implementation or adjustments in some preparations, and the verification of acceptability by the parents and the participating school's cooks.

In procedural terms, the interviews were recorded with Samsung cellphones, and later a transcription of the obtained audios was made using Word. Prior to the interview, the interviewees signed an Informed Consent Form, thus formalizing the consent of their participation in the research and authorizing its recording.

Data analysis

Regarding the data treatment and evaluation approach, the interviews were analyzed under the content analysis method. It was taken into consideration the set of associated information, the analytical categories of planning, elaboration and acceptability, both for the technical-administrative and the political dimensions, on the daily implementation. Bardin[15] clarifies that this technique is organized in three chronological poles, namely: pre-analysis, material exploration and treatment of results and interpretation.

Pre-analysis is a phase in which the material to be analyzed is organized in order to make it operational, systematizing the initial ideas.[16] Thus, this phase consisted of the floating reading of the interviews. It was established as a rule of analysis the comparison among the surveyed municipalities in order to identify similarities and differences in the production process of meals for the implementation of NutriSus.

The phase of material exploration, in turn, comprises coding, decomposition or enumeration operations, in function of rules formulated in the pre-analysis.[16] This is an important phase because it will or will not enable the richness of interpretations and inferences.

In the treatment phase of the results and interpretation is where we have the condensation and the highlight of the information for analysis, culminating in the inferential interpretations.[16] It is the moment of intuition, of the reflexive and critical analysis about how was the implementation of NutriSus in the municipalities under study.

After the transcription of the interviews of the four municipalities, we carried out the reading, the identification of the municipalities by number, and, therefore, a comparison among them was made and also with the operational manual and the guideline book, which were the theoretical reference adopted on the program for the research.

The productive process of meals comprises the stages of planning, elaboration and acceptability, thus, the discussion of the present study will be approached in the light of these three empirical categories.

Results and Discussion

Nine interviews were conducted, with four nutritionists working in the area of education, one nutritionist from the health area, and four school's cooks. Through these, it was found that the empirical categories of planning, elaboration and acceptability presented elements of convergence and differences in the implementation of the program.

Planning

The menu planning aims to technically program the meals that will be offered to meet the prerequisites, such as dietary habits, nutritional characteristics of the clientele and hygienic-sanitary quality, in order that they are adequate to the supply markets and to the production capacity of the Food and Nutrition Unit (UAN) and that they comply with the financial limits available.[17] Food preparation techniques, how to serve them, and the variety and harmony of the preparations chosen should also be considered.[18]

However, the low value of resources provided by the National School Feeding Program (PNAE) may compromise the correct implementation of this Program, since there are specific procedures for its implementation, which require that new preparations are necessary or adjusted to those already in existence, to suit the supplementation. Also due to the low costs, there is the simplification of the menus and the repetition of preparations in the school meal. In addition to this aspect, it is also possible to allege the training of the handlers, whether or not it is carried out, as well as their level of education and their level of understanding of the capabilities offered for the development of the Program.

In order to encompass the expected result of the Program, it is necessary to follow the recommended administration scheme, which stipulates the two-month period of supplementation with an interval of three or four months.[9,10] In the visited municipalities, it was possible to observe that the implementation of the strategy was carried out only as a pilot project, during a few months in 2014 or 2015, not completing the cycle, in addition to not progressing in 2016 and with a limited number of children, as a consequence of the insufficient number of sachets sent by the Ministério da Saúde (Ministry of Health). When asked about the number of participating children, the nutritionist from municipality 3 reported: "No, I also don't know how was the issue of the number of students, I only know the amount because it was introduced in the number of students."

Because the number of sachets came to the visited municipalities in limited quantities, the Technical Managers (TM) had to choose where the implementation of NutriSus would occur, according to criteria such as the number of children to be supplemented, their financial situation, their age and the location of the daycare center. The TM of municipality 1 commented: "[...] The criterion for choosing this daycare center was because it is in the rural area and the children's financial issue, which was a little low." Then, when asked about the number of participants, she stated:

> *No, the number of sachets was random, it came as if it had been in a lottery, that 22 children were contemplated, but we couldn't give to the 22 because we chose a specific class, that was closer to the age group and then only 18 children were able to participate, because the others the parents didn't show up and also because of the age, which some were already over it.*

Before starting the supplementation, it is necessary to hold meetings with the parents of the beneficiary children, explaining what is and which is the purpose of the Program. Fúccio et al.[19] reported in a study carried out in the Dentistry field that parents who were clarified about the social objectives of certain programs were significantly more receptive than those who did not receive any type of enlightenment.

The nutritionists from the four cities held meetings with the parents before beginning the supplementation. The nutritionist of municipality 2 stated:

> *Okay, at that meeting we had, just one before it starts, it's... they signed the consent form, everyone, and they all also brought the child's booklet that was where we registered with a sticker that this children was participating in the NutriSus strategy (sic).*

The implementation of the Program took place according to the school schedule of each city, since each municipality has the autonomy to create its own schedule. Thus, it occurred at different times, making difficult the supervision by other levels of government in a homogeneous way. Since this is a nationwide Program, there should be a compatibility of dates and number of sachets per children in order to facilitate the control and monitoring of the program implementation.

The nutritionist of the Secretaria de Saúde (Department of Health) of municipality 2 made the following comment about the beginning of the Program:

> *It started last year, right?!, when they said it was suppose to begin but we waited for the sachets to arrive, right?!, they didn't start together because of that. The schools stopped, were on vacation when the sachets arrived, then we looked, talked together with the one from education right?! the two nutritionists, we saw that the expiration date was okay for us to start after they were back from vacations, so it began last year, at the end of the year.*

In three of the four visited municipalities, there was only the participation of the nutritionist of the Educational area, when there should also be the one of the Health area in the implementation of the Program, thus generating an overload of work for that professional.

Resolution No. 465 of 2010 of the Conselho Federal de Nutrição (CFN - Federal Nutrition Council)[20] states that for every 500 students enrolled in preschool, there must be a Technical Manager, as well as a TM for up to 500 students enrolled in basic education. However, in the visited municipalities, there was only one nutritionist as Technical Manager, assuming all school meals, thus confirming the work overload.

When asked if the implementation of the strategy relied only on the articulation of the area of Education and not another area, the nutritionist of the educational area of municipality 1 commented: "That, I can tell you without fear that I did everything."

In the study conducted by Mello et al.,[21] which deals with the profile of the school feeding nutritionist, the authors postulate that this professional assumes responsibilities that interface with other areas, in particular with Education and Administration. Despite contentment with professional performance, the participants showed some dissatisfaction regarding working conditions.

The NutriSus guideline book[10] addresses some aspects related to the responsibility of Primary Care professionals:

> Cabe às equipes de Atenção Básica vinculadas às creches (ou ao profissional responsável, da área da Saúde, definido pelo GTI-M): Distribuir, gradualmente, os sachês nas creches, conforme demanda; Realizar o descarte dos sachês com prazo de validade vencido; Acompanhar, individualmente, os alunos com doenças causadas pelo acúmulo de ferro, bem como os alunos em áreas com endemia de malária; Verificar se e quais as crianças que já recebem sulfato ferroso na Atenção Básica; Registrar a administração dos sachês na Caderneta de Saúde da Criança; Fazer visitas aos estabelecimentos de ensino, pelo menos uma vez por mês, com o intuito de acompanhar a implementação da estratégia; Observar e acompanhar os casos de reação adversa que por ventura possam ocorrer.

Of the four visited municipalities, it was possible to observe in all of them that the cost of maintaining the Program is the main factor that defines the menu's preparations and not the calculations of nutritional needs, as recommended by RDC No. 26 of 2013.[22] According to this resolution, school meals should cover at least 30% (thirty percent) of nutritional needs, distributed in at least two meals for part-time daycare centers.

In these municipalities, the purchases are carried out in a centralized way, considering that the acquisition of foodstuffs is effected from the planning of the menus. Nevertheless, the daycare centers that are served by the Program receive resources and more attention in order that foodstuffs do not lack. Ideally, there should be the possibility of a standardization of menu for the daycare centers of the participating municipalities in order to facilitate the supervision of the Program.

Elaboration

The professionals involved in the implementation of NutriSus had the care of making changes in the school feeding before the implementation of the strategy, since the *NutriSus Operational Manual*[9] recommends that the contents of the sachet should be added in the food ready to be served to the child, which may be in rice with beans and paps/purées, and should not be mixed in liquids and/or hard foods.

When asked if there had been changes in the menu, the nutritionist of municipality 4 clarified: "Yes... we had to change several preparations that were the school's habit, but that wouldn't be

appropriate to put the sachet on, there could have been rejection." Despite this new planning, it was observed, by the preparations mentioned in the municipalities, a possible lack of care with the issue of bioavailability of nutrients, which may lead to a partial absorption of the contents of the ingested sachet, taking longer to reach the expected results of the Program.

For Cozzolino,[23] nutrient bioavailability may be defined as its accessibility to normal metabolic and physiological processes. This process may be influenced by several factors, ranging from the chemical form of the nutrient to the individual's health conditions.[23,24] Among the bioavailabilities that matter the most to the Program in question are the interactions of Iron, which, according to the *Armed Forces Feeding Manual*,[24] are:

> a) a vitamina C aumenta a biodisponibilidade do ferro na forma não-heme; b) a vitamina A pode afetar o seu transporte; c) a absorção de níquel, manganês, cádmio, cobalto e zinco fica aumentada na deficiência de ferro, sugerindo uma possível competição; d) o cálcio e os fitatos exercem efeito inibitório na sua absorção.

Besides the issue of bioavailability, there is also the factor related to regionalization, in the case of regional foods, which are always present in the school feeding menu. Thus, even with the changes to the Program, such preparations are constant on the menu of children in school stage. Chaves,[25] in a study on PNAE and regional dietary habits, mentioned the importance of raising awareness not only of the nutritionist, but also of those responsible for the school feeding sector, for the preservation and recovery of Brazilian food culture through the use of regional preparations in schools, in view of the relevance of their dissemination.

Table 2 lists the abovementioned preparations, by municipality, in which the contents of the sachet were added. An example of food in which bioavailability is affected is milk, which is used as an ingredient in some preparations. Because it is a source of calcium, milk has an inhibitory effect on iron absorption.[24]

Table 2. Cited preparations in which the supplement was offered by the municipalities from Rio Grande do Norte participating in the research, in 2015.

Municipalities	Preparations
Cerro Corá	Mashed potatoes, carrot purée, beans, rice pudding, pap
Japi	Rice pudding, bean soup, yellow soup, rice with meat, pasta
Serra Caiada	Rice pudding with hodgepodge, blended soup
Tenente Laurentino Cruz	Couscous, soup, hodgepodge, chicken soup, meat soup

Source: Own authorship.

From this information, it is possible to observe the presence of preparations with a low consistency, both in accordance with the standards established by NutriSus and the issue of the age range of the target audience served by the Program.

Still regarding the planning of school menu, there is also the concern with this last aspect, mentioning, namely, the age group of students. The nutritionist of municipality 4 reported:

> *There... as there are the little ones, the school has the elementary and has the daycare, so the first one to receive is always the daycare, so they prepare, put the sachet and take it to daycare. After the daycare is served, it will start with the elementary…*

The school's cook of the same municipality confirmed:

> *The only difference that the program implemented is that it can't be ingested with liquid drinks, such as porridge, juice, then the school meal would have to be, on the day that was the elementary, because the school also has the elementary, if it were a liquid meal, such as: biscuit with juice, then the daycare and the preschool would have another meal, it would be rice with hodgepodge, a couscous or a soup (sic).*

Concerning the presence of equipment and utensils used in the preparation of meals, the research showed that in two of the four municipalities visited, whose chosen daycare center is located in the rural area, there is a basic infrastructure for preparing meals. Depending on the size of the school, the number of handlers may vary, and may or may not be assistants with the school's cook.

When asked about the infrastructure of the school, if they had the minimum equipment to carry out the preparations, the nutritionist of municipality 1 narrated the following statement: "Yes, the infrastructure of the school is small but it has what it needs." The one from municipality 3, when asked about the compatibility of the number of handlers in relation to the demands of the Program, argued:

> *I don't think so, why? Because in the program, for the test yes, for the test there was only one and she, she really worked with the children. But to put in the municipality, for the two daycare centers, they would need about four school's cooks right?!.*

According to Calvet,[26] most Brazilian public school kitchens do not have adequate structure for the hygienic handling of food, from the receipt of raw material to its distribution.

Fernandes[27] postulates that the handlers, because of the intensity of the work, are hindered to actively participate in the processes of education. In these cases, these professionals seek to

stimulate school feeding, considering it a relevant activity, by emphasizing the importance of their participation in the process.

Still considering this context, Teo et al.[28] show that school kitchens were historically incorporated into school architecture, limiting the composition of the menus and providing risks of contamination in the produced meals.

In order to open the sachets, the *Operational Manual*[9] states that they should be torn with the hands at the tip indicated at one end. The use of sharp or punching tools such as knives, scissors or utility knives is not recommended to open the package due to the risk of contamination of the contents. However, two interviewed school's cooks from municipalities 2 and 4 reported the habit of opening sachets with scissors: "It's, with scissors, because, it has the... It seems, if I'm not mistaken, there is that corner for us to open it by hand, but I open it with scissors."

During the visits to collect the data from this research, it was possible to verify that supervisions of the work performed by the food handlers were carried out. Both nutritionists and school's cooks reported the existence of the supervision work: "Yes, every week we were there in the daycare center checking" (nutritionist of the educational area of municipality 2) // "She came, the girl came" (school's cook of municipality 1, referring to the nutritionist). It is through these supervisions that the nutritionist observes whether what he has planned is actually being performed. In the four municipalities, it was reported that the kitchen worked as planned by the professional.

CFN Resolution 465/2010, which outlines the attributions of the nutritionist within the scope of the School Feeding Program (PAE), emphasizes relevant aspects related to technical responsibility, as well as professional and legal commitments in the execution of activities, in accordance with the training and ethical principles of the profession, aiming at the quality of services provided to society. This resolution is incumbent upon the mentioned professionals in the exercise of their duties, the tasks of planning, organizing, directing, supervising, evaluating food and nutrition services, providing assistance and providing nutritional education to the school community, among other activities.[20]

Honório & Batista[29] argue that supervision ensures the execution of menus, the correct preparation of school meals and the maintenance of hygienic and sanitary safety of prepared meals. Supervision and inspection of educational units are therefore of paramount importance in order to ensure the quality of school meals, from the purchase and delivery of the product to the technical pre-preparation and preparation of meals, this assignment being one of the most recognized by nutritionists.

Nonetheless, the Grupo de Trabalho Intersetorial Municipal (GTI-M - Municipal Intersectoral Working Group) also has the responsibility to supervise the consumption and acceptability of supplements.[9]

Acceptability

In the subject of acceptability of the parents about the child's participation in the strategy, it was observed that there is a good acceptance on their part. According to the school's cook of municipality 1,

> *...there was a mother who liked it, she said that her girl was always with the flu, so with it she was totally healed, she was happy, that her girl never got better, you know? Then after the supplement she was well, then she was very happy.*

Based on the commentary elucidated in the speech of school's cook 1, the population's lack of knowledge about the use of vitamin and mineral supplements for children is evident, even though there are many programs currently available in schools and other government agencies, such as the National Vitamin A Supplementation Program and the National Iron Supplementation Program, among others.

The nutritionist of the same municipality, when asked about the acceptance of the parents, made the following comment:

> *Okay, it's... like I said, I had an initial meeting right? so at this meeting most people thought the idea was very interesting, they signed the term and throughout the program I was getting some complaints from the school's cook, because... some parents told their son that she was putting a vitamin in the food and that created a mess, right? And some kids didn't want to eat anymore, they got scared, but then I think it was more than a day and it was over, it wasn't necessary to talk to their parents again, after that the school's cook said that after a while they let it go, like, when they saw someone eating, they ate, and they forgot about this story, but I also don't know who was the father who did it.*

Regarding the acceptance of the Program by the school's cooks, the one from municipality 4 said: "Well, it's... NutriSus came to complement the school meal in daycare and preschool, right? It was well accepted..." The nutritionists of the four municipalities also accepted well the strategy, since the intention is to provide improvements in the health indicators of schoolchildren.

In general, supplementation with the micronutrient sachet is well accepted, since the side effects resulting from its use are minimal.[10] However, if the child has persistent diarrhea, the parents and/or guardians must report the fact to the Health team in order to carry out an investigation of the case.[10] In this regard, the school's cook from municipality 4 talked about the orientation she was given:

> *...she came, oriented us here in the kitchen, how we should proceed with the sachet and if in case a child had a reaction, like a diarrhea, the mother should always notify us to suspend the one of that child and to find out if it really was the supplement or some pathology that this child contracted.*

Concerning the monitoring of the NutriSus strategy, this is carried out by the Sistema Integrado de Monitoramento Execução e Controle (SIMEC - Integrated Monitoring, Execution and Control System), at the time of the PSE's annual evaluation. During monitoring, the main indicator to be analyzed is the number of children supplemented with a minimum of 36 sachets, as this is considered the minimum cycle for achieving positive health outcomes for supplemented children.[10]

Despite all the work that is done for the implementation of NutriSus, this program is not being continued. The Technical Managers report the difficulty of feeding the system available for monitoring the program, the SIMEC. Regarding this difficulty, the nutritionist from municipality 2 presented the following report:

> *Okay, last year, at the end of last year when we finished supplementation, I already had my link, with the active system, but I wasn't able to insert the data at all. Because there they ask the number of students that participate, participated, of the strategy and I didn't get that information at all, we tried to call, send e-mail to know the reason, what I could do to make the system work, we didn't get an answer, and this year we have already received several e-mails from them, demanding this monitoring, this information, but when we ask for information they don't answer, we don't get a reply then we don't know what happens.*

The report above supported the one from the nutritionist of municipality 3, who stated: "Through our secretary of health, only that at the moment this SIMEC has a serious problem, we are sending information and we're not getting through." The nutritionist from municipality 4 pondered:

> *...it opens for me, for the secretary of education or the person in charge of PSE, but this system has never opened, it's there for you to feed it but it never opens for us to put the number of students, I've already sent several e-mails, I didn't get an answer and I talked with some colleagues and we see that it's not only here in our city, in several others the system is not opening for this item.*

When analyzing all the reports, it is clear that the Technical Managers did everything possible to have the NutriSus strategy implemented. However, for various reasons, the Program has not continued, although the professionals involved have shown an interest in continuing it and even expanding the Program to other children from the municipality.

It is noteworthy that the discontinuity of this public policy generates dissatisfaction among the interviewed professionals, both the school's cooks and nutritionists, mainly because there are numerous people involved and technical and financial planning for the satisfactory implementation of this strategy. It is also worth mentioning that once the program becomes mandatory at the national level, cities that have already implemented NutriSus will have to redo all the planning, since the staff is constantly changing.

Conclusion

From this study, it was possible to perceive how complex it is to implement a new program, especially when it is national and involves the three spheres of government. Before it is intended for the final public, it is essential that all actors involved in the program have consistent planning from distribution, storage and disposal of sachets to monitoring. Furthermore, all planning must adapt to the reality of each municipality, such as a minimum infrastructure, trained professionals and in sufficient quantity to carry out the functions.

For the proper implementation of a program, the application of specific standards is required. Without these, it is not possible to do the implementation correctly, since they favor knowledge of the advantages and disadvantages of the program.

Strategy-specific menu planning is of utmost importance for implementation, thus ensuring that the child who consumes school meals with the supplement has the expected outcome of the program after the full cycle. The improvements in the menu also affect those children who did not participate in the strategy, due to the greater variety of preparations, thus ensuring a greater supply of micronutrients for all.

Consequently, positive and negative points were observed regarding the implementation of NutriSus in the visited municipalities. Among the positive points, we may mention: all municipalities have sufficient informational structure for the demands arising from the program; the performance of GTIs is satisfactory in most municipalities, with articulation among the professionals involved in the strategy; the training of the participating teams in an enlightening way about the operation of NutriSus; supervisions carried out frequently by the Program's Technical Managers. Concerning the negative points, the main point to be highlighted is the absence of monitoring in all municipalities due to failures in SIMEC, which makes it impossible for the monitoring of the strategy by the managers at the national level. In addition, the lack of data in this system prevents the inputs required for the continuation of the program to be passed on to the municipalities. Hence, children who should be benefiting from supplements are actually being deprived of receiving them adequately and enough to generate positive health effects.

Despite these issues, NutriSus is a program that only brings benefits to the population that receives it. Its operational structure, however, is still far from expected, since there is a lack of monitoring and supervision by the Ministério da Saúde e da Educação (Ministry of Health and Education) in a work that must be carried out conjunctly.

The main limitations of this study were: to know which municipalities had already implemented the strategy, the agreement to participate in the research and the transportation to the participating cities.

However, it is necessary to carry out more studies on this subject in order to better understand how NutriSus is being implemented in other Brazilian municipalities.

Collaborators

Sousa OMS, main author, participated in all stages of the study; Santiago CM assisted in the conception of the study and in the data collection; de Araújo FR participated in all stages, from the conception of the study to the revision of the final version of the article; de Azevedo JEP assisted in making available the contacts of the Technical Managers of the participating municipalities and in the revision of the final version of the article.

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References

1. Fidelis CMF, Osorio MM. Consumo alimentar de macro e micronutrientes de crianças menores de cinco anos no Estado de Pernambuco, Brasil. Rev Bras Saúde Mater Infantil 2007; 7(1):63-74.
2. Cavalcante AAM, Tinôco ALA, Cotta RM, Ribeiro RCL, Pereira CAS, Franceschini SCC. Consumo alimentar e estado nutricional de crianças atendidas em serviços públicos de saúde do município de Viçosa, Minas Gerais. Rev Nutr. 2006; 19(3):321-330.
3. Bernardi JR, De Cezaro C, Fisberg RM, Fisberg M, Rodrigues GP, Vitolo MR. Consumo alimentar de micronutrientes entre pré-escolares no domicílio e em escolas de educação infantil do município de Caxias do Sul (RS). Rev Nutr. 2011; 24(2):253-261.
4. Brasil. Ministério da Saúde. Programa Nacional de Suplementação de Ferro: manual de condutas gerais. Brasília: Ministério da Saúde, 2013.
5. Miglioli TC, Fonseca VM, Gomes Junior SC, Lira PIC, Batista Filho M. Deficiência de Vitamina A em mães e filhos no Estado de Pernambuco. Ciênc Saúde Coletiva 2013; 18(5):1427-1440.
6. Moreira AS, Silva RAA. Anemia ferropriva em portadores de anemia falciforme: a importância de se avaliar o estado nutricional de ferro. Rev Ciênc Méd Biol. 2014; 13(2):236-241.
7. Mclaren DS, Kraemer K. Manual on Vitamin A Deficiency Disorders (VADD). 3 ed. Switzerland: Sight and Life Press; 2012.
8. Milagres RCRM, Nunes LC, Pinheiro-Sant'ana HM. A deficiência de vitamina A em crianças no Brasil e no mundo. Ciênc Saúde Coletiva 2007; 12(5):1253-1266.
9. Brasil. Ministério da Saúde. NutriSUS – Estratégia de fortificação da alimentação infantil com micronutrientes (vitaminas e minerais) em pó: manual operacional. Brasília: Ministério da Saúde; 2015.

10. Brasil. Ministério da Saúde. NutriSUS: caderno de orientações: estratégia de fortificação da alimentação infantil com micronutrientes (vitaminas e minerais) em pó. Brasília: Ministério da Saúde; 2015.

11. Oliveira LC, Krummel A, Deamici KM, Moraes CC, Oliveira EG. Avaliação das boas práticas de manipulação de alimentos para o preparo da merenda escolar das escolas de Bagé. Anais do IV Salão Internacional de pesquisa, ensino e Extensão 2012; 4(3).

12. Rigodanzo SI, Gomes EC, Garcia L, Brasil CCB, Pereira FG, Marques AYC. Avaliação do processo de manipulação de alimentos e boas práticas de merendeiras das escolas municipais de ensino fundamental de Itaqui - RS. Anais do VI Salão Internacional de Ensino, Pesquisa e Extensão 2014; 6(2).

13. Gil AC. Como elaborar projeto de pesquisa. 4. ed. São Paulo: Atlas; 2007.

14. Brasil. Ministério da Saúde. Portal da atenção básica. NutriSUS [Internet]. [acesso em: mar. 2017]. Disponível em: http://dab.saude.gov.br/portaldab/faq_nutrisus.php

15. Instituto Brasileiro de Geografia e Estatística. Cidades [Internet]. Disponível em: http://cidades.ibge.gov.br/xtras/uf.php?coduf=24

16. Bardin L. Análise de conteúdo. Lisboa: Edições 70; 1977.

17. Akutsu RC, Botelho RA, Camargo EB, Sávio KEO, Araújo WC. A ficha técnica de preparação como instrumento de qualidade na produção de refeições. Rev Nutr. 2005; 18(2):277-279.

18. Ornellas LH. Técnica dietética: seleção e preparo de alimentos. 7ª ed. Rio de Janeiro: Atheneu; 2001.

19. Fúccio F, Ferreira KD, Watanabe SA, Ramos-Jorge ML, Pordeus IA, Paiva SM. Aceitação dos pais em relação as técnicas de manejo do comportamento utilizadas em odontopediatria. J Bras Odontopediatr Odontol Bebê 2003; 6(30):146-151.

20. Brasil. Conselho Federal de Nutricionistas. Resolução CFN nº 465 de 23 de agosto de 2010. Dispõe sobre as atribuições do nutricionista no âmbito do Programa de Alimentação Escolar (PAE) e dá outras providências. Diário Oficial da União 25 ago. 2010; 1:118-119

21. Mello AL, Vidal JPO, Sampaio LR, Santos LAS, Freitas MCS, Fontes GAV. Perfil do nutricionista do programa nacional de alimentação escolar na região Nordeste do Brasil. Rev Nutr. 2012; 25(1):119-132.

22. Brasil. Fundo Nacional de Desenvolvimento da Educação. Resolução/CD/FNDE nº 26, de 17 de junho de 2013. Dispõe sobre o atendimento da alimentação escolar aos alunos da educação básica no âmbito do Programa Nacional de Alimentação Escolar – PNAE. Diário Oficial da União 18 jun. 2013.

23. Cozzolino SMF. Biodisponibilidade de nutrientes. 4ª ed. Barueri, SP: Manole; 2012. 1368 p.

24. Brasil. Ministério da Defesa. Portaria Normativa Nº 219, de 12 de Fevereiro de 2010. Aprova o Manual de Alimentação das Forças Armadas. Diário Oficial da União 17 fev. 2010; 31(1):11.

25. Chaves LG, Mendes PNR, Brito RR, Botelho RBA. O programa nacional de alimentação escolar como promotor de hábitos alimentares regionais. Rev Nutr. 2009; 22(6):857-866.

26. Calvet RM, Moura KK, Muratori MCS, Varão HC, Lima MFV, Cordeiro JR. Condições de funcionamento das cozinhas de escolas estaduais de São Luís, MA. Hig Aliment. 2012; 26(204/205):41-44.

27. Fernandes AGS, Fonseca ABC, Silva AA. Alimentação escolar como espaço para educação em saúde: percepção das merendeiras do município do Rio de Janeiro, Brasil. Ciênc Saúde Coletiva 2014; 19(1):39-48.

28. Teo CRPA, Corrêa EN, Gallina LS, Fransozi C. Programa nacional de alimentação escolar: adesão, aceitação e condições de distribuição de alimentação na escola. Nutrire: Rev Soc Bras Aliment Nutr. 2009; 34(3):165-185.

29. Honório ARF, Batista SH. Percepções e demandas de nutricionistas da alimentação escolar sobre sua formação. Trab Educ Saúde, 2015; 13(2):473-492.

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