



EFFECTS OF A DOMICILIARY NUTRITIONAL EDUCATION PROGRAM FOR ASTHMATIC ADOLESCENTS

EFEITOS DE UM PROGRAMA DE EDUCAÇÃO NUTRICIONAL DOMICILIAR PARA ADOLESCENTES ASMÁTICOS

EFFECTOS DE UN PROGRAMA DE EDUCACIÓN NUTRICIONAL EN EL HOGAR PARA ADOLESCENTES ASMÁTICOS

Isabel Thereza Steffenon Weber¹, Simone Zeni Strassburger², Márcio Júnior Strassburger³, Maristela Borin Busnello⁴, Lígia Beatriz Bento Franz⁵

ABSTRACT

Objective: to investigate the effects of a food and nutrition education program on asthma symptoms in asthmatic schoolchildren. **Method:** descriptive study, intervention, clinical trial. Home nutritional education activities were carried out over six months with eight asthmatic schoolchildren. It was evaluated, at the time of pre-intervention and post-intervention for comparison purposes. **Results:** there was inadequacy in the food intake of schoolchildren, with an increase in the consumption of fruits, vegetables and legumes during the research. The assessment of asthma, as a well controlled, increased from 25% to 62.5%, and the percentage of students with more than 12 asthma attacks per month decreased from 37.5% to 12.5%. **Conclusion:** it can be inferred that there was an effective improvement in food behavior and an increase in asthma control with a decrease in the frequency and intensity of asthma. **Descriptors:** Food and Nutrition Education; Home Nursing; Asthma; Health Education; Food Habits.

RESUMO

Objetivo: investigar os efeitos de um programa de educação alimentar e nutricional sobre os sintomas da asma em escolares asmáticos. **Método:** estudo descritivo, de intervenção, ensaio clínico. Foram realizadas atividades de educação nutricional domiciliar, ao longo de seis meses, com oito escolares asmáticos. Avaliou-se, no momento de pré-intervenção e no pós-intervenção, para fins de comparação. **Resultados:** houve inadequação na ingestão alimentar dos escolares, com incremento no consumo de frutas, legumes, verduras e leguminosas durante a pesquisa. A avaliação da asma, como bem controlada, passou de 25% para 62,5%, e o percentual de escolares com mais de 12 crises de asma ao mês diminuiu de 37,5% para 12,5%. **Conclusão:** pode-se inferir que houve efetiva melhora do comportamento alimentar e aumento no controle da asma com diminuição da frequência e intensidade da asma. **Descritores:** Educação Alimentar e Nutricional; Assistência Domiciliar; Asma; Educação em Saúde; Hábitos Alimentares.

RESUMEN

Objetivo: investigar los efectos de un programa de educación alimentar y nutricional sobre los síntomas del asma en escolares asmáticos. **Método:** estudio descriptivo, de ensayo clínico. Actividades de educación nutricional se llevaron a cabo en el hogar, en el transcurso de seis meses, con los asmáticos de ocho niños en edad escolar. Se evaluó, en el momento inicial de la intervención, y después de la intervención para propósitos de comparación. **Resultados:** hubo ingesta alimentar inadecuada, con un aumento en el consumo de frutas, hortalizas, verduras y legumbres durante la búsqueda. La evaluación del asma, como bien controlada, pasó de 25% a 62,5%, y el porcentaje de escuelas con más de 12 ataques de asma por mes disminuyó de 37.5% a 12,5%. **Conclusión:** se infiere que hubo una mejora eficaz del comportamiento alimentario y aumento de control del asma con disminución de la frecuencia y severidad del asma. **Descriptores:** Educación Alimentaria y Nutricional; Atención Domiciliar de Salud; Asma; Educación en Salud; Hábitos Alimentarios.

¹Nutritionist, Post-graduate in Geriatrics and Gerontology, University of the Northwest Region of the State of Rio Grande do Sul/Unijui. Ijuí (RS), Brazil. E-mail: isabel.tsteffenon@gmail.com; ²Physiotherapist, PhD in Child Health, University of the Northwest Region of the State of Rio Grande do Sul/Unijui. Ijuí (RS), Brazil. E-mail: simone.s@unijui.edu.br; ³Physiotherapist, Master Professor in Collective Health in Unijui. Ijuí (RS), Brazil. E-mail: marcio.s@unijui.edu.br; ⁴Nutritionist, PhD in Science Education, University of the Northwest Region of the State of Rio Grande do Sul/Unijui. Ijuí (RS), Brazil. E-mail: marisb@unijui.edu.br; ⁵Nutritionist, Postgraduate in Nutrition and Intensive Care / Institute of Education and Research of Hospital of Moinhos de Vento. Ijuí (RS), Brazil. E-mail: vitor.buss@hotmail.com; ⁶Nutritionist, PhD Professor in Public Health, Postgraduate Program in Integral Health Care - Masters, University of the Northwest Region of the State of Rio Grande do Sul/PPGAIIS /Unijui. Ijuí (RS), Brazil. E-mail: ligiafra@unijui.edu.br

INTRODUCTION

Asthma is a chronic inflammatory disease characterized by lower airway hyperresponsiveness, with variable airflow limitation. It is the result of a combination of several factors, among them, genetic and environmental, whose interaction results in pathology. The clinical manifestation of the disease occurs through recurrent episodes of wheezing, dyspnoea, chest tightness and coughing, especially at night, or upon awakening. Spontaneous reversal or response to drug treatments may occur.¹

In Brazil, between 1998 and 2008, there was an increase of 2.2% per year in the prevalence of asthma in adolescents and 1% per year for children. In general, the average prevalence of asthma found in 2008 was 8.5% in children and 5.5% in adolescents.²

According to DATASUS, asthma accounts for 10% of the Brazilian population, accounting for about 160,000 hospitalizations, making it the fourth largest cause of hospitalizations in the country.¹ The disease mainly affects children and adolescents and, due to its high prevalence, is considered a public health problem in Brazil, generating a growing burden to the Unified Health System (UHS) with outpatient visits, hospitalizations, medicines dispensed to patients with the disease, and increase in the rate of school absenteeism.

Despite the advances in the pharmaceutical industry, a large contingent of asthmatics has poorly controlled asthma.³ This interferes directly with the quality of life of the patients; Indirectly, in the nutritional status of individuals. Asthma is often a limiting factor in the regular practice of physical activity; the less active carriers are more likely to be obese or overweight^{4,5}, in addition to being related to morbidities such as anxiety and depression⁶, which in turn can translate into binge eating or other harmful nutritional behaviors, generating a vicious circle of disorders related to nutritional status.

Not only is excess weight a contributing factor to the intensity of asthma symptoms; also the food, or some components of it, can have beneficial or harmful effects on the control of the disease. One hypothesis that is currently being studied is that antioxidants and polyunsaturated fats have favorable effects during asthma attacks, especially with regard to antioxidants, vitamins C and E, that have a protective effect already clinically proven in the development of the inflammatory response associated with asthma and symptoms.⁷⁻⁸

A healthy dietary pattern was a protective factor for asthma symptoms in a study of adolescents aged 11 to 17 living in Salvador-Bahia. A lower prevalence of asthma was also found among healthy eating individuals, noting that adherence to good eating habits is also a protective factor against the development of the disease.⁷

A French study investigated whether dietary intake interfered with the prevalence of asthma in women and, after adjusting for confounding variables, concluded that a high intake of tomatoes, carrots, leafy vegetables and apples was associated with a lower prevalence of asthma.⁹

Through a case-control study, conclude that symptomatic asthma in adults is associated with a low intake of fruits, vitamin C, manganese and low plasma levels of vitamin C, these risk factors being modifiable for the presence of asthma.¹⁰

For favorable changes in eating habits, food and nutrition education is of great value - according to the nutritionist - in all phases of the process of change and adequacy of eating behavior. Food and nutrition education can be defined as an educational process in which the prior knowledge and experiences of the educator and the learner are united in search of the learner's autonomy and safety for healthy food choices in meeting the physiological, psychological and social needs.¹¹

There is a lack of methodological theories, in education, in the daily life of health professionals in general, including nutritionists. There is a lack of publications on theoretical-methodological elaborations. There are reports of intervention experiences in the form of nutritional education focused on the quantitative or qualitative responses of the subjects, but little is discussed about nutrition education. Thus, doing nutrition education is hampered by the lack of theoretical bases and being followed.¹²

The aim of this study is to investigate the effects of a food and nutrition education program on asthma symptoms in asthmatic schoolchildren.

METHOD

Descriptive study, intervention, clinical trial. The population consisted of ten adolescents, and the selection, as a convenience, among the students with asthma participating in the study "Control of asthma and allergic rhinitis in schoolchildren at the time of pollination of grasses" was carried out in the city of Ijuí (RS), Brazil, In the year

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2013.¹³ Among the participants, those classified as having uncontrolled asthma were considered eligible. Asthmatics with controlled asthma, patients with chronic diseases such as heart disease, cystic fibrosis, and those with cognitive limitations or other conditions that might compromise quality of life were excluded.

The educational nutritional intervention was based on monthly home visits, during six months, scheduled by telephone contact. The intervention was divided into three stages: pre-intervention data collection, intervention, and post-intervention data collection.

In the pre-intervention data collection, the study proposal was presented, the asthmatic symptoms were evaluated with the application of questions selected from the questionnaire International Study of Asthma and Allergy in Childhood (ISAAC),¹⁴ and the control of asthma through Asthma Control Test - ACT.¹⁵ ACT is composed of five questions regarding asthma symptoms present in the last four weeks and was used to quantify asthma control status.¹⁵ Already the selected questions from the ISAAC questionnaire were used to investigate respiratory symptoms, through specific questions about asthma, symptoms and treatments performed.¹⁴

Nutritional status was assessed by measuring body mass (BMI) and height for the calculation of Body Mass Index (BMI) using the weight / height formula². The waist circumference (PC) was also checked for the presence of excess visceral adipose tissue. PMC measures and height were collected following the criteria adopted by the Health and Nutrition Surveillance System-SISVAN of the Ministry of Health.¹⁶ For the classification by BMI, the criteria of the Adolescent Health Book of the Ministry of Health/Brazil, through the score Z.¹⁷⁻⁸ The CP was measured in the narrowest part of the trunk¹⁹ and classified according to Taylor et al.²⁰

Food consumption was assessed using a questionnaire of habitual consumption elaborated by the author of this study from the 24-hour recall and was used to support the proposed dietary changes.²¹

During the educational intervention, the Ten Steps for Adolescent Healthy Eating, recommended by the Ministry of Health, were first discussed in order to introduce the issue of healthy eating.²²

On the second visit, we, briefly, presented the world panorama of the studies that discuss the effect of feeding on the symptoms of asthma, presenting foods scientifically

recognized as interfering in the disease in question, dividing them into "protective foods" of asthma and "foods that worsen" the symptoms of asthma. Were considered protectors: apple or apple juice; vegetables and fish; fruits rich in vitamin C; vegetable oils and olive oil, because they are rich in vitamin E; walnuts and nuts rich in selenium and magnesium. As food to avoid, we considered fried foods, fatty foods and biscuits stuffed with filling, rich in saturated fat.

Potential and general nutritional guidelines were elaborated on the importance of adequate food in the good control of the pathology.

On the third and fifth visits, the changes in eating habits expected were monitored due to the orientations made during the first and second visits. Participants were questioned about the changes they had undergone, doubts and perceived difficulties. At these times, in addition to inducing healthy dietary changes aimed at controlling the symptoms of asthma, families were encouraged to reflect on the role of eating behavior in the context of healthy living.

On the fourth visit, the students were provided with fruit vitamin and fruit and vegetable juices, with the purpose of increasing their consumption, because difficulties were perceived in the in natura acceptance of fruits and some greens such as leafy vegetables. The selection of ingredients from the list of beneficial effects in the control of asthma symptoms was recommended, as well as the orientation of noncontamination and/or sweetening of the juice, which should be produced at the time of consumption in order to avoid Nutritional losses.

After the six-month intervention, in a visit called post-intervention, all the evaluations performed in the first one, were repeated to verify the changes that occurred during the nutritional intervention.

For descriptive analysis, the data were distributed in absolute and relative frequencies. The description of continuous variables was represented by mean and standard deviation or median and interquartile range, according to the symmetry of the variables. For statistical analysis, *Statistical Package for Social Sciences (SPSS)*, software version 18.0 was used.

This research followed the ethical procedures, which involve human beings, defined by the National Health Council in

Resolution 466/2012, and was approved by the Research Ethics Committee of Unijuí, consubstantiated opinion number 689.304 / 2014. Those responsible for the adolescents signed the Free and Informed Consent Term.

RESULTS

Of the ten selected students, eight completed the research. The participants had ages between ten and 15 years, with a mean of 13 years (± 1.71), predominantly male (62.5%) and white (87.5%) students, all of whom were classified as adolescents.

The nutritional status verified in the pre-intervention phase showed 87.5% of eutrophy

and 12.5% of excess weight, results maintained after the intervention. On the other hand, the classification of the waist circumference, both pre- and post-intervention, indicated that the values recommended were adequate.

Table 1 shows the number of meals performed by the students, visualized from the data of the usual food consumption survey, applied in pre and post-intervention visits. There was an increase in the number of meals performed by the students in the post-intervention, in agreement with the accomplishment of five to six meals daily.²²

Table 1. Meals had by the students participating in the research, pre- and post-intervention. Ijuí (RS), Brazil, 2014.

	Pre-Intervention		Post-intervention	
	n	%	n	%
Breakfast	7	87,5	8	100
Collation	3	37,5	6	75
Lunch	8	100	8	100
Snack	7	87,5	8	100
Dinner	8	100	8	100
Supper	2	25	5	62,5

Table 2 presents the food intake of asthmatic schoolchildren, in the pre- and post-intervention periods. Adequacy was considered through the portions and food groups recommended by the Food Guide for the Brazilian Population²². Consumption of

fruits, vegetables and dairy products, fell far short of what was recommended as part of a healthy diet, although there was an increase in the consumption, mainly of fruits, during the educational intervention.

Table 2. Food intake of asthmatic schoolchildren, pre and post intervention. Ijuí (RS), Brazil, 2014.

Food Group	Recomended Portions*	Pre-intervention intake (Mean + SD)	Post-intervention intake (Mean + SD)
Cereals, tubers and roots	6	4,3 \pm 1,40	5,5 \pm 0,74
Vegetables	3	1,1 \pm 0,76	1,2 \pm 0,75
Fruits	3	0,7 \pm 0,75	2,6 \pm 1,04
Milk and dairy products	3	1,8 \pm 0,61	1,4 \pm 1,32
Meat and eggs	1	1,3 \pm 1,08	1,5 \pm 0,6
Legumes	1	0,6 \pm 0,39	0,8 \pm 0,21
Oil and fat	< 1	2,1 \pm 2,01	1,3 \pm 1,05
Sugar and candies	< 1	0,8 \pm 0,87	0,8 \pm 0,71

Figure 1 expresses the results obtained in the question of the ISAAC questionnaire regarding which environmental factors negatively affect the symptoms of asthma. Each environmental factor is described according to the percentage of families that credit the worsening of the asthma symptoms.

Although the perception of worsening symptoms is quite individual, it can be seen that climate, pollen, smoke and dust and the presence of influenza translate as more prevalent factors in the presence of asthma symptoms.

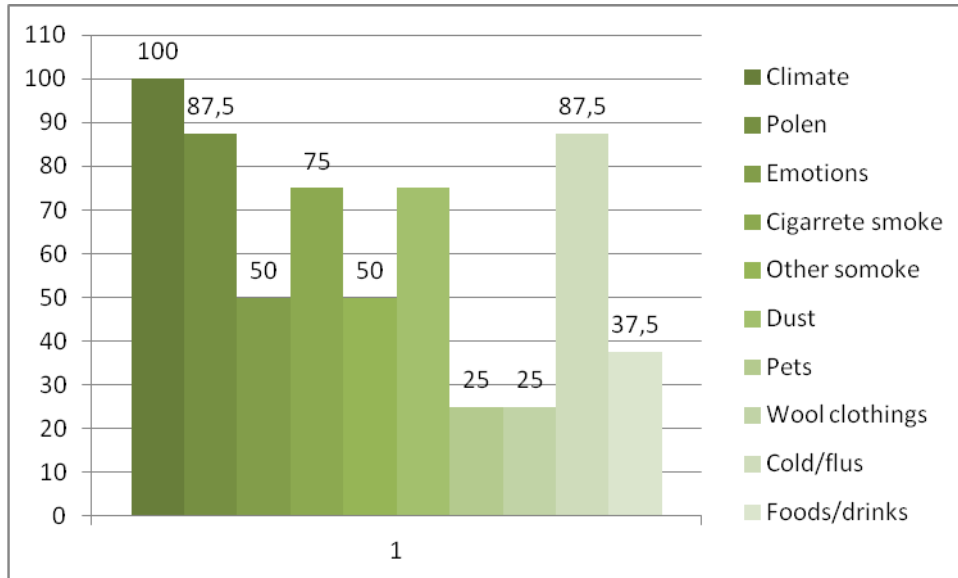


Figure 1. Factors that worsen asthma according to family members. Ijuí (RS), Brazil, 2014.

According to the criteria of the ISAAC questionnaire, in the pre-intervention phase, 75% of the students reported dry cough during the night (in the absence of influenza or cold)

as a symptom of asthma, while only 25% of this symptom.

The control of asthma, by adolescents verified through ACT, in the pre- and post-intervention, moments is shown in figure 2:

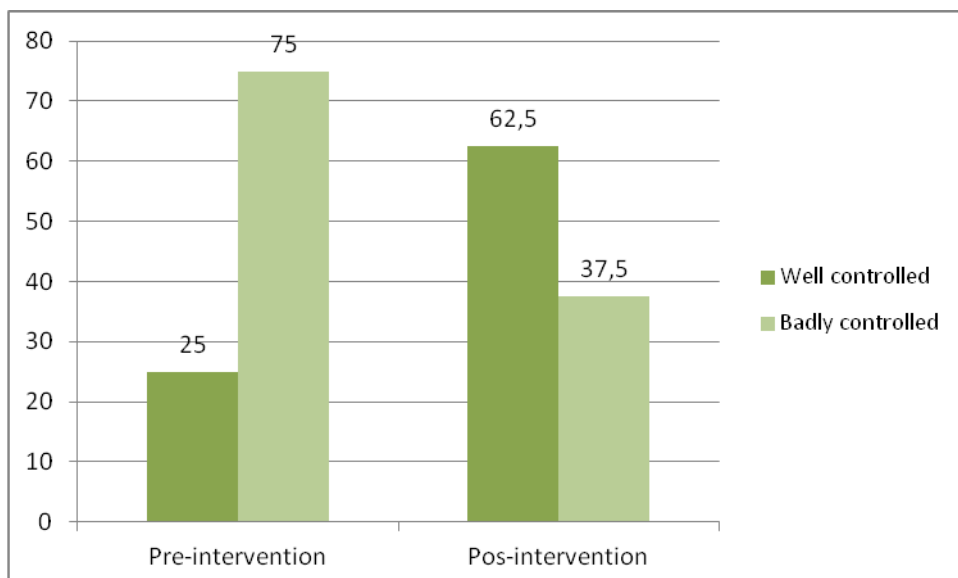


Figure 2. Control of asthma in schoolchildren. Ijuí (RS), Brazil, 2014.

There was an increase in the control of asthma in schoolchildren after the intervention, from 25% of well-controlled asthmatics to 62.5% of students with asthma control.

DISCUSSION

High values of eutrophy were reported in the studied population, which can be explained by the systematic refusal of overweight adolescents to participate in the study, verified during the selection phase. In a systematic literature review²³, it was concluded that, although studies are numerous, the cause and effect relationship between overweight and asthma has yet to be established, although research has shown that there is positive evidence for the association between both.⁸

The presence of abdominal obesity, verified in CP measurement, is strongly associated with asthma symptoms by the concentration of visceral fat. The presence of excess adipose tissue in the abdominal region is associated with lower respiratory capacity, due to the lower residual lung volume, lower expiratory reserve volume and airflow limitation,²⁴ interfering - negatively - in the control of asthma.

The design of interfering environmental factors in the symptoms of asthma comes from the fact that these can act as triggers in the onset of asthma attacks. Among the foods/drinks cited as implicated in worsening symptoms were fatty foods and milk. The relationship between milk and dairy products and asthma is much discussed. Among carriers and health professionals, there is a belief that milk and its derivatives cause asthma

symptoms to worsen, but, no scientific references have been found to prove that the intake of dairy products per se is responsible for this worsening. Some authors defend the thesis that milk and its derivatives are mucogenic, provoking even greater obstruction in the respiratory flow during crises. The increase in mucus production from milk consumption, however, depends on several other factors, such as increased intestinal permeability and occurs in a very small portion of asthma sufferers.²⁵ Thus, only asthma associated with food allergies and intestinal disorders, is affected by the ingestion of dairy products.

Fats, also cited as having a negative impact on the presence of asthma, have been blamed by some authors for the increased prevalence of asthma. The responsibility is for increased consumption of polyunsaturated fatty acids (PUFAs) and decreased consumption of saturated fatty acids. The omega-6 class PUFAs play a role in regulating the immune response and inflammation associated with asthma. At the same time, the PUFAs of the omega-3 class act contrary to their anti-inflammatory action. Dietary changes in omega-6 intake and decreased omega-3 intake were accompanied by an increase in the prevalence of asthma, which reinforces this hypothesis.²⁶

In the evaluation of the number of meals performed by the adolescents, we can notice the predominance of the main - breakfast, lunch and dinner - at the expense of snacks and supper. The fact that, at first, 87.5%; Secondly, 100% of the participants eat breakfast is a very important fact. A study verified the omission of breakfast and the associated factors among students from Itajaí-SC and concluded that 25% of the students did not eat the meal.²⁷ Among students who reported having breakfast, the frequency of consumption of foods such as raw vegetables, cooked vegetables, dairy products, fruits, fruit juices, and beans was higher than those who skipped the meal. School children who had this meal have better school performance, better cognitive performance, attention, memory for school activities and higher school attendance, when compared to those who do not eat the meal.²⁸

On the other hand, it is noticed the omission of meals considered by the public as of minor importance, as the collation and the supper. In particular, it was noticed that these snacks were not realized during the school shift. In theory, this should be a time when students would have access to a healthy and balanced diet; in practice, it is not so.

Foods, often, do not match the time they are served, with rice, beans, carter or pasta at ten o'clock, a time considered inadequate for intake of something considered "too heavy" by students.

When the choices are fruit, milk, yogurt, sandwiches and other less caloric foods, there is a good acceptance and consumption report. Other authors developed a study that verified the preference and consumption of schoolchildren between school-provided and competitive meals (canteens and snacks brought from home) and concluded that competitive meals are prevalent. School feeding is still seen as the "only alternative" when there are no canteens or individuals who cannot afford it.

Ingestion of fruits, vegetables and vegetables, such as tomatoes, carrots, leafy vegetables and apples¹⁰ and nutrients such as vitamin C, manganese, and fruits in general¹⁰, namely food sources of protective nutrients for asthma, were essentially inadequate in the pre-intervention. After the intervention program, there was a very low increase in the consumption of vegetables, while in fruit consumption there was a significant increase (from a mean of 0.7 to 2.6 servings per day). The consumption of fruits and vegetables has generally decreased in the population, but in children and adolescents this fact is more evident. This should be taken into account by the protective effect that a healthy eating style has on the presence and control of asthma.⁵

In adherence to the proposed guidelines, it was observed that some participants had difficulty, especially in families that underestimated asthma and its symptoms, considering that it "passes with age". In families where there was no presence and constant coexistence of the father and mother figures, it was more difficult to discuss and program new habits.

The percentage of adolescents with well-controlled asthma increased from 25% to 62.5%, demonstrating that during the nutritional education period there was an increase in asthma control. Values close to those of the pre-intervention result were found in a study conducted in Tubarão (SC), Brazil, which analyzed the control of asthma in two health outpatient clinics, with the application of ACT, found a percentage of controlled asthma of 30.6 % .²⁰

Poorly controlled asthma can occur either during the use of prescribed drugs or through underestimation of the disease by families and carriers. In these cases, there is no search for help from health professionals or use of

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preventive medication or control during crises. It is of fundamental importance to carry out education for self-care in health with the patients and their families, so that they can manage the symptoms, improve the quality of life and prevent more serious complications.

Although it has been demonstrated that there was an increase in the number of asthmatics with the symptom well controlled and that these cases are less frequent, the period of six months was insufficient to state as to the effectiveness of the study. Deeper bonding and effective and lasting food changes require a longer period of time. Despite this, it was noticed that a degree of trust was established and that home visits represented much more than a space to discuss nutrition. The new attitudes of coping with asthma were recurrent themes during home visits that provided moments of reflection on the importance of self-care in health.

In a systematic review of the literature³⁰, the effectiveness of several food and nutritional education projects carried out in schools on the outcome of prevention or reduction of overweight and obese in children and adolescents was studied. Positive anthropometric data and increased consumption of fruits and vegetables were considered, as results of effectiveness, positive anthropometric data and increased consumption of fruits and vegetables. After a detailed analysis, they concluded that some requirements were important for the success of the intervention: "duration greater than one year, introduction as a regular school activity, involvement of parents, introduction of nutrition education in the regular curriculum and supply of fruits and vegetables by School feeding services". Thus, the idea that the family plays a central role in the dietary changes of schoolchildren and that a longer period of time is necessary to promote the bonding between the educator and the subjects becomes even clearer.

CONCLUSION

Despite the short study time and the limitations imposed by the non-elimination of confounding factors, such as environmental conditions and periodicity of the year, it was concluded that food and nutritional education was effective in providing dietary changes in schoolchildren's lives. There have been improvements in asthma symptoms, frequency and intensity, and these results, may be, related to food components beneficial to the disease, although there is no possibility of

associating the improvement of symptoms with specific components of the diet in this study.

The reflection on healthy life habits and on the importance of asthma control in families was very important; For greater effectiveness of educational actions, however, it takes a longer period of study, which would enable the formation of bonds and deeper trust relationships between educator and learners.

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Corresponding Address

Lígia Beatriz Bento Franz
Programa de Pós-Graduação em Atenção Integral à Saúde - Mestrado/PPGAIS
UNIJUÍ - Departamento de Ciências da Vida/DCVida
Rua do Comércio, 3000
Bairro Universitário - Campus UNIJUÍ
CEP: 98700-000 – Ijuí (RS), Brazil