

IMPACT OF NUTRITIONAL EDUCATION STRATEGIES ON ANTHROPOMETRIC VARIABLES AND NUTRITION KNOWLEDGE

Impacto de estratégias de educação nutricional sobre variáveis antropométricas e conhecimento alimentar

Impacto de estrategias de educación nutricional sobre variables antropométricas y conocimiento alimentario

Original Article

ABSTRACT

Objective: To assess the impact of a nutrition education program on the nutritional status and food knowledge of patients with overweight. **Methods:** A longitudinal quantitative study, performed between September and October 2012, with sample consisting of 15 patients with excessive weight (overweight: Body Mass Index or BMI between 25kg/m² and 29,9kg/m²; and obesity: above 30kg/m²), enrolled in a group of food education in a Primary Healthcare Unit. Nutritional intervention occurred in six weekly meetings (M1: general screening; and M2 to M7: 6 nutritional interventions), being applied a questionnaire assessing the participants' knowledge on the subjects to be discussed before and after the intervention. Prior to the first meeting and in the last intervention, measures of weight, height and waist circumference were obtained. Nonparametric Wilcoxon tests were performed, with a significance level of 5%, to analyze the average number of correct answers and the nutritional outcome. **Results:** Following the nutritional education strategy, there was an average reduction of 1.51kg in relation to the initial weight; the average BMI increased from 37.41kg/m² to 36.85kg/m²; waist circumference showed mean reduction of 5.6cm; and the number of correct answers in the questionnaires increased. **Conclusion:** The nutritional education strategy seems to have influenced the good evolution of the participants' nutritional status, leading to a decrease in the anthropometric measures and increasing knowledge about healthy eating.

Descriptors: Food and Nutrition Education; Obesity; Health Promotion; Health Education.

RESUMO

Objetivo: Avaliar o impacto de um programa de educação nutricional sobre o estado nutricional e conhecimento alimentar de pacientes com excesso de peso. **Métodos:** Estudo longitudinal, de natureza quantitativa, realizado entre setembro e outubro de 2012, com amostra constituída por 15 pacientes com excesso de peso (sobrepeso: Índice de Massa Corpórea (IMC) $\geq 25,0\text{kg/m}^2$ e $< 30\text{kg/m}^2$, e obesidade: $\text{IMC} \geq 30\text{kg/m}^2$), frequentadores de um grupo de educação alimentar em uma Unidade Básica de Saúde (UBS). A intervenção nutricional ocorreu em seis encontros semanais (M1: triagem geral e M2 a M7: 6 intervenções nutricionais), sendo aplicado um questionário para avaliar o conhecimento dos participantes sobre os assuntos a serem discutidos antes e após a intervenção. Antes do primeiro encontro e na última intervenção, foram aferidos peso, altura e perímetro de cintura. Realizou-se teste não paramétrico de Wilcoxon, com nível de significância de 5%, para analisar a média do número de acertos nas questões e na evolução nutricional. **Resultados:** Após a estratégia de educação nutricional, houve uma redução média de 1,51kg do peso inicial; o valor médio de IMC passou de 37,41kg/m² para 36,85kg/m²; o perímetro de cintura apresentou redução média de 5,6cm; além do aumento no número de acertos dos questionários. **Conclusão:** A estratégia de educação nutricional parece ter influenciado na boa evolução do estado nutricional dos participantes, propiciando redução de medidas antropométricas e ampliando os conhecimentos sobre alimentação saudável.

Descritores: Educação Alimentar e Nutricional; Obesidade, Promoção da Saúde; Educação em Saúde.

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RESUMEN

Objetivo: Evaluar el impacto de un programa de educación nutricional sobre el estado nutricional y conocimiento alimentario de pacientes con exceso de peso. **Métodos:** Estudio longitudinal de naturaleza cuantitativa realizado entre septiembre y octubre de 2012 con una muestra de 15 pacientes con exceso de peso (sobrepeso: Índice de Masa Corpórea (IMC) $\geq 25,0 \text{ kg/m}^2$ y $< 30 \text{ kg/m}^2$, y obesidad: $\text{IMC} \geq 30 \text{ kg/m}^2$), frequentadores de un grupo de educación alimentaria en una Unidad Básica de Salud (UBS). La intervención nutricional se dio en seis encuentros semanales (M1: selección general y M2 a M7: 6 intervenciones nutricionales), con la aplicación de un cuestionario para evaluar el conocimiento de los participantes sobre los asuntos discutidos antes y después de la intervención. El peso, la altura y el perímetro de cintura fueron medidos antes del primer encuentro y en la última intervención. Se realizó el test no paramétrico de Wilcoxon con nivel de significancia de 5% para analizar la media del número de aciertos en las cuestiones y en la evolución nutricional. **Resultados:** Hubo una reducción media de 1,51kg del peso inicial; el valor medio del IMC cambió de $37,41 \text{ kg/m}^2$ para $36,85 \text{ kg/m}^2$; el perímetro de cintura presentó reducción media de 5,6cm; además del aumento del número de aciertos de los cuestionarios después de la estrategia de educación nutricional. **Conclusión:** La estrategia de educación nutricional parece haber influenciado en la buena evolución del estado nutricional de los participantes llevando a una reducción de medidas antropométricas y ampliando los conocimientos de alimentación saludable.

Descriptor: Educación Alimentaria y Nutricional; Obesidad; Promoción de la Salud; Educación en Salud.

INTRODUCTION

Obesity is a disease caused by excessive accumulation of body fat, being a risk factor for metabolic disorders. It can be located in the abdominal region (android obesity) or the hip region (gynoid obesity)⁽¹⁾.

The excessive weight comprises overweight ($\text{BMI} \geq 25.0 \text{ kg/m}^2$ and $< 30 \text{ kg/m}^2$) and obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$)⁽²⁾; it is also considered a public health problem and is characterized as an epidemic, affecting industrialized and developing countries⁽³⁾. This multifactorial disease may be the result of positive energy balance, genetic factors, changes in food intake with increased energy supply in the diet, and reduced physical activity, leading to health problems⁽⁴⁾.

The "World Health Statistics" report shows that 12% of the world population present obesity, which is the cause of death of 2.8 million people every year. Thus, other diseases and complications related to overweight represent two-thirds of deaths worldwide⁽⁵⁾. In Brazil, the process of the nutritional transition in recent decades has led to increased obesity and decreased rates of malnutrition of both poor and

rich population of the country⁽⁶⁾. Data from the *Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico – Vigitel* (Surveillance of Risk and Protective Factors for Chronic Diseases via Telephone Survey), which monitors the frequency and distribution of risk and protective factors for non-communicable chronic diseases (NCCDs) in the adult population of 27 Brazilian cities revealed excessive weight in 48.5% of participants, being higher for men (52.6%) than for women (44.7%); the frequency of obese adults was 15.8%⁽⁷⁾.

Early diagnosis of NCCDs, such as obesity, is considered a challenge to the health system, and promoting nutrition education becomes a key strategy to address the problems of the health-disease-care process⁽⁸⁾. The treatment of both overweight and obesity should be multiprofessional and interdisciplinary because besides weight loss there must be a lifestyle change⁽³⁾.

Interdisciplinary treatment may provide better results compared to conventional treatment, where there is only one physician or nutritionist working alone, as observed in different studies of treatments for obesity⁽⁹⁾. It is necessary to provide appropriate treatment for patients classified as obese to lose weight and reducing health problems⁽¹⁰⁾.

According to the Ottawa Charter, health promotion should be "the process of enabling people to act improving their quality of life and health, including greater participation in control of this process"⁽¹¹⁾. Thus, nutrition education is related to the disclosure of information to enable individuals to make their decisions, ensuring the right and access to information⁽¹¹⁾.

The role of the nutritionist through nutrition education is based on changing the individuals' eating habits by qualifying them so that they can have autonomy in relation to food choices. In order to do so, teaching-learning methodologies are used to improve individual skills⁽¹²⁾. Food habits are seen as an environmental factor influenced by economic, social and personal habits, which is solidified during childhood and adolescence, and can be taken the same way to adulthood. Moreover, the quality of food can directly influence the mental health of the individual⁽¹³⁾.

Adherence to obesity treatment becomes more difficult when emotional factors impair the patient's progress, such as personal problems, lack of family support and lack of motivation due to lack of results in weight loss⁽⁶⁾. The public health work showed group activities as a good strategy to perform these educational activities, as they allow experience exchange and collective production of the development of strategies for dealing with reality through playful interaction⁽¹⁴⁾.

A study approached the need for educational interventions focused on nutrition education and exalted the

lack of studies addressing the improvement of educational strategies focused on nutrition⁽¹⁵⁾. On the other hand, another study points for caution in the development of strategies to be used in the nutrition field, despite completing beneficial effects on weight loss from dietary intervention⁽¹⁶⁾.

The huge number of overweight patients attending a *Unidade Básica de Saúde – UBS* (Basic Health Care Unit) who, probably because of the lack of food knowledge, showed excessive weight and other comorbidities drew the attention of family health teams, leading to an interest in developing the groups of nutrition education. Thus, this study aims to evaluate the impact of nutrition education program on the nutritional conditions and food knowledge of overweight patients.

METHODS

Quantitative longitudinal study with educational intervention conducted within a seven-week period between September and October 2012 in a UBS of the city of Diadema, São Paulo state.

Sixty-three people, both literate adult and elderly women and men were invited to take part in the program. They are all attending a group of food education focused on overweight people. Inclusion criterion was: having $BMI \geq 25.0$ kg/m², corresponding to excess weight, overweight or obesity. Exclusion criterion was: not having completed the activities developed during the study.

At timepoint 1 (T1), a general screening was performed, when the data of each participant were collected, including: weighing in Filizola™ digital scale with a maximum capacity of 120kg, measurement of waist circumference with simple anthropometric tape WCS™, blood pressure measurement in pressure aneroid device with Nylon Premium™ cuff and verification of dextro using the Accu-chek™ glucose meter. All measurements were performed by the nursing staff and were written in the patients' record.

Every week, the group met in a room in the UBS where nutritional education was developed throughout six meetings. Group workshops were carried out, emphasizing the theoretical part focused on a central matter in which all members have an interest, but also dealing with the emotional aspect of the participants, hoping that the sharing of experiences would make the learning process easier⁽¹⁷⁾.

At timepoint 2 (T2), the first meeting was set with the patients previously selected to the study. Lectures and demonstrations were used to present the concept of meal frequency and its importance for a healthy eating.

The second meeting was held at timepoint 3 (T3), with a group discussion about encouraging fruits intake and the difference between vegetables and legumes. The concept of

portions – through demonstrations – and its importance in the diet were discussed.

During the third meeting - timepoint 4 (T4) –the importance of carbohydrates and proteins was discussed. A lecture was also held exemplifying the necessary portions in the diet.

During the fourth meeting – or timepoint 5 (T5) – the topic chosen was “Candies and fat: why to avoid them? / Diet and light: what is the difference?”. Diet and light products were compared, and the health effects of a diet filled with sugar and fat were discussed.

At timepoint 6 (T6), the fifth meeting was held, approaching the topic “Making intelligent exchanges with fewer calories,” which used visual information to illustrate the calories of different dishes and their healthy substitutes.

During the sixth and last meeting, the importance of physical activity and water was addressed, with the participation of the Lian Gong group that works in the UBS. This group uses a Chinese technique of low-impact exercises, working the sensations of the body at the time of activity and reducing musculoskeletal pain and blood circulation, in addition to exploring the field of meditation and body awareness. At this timepoint (T7), the meeting was also attended by a physical educator.

At timepoints T2 to T7, author-developed questionnaires containing five multiple-choice questions related to the topics of the timepoint – based on the Food Guide for the Brazilian Population⁽¹⁸⁾ – were applied. The questionnaires were developed to assess patients' level of knowledge about the topic in each intervention, allowing the identification of successful points and ways to improve the educational intervention⁽¹⁷⁾. Thus, the questionnaire was applied at the beginning and end of each meeting in order to assess each participant's understanding of the issue addressed in nutrition education. At the end of each meeting, the questionnaires were corrected, and the number of right answers of each patient was scored.

At T1 and T7, weight, height, waist circumference and indicators of risk for cardiovascular disease were measured in addition to calculating BMI for defining the nutritional diagnosis following the standards listed by the WHO⁽¹⁹⁾ in order to assess changes in anthropometric indicators of patients.

The procedures developed in this study were approved by the Ethics Committee of the *Universidade Metodista de São Paulo* under the number 87206, being in accordance with the guidelines and regulations that rule research involving human beings.

The authors analyzed mean and standard deviation (SD) of the number of correct answers for the questions applied at the beginning and end of each meeting and anthropometric

indices found by the non-parametric Wilcoxon test for related samples, with the significance level of 5%.

RESULTS

During the study, the sample was initially composed by 63 patients; however, there were losses throughout the sessions, in which participants were absent. Thus, they did not receive the nutritional education and did not answer the

proposed questionnaires, resulting in a final sample of 15 participants.

Table I shows the social-demographic and nutritional characteristics of the group of nutritional education of the UBS of Diadema. The biggest part of the sample - 7 patients (46.7%) - was between 30 and 49 years old. Regarding education, only one patient presented a higher education level (6.7%). The majority of the sample consisted of obese people (86.7%).

Table I – Socio-demographic and nutritional characteristics of the nutrition education group in the UBS. Diadema, 2012

Variables	n	%
<i>Age</i>		
19 – 29 years old	3	20.0
30 – 49 years old	7	46.7
50 – 59 years old	5	33.3
<i>Sex</i>		
Female	15	100
Male	0	0
<i>Schooling</i>		
Elementary School	4	26.7
High School	10	66.6
Higher Education	1	6.7
<i>Nutritional Status</i>		
Overweight	2	13.3
Obesity class I	4	26.7
Obesity class II	5	33.3
Obesity class III	4	26.7

The mean and standard deviation of anthropometric variables before and after intervention in the UBS are described in Table II, through which it is possible to observe a significant reduction in anthropometric measures after the educational activities, with a mean reduction in body weight loss of 1.5 kg and 5.6 cm of mean reduction in waist circumference.

Figure 1 shows the evolution of the nutritional status of participants during the nutrition education program, revealing that of 86.7 % (n=13) of obese patients before the intervention, 6.7% (n=1) moved to an overweight condition at the end of the program and 6.7 % (n=1) developed class I obesity. However, class II obesity decreased by 13.3 % (n=2) and class III remained at 26.7% (n=4). Thus, there

Table II – Mean and Standard Deviation of the anthropometric variables before and after the intervention in the UBS. Diadema, 2012

Anthropometric Variables	Before		After		Value <i>p</i> *
	Mean	SD	Mean	SD	
Weight	95.4	± 23.5	93.9	±24.2	0.0125
BMI	37.4	± 7.0	36.9	± 7.1	0.0309
Waist Circumference	112.8	± 16.0	107.2	± 16.2	0.0007

BMI: Body Mass Index. SD: standard deviation

* Wilcoxon test for related samples

was a reduction of obesity rates before and after the nutritional intervention (86.7% versus 80%). The rest of the

patients showed a reduction in BMI, but remained at the same nutritional status.

Tabela III – Mean and Standard Deviation (SD) of correct answers of the questionnaire applied before and after de intervention in the UBS. Diadema, 2012.

Questionnaire	Before		After		Value p*
	Mean	SD	Mean	SD	
Meal frequency	3.9	± 1.6	4.8	± 0.6	0.0456
Encourage the consumption of fruits, legumes and vegetables	3.1	± 1.0	4.1	± 0.8	0.0011
Carbohydrates and proteins. What is the importance?	2.4	± 1.2	4.1	± 1.3	0.0006
Candies and fat / Diet e Light	2.6	± 1.2	4.3	± 0.8	0.0006
Making intelligent changes with fewer calories.	3.4	± 0.7	4.2	± 0.9	0.0113
The importance of physical activity and water.	3.6	± 0.6	4.4	± 0.7	0.0007

SD: standard deviation *Wilcoxon test for related samples.

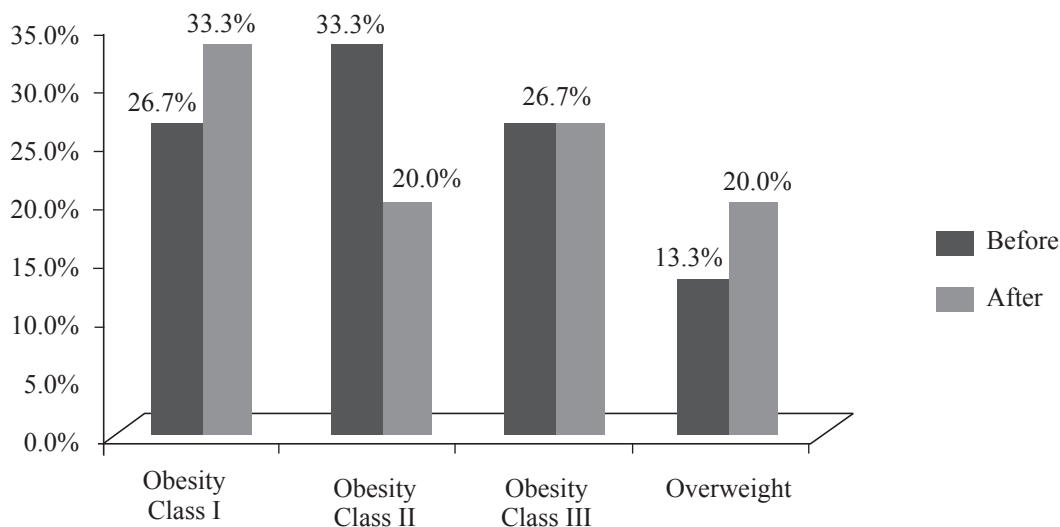


Figure 1- Nutritional status evolution of patients before and after the educative intervention. Diadema, 2012

Table III shows the mean and standard deviation of correct answers before and after the intervention in the UBS, showing a significant increase in the number of right answers in the questionnaires after the educational activities. The questionnaires showed a mean score of 1.15 points higher than those applied before the intervention (3.15 versus 4.30). The themes developed at T4 and T5 were those with the highest scores compared to those applied before; the variation was 1.7 points higher in both questionnaires (respectively 2.4 versus 4.1 and 2.6 versus 4.3).

DISCUSSION

This study demonstrates the positive influence of nutritional strategies on obesity fight, disease prevention and health promotion, helping patients to understand about healthy eating and, therefore, change their habits, resulting in improved nutritional status.

Nutrition education shows positive results in improvement of anthropometric indices and knowledge about healthy eating. Eating habits considered unhealthy

possibly undergo changes among participants who are willing to participate in the intervention⁽¹⁵⁾.

Although health promotion is perceived as an educational work, it is often more targeted at treating disease than preventing them effectively. Thus, it takes a set of strategies, respecting the culture of the participants, to adapt nutrition and food information for each group or region⁽²⁰⁾. The educational focus of the present study occurred through its methodology, with strategies that adapted the theoretical information and helped participants understand the issues addressed, characterizing food education and making patients become subjects of the action, and not just objects receiving information.

The insertion of the nutritionist in teams of the Family Health Program or outpatient teams brings the possibility of nutritional assistance to the Brazilian population. The nutritionist deals with the nutrition education through knowledge about food that can improve the quality of life⁽²¹⁾. The current study in UBS showed a positive influence of the performance of the nutritionist together with a multidisciplinary team, being essential to develop a nutrition education with the population, helping in the weight loss and changing of eating habits for a healthier life.

In primary care, the role of the nutritionist should be focused on health promotion, including community work with families, schools and churches, being in the social context of the target audience⁽²⁰⁾. Corroborating this study⁽²⁰⁾, the role of the nutritionist was developed in a UBS, adjusting actions to the target audience and working in groups through conversations and lectures, enabling greater approximation of the population through the discussion of understandable content and guidelines for healthy eating.

Nutrition education actions and the changing of eating habits, in addition to a moderate reduction in energy intake and the practice of physical activity, are the major forms of non-pharmacological treatment for excess weight, providing patients with the necessary knowledge for autonomy in decision, building attitudes, habits and healthy eating practices⁽³⁾. This enables them to identify barriers to self-control and develop mechanisms to overcome them, thus preventing relapses and acquiring skills to solve problems in search for results in the obesity treatment⁽⁶⁾.

It is possible to lose and maintain weight by eating all types of food, provided that the pre-set quantities are respected. Adherence to treatment is also necessary because excess weight - for being a chronic disease - requires long-term treatment and commitment by the patient who needs to change lifestyle in order to have clinical improvement⁽³⁾

Nutrition education held in groups is considered an effective strategy in health promotion, treatment of

overweight, metabolic syndrome, cardiovascular risk reduction, among other diseases. The association between caloric restriction and exercise can lead to weight loss from 5.0% to 10.0% in four to six months of follow-up⁽³⁾. By analyzing the present study, it is possible to observe that there was a 1.58% weight reduction in one month and a half of nutrition education. From this value, maintaining the same average, it is believed that the patient would reach the values mentioned by Bueno *et al*⁽³⁾; however, it is known that weight loss does not occur in a constant manner.

A study conducted with 200 women in the climacteric period and who presented an average class I obesity and very high risk for cardiovascular disease, with a median of 97 cm of waist circumference, showed an inappropriate nutrition in quantitative and qualitative terms, reinforcing the need for an education program to improve the standard of food consumption and anthropometric profile⁽²²⁾. Similar results were found in this study, where the mean BMI was in class II obesity and waist circumference showed high risk for cardiovascular disease.

The waist circumference found in this study, despite reducing 5.6cm (112.8 versus 107.2), constitutes a high risk for developing cardiovascular disease according to the WHO⁽¹⁹⁾. This risk is due to the metabolic actions and location of adipocytes and may result in insulin resistance. Weight loss is related to the reduction in waist circumference. Then, the loss of visceral fat is suggested⁽³⁾.

The nutritional intervention for weight loss should be realistic and of indefinite duration, assessing more than isolated weight loss and reduction of risks to health, as it is necessary to promote changes in behavior to have quality of life. Shortly after 40 weeks of intervention of a study, it was possible to analyze the effect of the program and the improvement in the anthropometric profile of participants⁽²³⁾. It was also possible to observe in this current study, even within a short time, that the nutrition education is a form of awareness and encouragement for changing of eating habits.

Regarding group strategies and corroborating other findings⁽²⁴⁾, women's participation is greater in studies where health promotion issues are discussed because they are the ones who use health services more often at different stages of life, especially in the prenatal, childbirth and childcare time.

In the referenced study⁽²⁴⁾, there was an increase in the average assessment score from 5.01 to 6.26, with a statistical difference of 1.25 points in issues related to general nutrition and other specific topics in the area. However, in this study, the questionnaires showed an average of right answers of 1.15 higher than those applied before the intervention (3.15 versus 4.30). Although there was no genre restriction,

there was a strong presence of women in the group (100%), which corroborates with the aforementioned study.

Despite the possible contribution to the nutritional information and anthropometric changes of individuals, the current study presented some limitations due to the short time available to carry out the nutritional interventions and the impossibility of applying an instrument to collect the usual intake of individuals. Thus, the analysis was limited to anthropometric data and results obtained from the questionnaires. Loss of patients should also be mentioned. Early abandonment of the treatment can occur due to the lack of a bond and possibly because the treatment does not meet the expectations of the patient. Patients may also abandon the treatment due to feelings of social isolation, aggression and low motivation or even lack of identification with the method to be developed, such as a group work in workshops. Thus, it is important to encourage the group respecting their lifestyle and financial conditions, developing activities with current themes and close to the daily lives of patients⁽²⁵⁾.

CONCLUSION

The nutrition education strategy developed in the UBS of the city of Diadema seems to have collaborated with the good development of the nutritional status of participants, leading to a decrease in anthropometric measures and increasing knowledge about healthy eating.

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