

## EFFECTIVENESS OF EDUCATIONAL PROGRAM FOR PREVENTION OF JUVENILE OBESITY

Efetividade de programa educativo para prevenção de obesidade juvenil

Eficacia del programa educativo para la prevención de la obesidad juvenil

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### ABSTRACT

**Objective:** To evaluate the effectiveness of the educational program aimed at preventing obesity among school adolescents, anchored in the trans-theoretical model of behavior change. **Method:** a quasi-experimental study of a single group, with a quantitative approach, carried out in a public high school in the city of Sobral-Ceará with 39 adolescents through the implementation of an educational program. **Results:** the educational program was effective in reducing anthropometric variables: weight (58.85 to 58.31,  $p=0.005$ ); abdominal circumference (73.5 to 72.65 cm,  $p=0.000$ ); hip circumference (91.65 to 90.75 cm,  $p=0.000$ ) and body mass index (22.89 to 22.67 kg/m<sup>2</sup>,  $p=0.012$ ). In M-1, most students were in the pre-contemplation stage (66.7%). Along the moments of collection, it was observed a discrete increase in the percentage of contemplation. **Conclusion:** educational interventions to prevent juvenile obesity are valid tools to be used by health professionals together with the school, favoring health promotion and empowerment of adolescents.

**Descriptors:** Obesity, Adolescent, Health education, Quality of life, Nursing.

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## RESUMO

**Objetivo:** Avaliar efetividade do programa educativo voltado para prevenção da obesidade entre adolescentes escolares, ancorado no modelo transteórico de mudança de comportamento. **Método:** estudo quantitativo do tipo quase-experimental de grupo único realizado em escola pública de ensino médio, na cidade de Sobral-Ceará com 39 adolescentes por meio da implementação de programa educativo. **Resultados:** o programa educativo foi efetivo na redução de variáveis antropométricas: peso (58,85 para 58,31,  $p=0,005$ ); circunferência abdominal (73,5 para 72,65 cm,  $p=0,000$ ); circunferência do quadril (91,65 para 90,75 cm,  $p=0,000$ ) e índice de massa corporal (22,89 para 22,67 kg/m<sup>2</sup>,  $p=0,012$ ). No M-1, a maioria dos estudantes estavam no estágio de pré-contemplação (66,7%). Ao longo dos momentos de coleta, observou-se discreto aumento no percentual de contemplação. **Conclusão:** intervenções educativas para prevenção da obesidade juvenil são ferramentas válidas para serem utilizadas por profissionais da saúde em conjunto com a escola, favorecendo a promoção da saúde e empoderamento de adolescentes.

**Descritores:** Obesidade, Adolescente, Educação em saúde, Qualidade de vida, Enfermagem.

## RESUMEN

**Objetivo:** Evaluar la efectividad del programa educativo dirigido a prevenir la obesidad entre los adolescentes escolares, anclado en el modelo transteórico de cambio de conducta. **Método:** estudio cuasi-experimental de un solo grupo, con un enfoque cuantitativo, realizado en una escuela secundaria pública de la ciudad de Sobral-Ceará con 39 adolescentes mediante la aplicación de un programa educativo. **Resultados:** el programa educativo fue efectivo en la reducción de las variables antropométricas: peso (58,85 a 58,31,  $p=0,005$ ); circunferencia abdominal (73,5 a 72,65 cm,  $p=0,000$ ); circunferencia de la cadera (91,65 a 90,75 cm,  $p=0,000$ ) e índice de masa corporal (22,89 a 22,67 kg/m<sup>2</sup>,  $p=0,012$ ). En M-1, la mayoría de los estudiantes estaban en la etapa de pre-contemplación (66,7%). A lo largo de los momentos de recolección se observó un discreto aumento del porcentaje de contemplación. **Conclusión:** las intervenciones educativas para prevenir la obesidad juvenil son herramientas válidas para ser utilizadas por los profesionales de la salud junto con la escuela, favoreciendo la promoción de la salud y el empoderamiento de los adolescentes.

**Descriptorios:** Obesidad, Adolescente, Educación en salud, Calidad de vida, Enfermería.

## INTRODUCTION

Obesity is a global public health problem that is increasingly affecting children and adolescents, with repercussions on health status and quality of life in adulthood.<sup>1-2</sup> The presence of obesity favors the development of comorbidities such as dyslipidemia, diabetes and hypertension, in addition to early mortality.<sup>3</sup>

In recent decades, childhood obesity has become a pandemic and its prevalence has increased significantly. In 2016, the World Health Organization indicated that it estimated 340 million cases of overweight or obesity in children and adolescents between 5 and 19 years old<sup>4</sup>

For the modification of this scenario, it is necessary the involvement of health professionals from educational strategies that aim at the orientation of healthy habits and the promotion of adolescent health.<sup>5</sup> Thus, the presence of the nurse in the Programa Saúde na Escola (PSE) enables

these actions to be implemented routinely, because the nursing professional is based on care, especially in the dimensions of health promotion.<sup>6</sup>

Nurses can develop educational programs in schools based on theoretical models. An educational program can be defined as a space that allows organizing and detailing the pedagogical process that will contribute to the training of individuals. These continuous actions can favor the identification of groups of risks for the development of comorbidities, besides allowing space for dialogue and construction of knowledge on themes of interest to adolescents.<sup>7</sup>

One model that can be implemented in youth obesity prevention programs is the trans-theoretical model (MTT) of Prochaska and DiClemente, which has been used to evaluate behaviors related to physical activity and eating and to propose strategies needed to achieve lifestyle change.<sup>8</sup> One of the important implications of this model is how the individual feels about a possible change in behavior and how to motivate him or her to change the lifestyle that remains in the long term.<sup>9</sup>

Despite the number of articles on the proposed theme, it is noticeable that most studies address the problem of juvenile obesity directed at triggering factors from individual strategies.<sup>10-12</sup>

In addition, there are few records in the scientific literature on the development of actions to prevent obesity that use theoretical models in conducting studies. From this perspective, the question has arisen: how effective is the educational program for the prevention of obesity in school adolescents based on the trans-theoretical model?

Thus, the objective of this study was to evaluate the effectiveness of the educational program aimed at the prevention of obesity among school adolescents, anchored in the trans-theoretical model of behavior change.

## METHODS

It is a quantitative study of the quasi-experimental type of single group carried out in a high school, in the city of Sobral, Ceará, during the period from April to August 2019.

The population of the study was composed of adolescents, of both sexes, attending the first year of high school of the selected public school. The inclusion criteria were: adolescents regularly enrolled in school and having time available to participate in the educational program. The exclusion criteria were: presence of a temporary or permanent physical disability that makes it impossible to perform physical activities; being pregnant and being under the effect of psychoactive substances. Thus, the sample was of the non-probabilistic type and for convenience, being composed of 39 adolescents.

The educational program was based on the trans-theoretical model from the orientation of healthy eating and physical activity practice, which was implemented

during 14 weeks, with individual and group activities. The program included physical exercise, anthropometric measurement, nutritional guidance and health education on healthy eating, food composition, self-esteem and well-being, the importance of physical activity and its different modalities.

The physical exercises were performed once a week, during 60 minutes, structured in three moments: initial warm-up and stretching (15 minutes), localized activity (35 minutes) and final stretching (10 minutes).

Health education and nutritional orientation also took place weekly for 60 minutes. These moments were ministered by a nurse, a nutrition scholar and a physical education scholar who carried out specific orientations related to the area of activity of each professional category.

For data collection, a structured instrument was used, divided in two parts. The first one contained socio-demographic data (gender, age, color, marital status) and clinical data (self-evaluation of health, cigarette consumption, beverages and other drugs). It also contained anthropometric variables such as weight, height, Body Mass Index (BMI), Abdominal Circumference (AC), Hip Circumference (HC) and Waist to Hip Ratio (WHR).

The second part contained the questionnaire based on the trans-theoretical model for evaluating the stages of change in eating behavior and physical activity. The behavior change stage is determined according to the average score obtained, being the values between 1 to 1.4 pre-contemplation stage; between 1.5 to 2.4 contemplation; between 2.5 to 3.4 preparation; between 3.5 to 4.4 action; and between 4.5 to 5 maintenance.<sup>13</sup> To verify the global behavior change readiness stage, the general average of the scores obtained in each of the domains was calculated.

The data were categorized and tabulated in Excel and then exported to the Statistical Package for the Social Sciences (SPSS) version 24.0, being the data presented in absolute and relative frequencies. For the descriptive statistics, we used the exploratory analysis of the data (frequency distribution, percentages, mean, minimum and maximum analysis and data dispersion with standard deviation), through the Kolmogorov-Smirnov test. The Friedman test was used to compare anthropometric variables and behavioral change stages in the four collection moments.

The research project was submitted to the ethics committee of the Universidade Estadual Vale do Acaraú, and obtained a favorable opinion (number 3,313,747) on May 8, 2019.

## RESULTS

There was a predominance of females (n=38; 97.4%) with a mean age of 16 years. Most were single (n=38; 97.4%), brown (n=26; 66.7%) and from Sobral (n=37; 94.9%). Regarding family composition, the majority was composed

of three (25.6%) or four (25.6%) people. It was observed that 10 (25.6%) family caregivers had attended incomplete elementary school. **Table 1** presents the socioeconomic profile of the students.

**Table 1** - Socioeconomic profile of adolescents participating in educational intervention on youth obesity. Sobral, CE, Brazil, 2019

Variables	n	%
<b>Gender</b>		
Female	38	97,4
Male	01	2,6
<b>Age(average)</b>	16,17	
<b>Civil Status</b>		
Single	38	97,4
Stable Union	01	2,6
<b>Color</b>		
White	07	17,9
Brown	26	66,7
Black	06	15,4
<b>Educational Instruction for the Family Responsible</b>		
Illiterate	01	2,6
Complete Elementary School	08	20,5
Incomplete elementary school	10	25,6
Complete High School	09	23,1
Incomplete High School	09	23,1
Incomplete higher education	02	5,1

The predominant health perception in self-evaluation was good (n=19; 48.7%) and 27 (69.2%) stated to get sick “sometimes”. Regarding smoking and alcoholism, 35 (89.7%) students never smoked and 22 (56.4%) did not consume alcoholic beverages. In **Table 2**, it is possible to visualize the data referring to the adolescents’ health practice.

**Table 2** - Adolescents’ perception of health practices, sickness and consumption of cigarettes and beverages. Sobral, EC, Brazil, 2019

Variables	n	%
<b>Self-evaluation of health</b>		
Bad	01	2,6
Regular	14	35,9
Good	19	48,7
Excellent	05	12,8
<b>Frequency that gets sick</b>		
A few times	03	7,7
Sometimes	27	69,2
Many times	07	17,9
Almost always	02	5,1
<b>Cigarette consumption</b>		
Do not smoke	35	89,7
Smokes sometimes	03	7,7
Smokes frequently	01	2,6
<b>Beverage consumption</b>		
Does not drink	22	56,4
Drink sometimes	16	41
Drink often	01	5,6

**Table 3** presents the clinical indicators of obesity. Among the M1-M4, there was statistically significant variation among means of variables such as weight (58.85 to 58.31, p=0.005); abdominal circumference (73.5 to 72.65 cm, p=0.000); hip circumference (91.65 to 90.75 cm, p=0.000) and BMI (22.89 to 22.67 kg/m<sup>2</sup>, p=0.012). The waist-to-hip ratio (WHR) remained at 0.80 at all times of collection, with no statistically significant difference (p=0.294).

**Table 3** - Clinical indicators of obesity in adolescents before and after educational intervention. Sobral, EC, Brazil, 2019

Variables	M1	M2	M3	M4	p-value†
Weight	58,85 (±11,75)	58,58 (11,54)	58,49 (11,11)	58,31 (10,98)	0,005
AC	73,5 (8,84)	73,0 (8,52)	72,65 (8,32)	72,65 (8,32)	0,000
HC	91,65 (9,64)	91,24 (8,99)	90,75 (8,87)	90,75 (8,87)	0,000
WHR	0,80 (0,04)	0,80 (0,03)	0,80 (0,04)	0,80 (0,04)	0,294
BMI	22,89 (4,19)	22,70 (4,12)	23,84 (8,76)	22,67 (3,83)	0,012

† Friedman Test.  
AC = abdominal circumference; HC = hip circumference; WHR = waist-hip ratio; BMI = Body Mass Index.

Regarding the classification of behavior change stages, it was verified that in M-1, most students were in the pre-contemplation stage (66.7%). Throughout the M-1 to M-4 collection moments, a slight increase in the contemplation percentage was observed. In **Table 4**, it is possible to visualize the data of the behavior stages of adolescents during the four moments of intervention.

**Table 4** - Distribution of the stages of behavior change in adolescents during the educational intervention. Sobral, EC, Brazil, 2019

Stages of Change	Moments of Intervention								p-value†
	1st Moment		2nd Moment		3rd Moment		4th Moment		
	n	%	n	%	n	%	n	%	
Pre-contemplation	26	66,7	27	69,2	25	64,1	25	64,1	
Contemplation	11	28,2	09	23,1	12	30,8	12	30,8	
Preparation	02	5,1	03	7,7	02	5,1	02	5,1	
Action	-	-	-	-	-	-	-	-	
Maintenance	-	-	-	-	-	-	-	-	
Contemplation	-	-	-	-	-	-	-	-	
<b>Average</b>	1,36 ± 0,46		1,37 ± 0,52		1,40 ± 0,51		1,40 ± 0,51		0,908

† Friedman Test.

## DISCUSSION

The results of this study are in accordance with the literature in demonstrating the beneficial effects of educational interventions to combat youth obesity, which favor weight reduction and improvement of habits. The profile of the adolescents who participated in the research was composed, in its majority, of women, single, brown and with the responsible family educated until the incomplete elementary school. These results differ in the literature in which the sex varies between males and females according to each study, with no pattern of prevalence.<sup>15-16</sup>

In São Paulo, a study was conducted to evaluate the influence of a multidisciplinary program on the autonomic modulation of overweight and obese children and adolescents. The experimental protocol included initial evaluation, the multidisciplinary program and final evaluation during a three-month follow-up. The sample consisted of 38 children and adolescents, both sexes, aged between six and 17 years. The results showed a significant change in obesity indicators, there was a change in relation to the classification of overweight or obesity by BMI. At the beginning of the study, four volunteers (26.67%) were considered overweight and 11 (73.33%) obese. At the end of the study, there was a change of three volunteers with obesity grade 1 to overweight. The average BMI before the intervention was 26.37 kg/m<sup>2</sup> and after the intervention it increased to 24.<sup>13,14</sup>

Regarding the perception of health, adolescents consider themselves to be in good health despite being routinely ill. This reflects the adolescents' restricted conception of what health represents: not being sick, showing difficulty in conceptualizing health and quality of life.<sup>17</sup> In addition, the occurrence of illness may be due to the lack of demand from this public for health services, due to organizational, social and cultural barriers still present in the Brazilian population and the unique health system.<sup>18</sup>

Regarding the consumption of alcohol, a good part of the teenagers referred to consume alcoholic beverages. The ingestion of alcohol is related to the development of chronic non transmissible diseases (DCNT) in adolescents.<sup>19</sup> Another point is the fact that the consumption of alcohol can lead to risky sexual behavior and accidents due to external causes.<sup>20</sup>

With this, the consumption of alcohol among adolescents contributes to obesity due to alterations in appetite and weight gain provided by the excessive consumption of this type of calorie. Another problem is that the consumption, many times, is associated to group activities that stimulate even more the practice.<sup>21</sup>

The reduction of anthropometric indicators reinforces the applicability of the intervention (physical activity and nutritional orientation). The literature points out that interventions related to the practice of physical activity and nutritional orientation are able to promote changes in measures, especially those related to body mass.<sup>22</sup>

In relation to physical activity, the studied public presented similarity of behavior when adopting the practice of activities such as: walks, dances, weight training class, collective games, besides helping in the accomplishment of domestic activities and going to school walking. It can be stated that adolescents who engage in physical activities are more likely to become active adults, and they should be encouraged to seek routine scheduled to perform these activities.

The practice of physical activities offers several benefits to the adolescent's health, whether physical, psychosocial or behavioral, such as improved quality of sleep, adequate eating habits and reduced sedentary behavior. This practice is manifested in different contexts of the daily life of young people, characterized as the domestic, occupational/school, displacement and leisure domains.<sup>23</sup>

Faced with this problem of obesity in adolescents and distance from health services, there is a need for educational interventions that guide and assist this public in the control of this chronic disease. For this purpose, long-term intervention programs are more effective.

A quasi-experimental longitudinal and quantitative study conducted a 12-week program of interdisciplinary interventions (physical educators, physical therapists, nutrition, and psychology) and resulted in improved body image in relation to the perception of the physical state and reduced fear presented by adolescents.<sup>24</sup>

In the present study, according to the distribution of individuals, it was identified that they did not reach the stages of action towards contemplation. An inverse behavior, to that expected by the study, with evidence that there is no intention in most of the adolescents changing to healthy habits. There were also no significant changes between the stages in relation to the four moments of intervention, corresponding to 14 weeks. Regardless of these results, at the end of the study period, the evaluated public showed a reduction in the variables: weight, BMI, waist and hip.

A study conducted with 90 obese women in Iran, showed that to occur effective changes in BMI it is necessary that individuals perceive their health condition and are in a stage of preparation and/or action. It also pointed out the importance of giving support to these subjects through systematic and long-term interventions.<sup>25</sup> These data corroborate the findings of the study, since part of the students were in the stages of pre-contemplation and contemplation, and the program contemplated only a certain period, contributing to the lack of progress in the stages of behavior change.

According to a study conducted in Santa Catarina (2016), it was identified that adolescents between 16 and 18 years of age were in early stages of behavior change, while adolescents between 13 and 15 had more advanced stages of readiness for physical activity and healthy eating.<sup>26</sup> In this study, it was possible to identify a profile of adolescents, single with an average age of 16 years. In this perspective, it was found that BPS are less advanced with the advancement in school grades, i.e., older adolescents were in less advanced stages compared to younger adolescents.<sup>27</sup>

At the beginning of the program, the pre-contemplation stage was similar to another study that, when carrying out the multidisciplinary intervention, showed that at the beginning 70% of the public was in this stage, evolving into action after six months, which it was not possible to evaluate in the face of time and meeting limitations. With this, it is observed that the trans-theoretical model has progression of its stages, but when relating them to obese adolescents, a longer intervention is necessary.<sup>28</sup>

Evaluating readiness for behavior change allows us to distinguish individuals who are willing to change their lifestyle from those who do not have well-defined plans for it. This avoids negative evaluation of the intervention in cases where unsatisfactory results may be more related to the individual not wanting to change his or her habits.<sup>22</sup>

The results presented in this study refer to the small number of participants, which makes it impossible to generalize its effects regarding behavior change when compared to research involving a larger number of individuals.

## CONCLUSIONS

It was possible to understand that, in order to occur significant changes, with impact on anthropometric components, there is a need to offer actions that aim to promote the regular practice of physical exercise and balanced nutrition. In this study, it is important to highlight the multiprofessional support that was important for the changes observed in anthropometric data.

The use of a theoretical model also allows health professionals to actively contribute to the educational program with regular and playful activities. It is also valid to emphasize that the nurse, active in the Health in Schools Program, will be able to contribute in the improvement of the quality of the assistance provided, providing the empowerment of these individuals in the search for quality of life and well-being.

As limitations of this study, the small number of participants stands out, making it impossible to generalize the results, as well as the time made available by the school for educational activities due to the school calendar. It is suggested that nurses carry out research on the subject in order to obtain greater involvement of this professional in the care and treatment of obesity.

It is also pointed out the need of other studies that aim to complement the educational intervention and allow other researchers a better understanding of the state of readiness for action in changing behavior with overweight and obese adolescents so that there is more control related to the intervention and encourage adherence to interventions that aim to prevent and treat obesity.

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