KNOWLEDGE ABOUT OVERWEIGHT AND OBESITY, AND EFFECTS OF EDUCATIONAL INTERVENTIONS IN ADOLESCENTS AGED 15-17 YEARS IN THE SUBURBAN AREA IN HANOI, VIETNAM

Duong Thi Anh Dao¹,#, Nhat Le Bui²,#, Le Thi Duyen¹, Dinh-Toi Chu²,*

Abstract. Introduction: This study aimed to access the general knowledge of adolescents about nutrition and obesity, as well as evaluate the effectiveness of educational intervention in changing their knowledge in the suburban area in Hanoi, Vietnam. Methods: An interventional study was conducted from Nov 2019 to Jan 2020 on 343 students aged 15-17 years at a high school in Hanoi. Participants were randomly selected and divided into control and intervention groups. The intervention group was asked to participate in a nutritional course. All students were asked to fill in a self-administered questionnaire three times: before, 1 week, and 1 month after intervention. Results: Before intervention, both groups had intermediate understandings about nutrition and obesity, with a total score of 54.72 (± 8.75)/100 and 54.71 (± 8.34)/100 on average, respectively, and no statistical difference. After intervention, the total score of the questionnaire was significantly increased to 88.7 (± 6.29, p < 0.001) at 1 week and 86.71 (± 7.31, p < 0.001) at 1 month in the intervention group while this figure for the control group was witnessed a slight change. Conclusion: These findings reflected the tremendous impact of educational intervention on improving nutrition and obesity-related understanding among adolescents and promoted the application of this training on a large scale.

Keywords: Adolescents, educational intervention, knowledge, overweight and obesity, Vietnam.

1. INTRODUCTION

Adolescence, especially 15-17 years old, is a nutritionally vulnerable period of life with rapid growth in social, psychological as well as physical areas, which can be slower when entering adulthood (Sharif Ishak et al., 2020). With their higher demand for growth, nutrition plays a vital and long-term part in developing body image and sustaining lifelong health. Thus concerns about the improper dietary and lifestyle and risk-taking behaviors of adolescents are increasing.

In Vietnam, thanks to the rapid development of socioeconomics, recent statistics from the Ministry of Health reported that the rate of underweight among school-age children was down to 14.8 %. However, the rate of overweight and obesity increased from 8.5 % in 2010 to 19.0 % in 2020. The rate of overweight and obesity in urban and rural

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areas was 26.8 % and 18.3 %, respectively. This trend is associated with the rising prevalence of type 2 diabetes, dyslipidemia, cardiovascular diseases, and other metabolic disorders, which have a detrimental impact on children and adolescents’ long-term health.

Previous studies primarily focused on evaluating the prevalence and risk factors of overweight and obesity (Chu et al., 2021). Researches about Vietnamese students’ knowledge about nutrition is limited and only conducted in the big city. Therefore, we carried out this study to access nutrition-related knowledge among students in a suburban area of Vietnam. The remaining purpose is to apply and evaluate the effectiveness of an educational intervention in raising students’ awareness against overweight and obesity.

2. METHODS

2.1. Study group

An interventional study was conducted from November 2019 to April 2020 at Hong Thai high school, located in a suburb near Hanoi called Dan Phuong district, where the proportion of overweight and obesity in adolescents was nearly 9 % (Chu et al., 2021).

The formula for calculating sample size was based on the mean correct rate of each nutritional knowledge item, followed by a previous study of Wang et al. (2015). The formula for each group is:

\[ n = \frac{(Z_{2\alpha}\sqrt{2pq} + Z_{2\beta}\sqrt{p_1q_1 + p_2q_2})^2}{(p_1 - p_2)^2} \]

Where \( \alpha = 0.05 \) as the significant level and \( \beta = 0.1 \) as the possibility of making type II error, thus, \( Z_{2\alpha} = 1.96 \), \( Z_{2\beta} = 1.28 \), \( p_1 = 0.6 \), \( p_2 = 0.8 \), \( p = 0.65 \), \( q = 1 - p \) respectively. Each group required at least 110 students as subjects. To avoid dropouts and invalid answers, a total of 343 students were enrolled by randomized sampling method and were randomly divided into the interventional group (171 students) and control group (172 students). Students with chronic diseases were not involved in this study.

2.2. Measurements

Students in the intervention group were asked to participate in a short-term nutritional course held by nutritional doctors and experts from our research team as the educational intervention. Besides educational intervention, students in both intervention and control groups were required to complete the same self-administered questionnaire three times: before the intervention course, 1 week, and 1 month after intervention. The questionnaire was previously designed, as well as determined the validity and reliability by experts in the National Institute of Nutrition, Vietnam. The questionnaire is separated into 2 parts. The objective of part 1 is to collect socio-demographic information and their body mass index (BMI). Students’ nutritional status was determined based on WHO classification for children aged 5-19 years old. Part 2 consisted of 25 multi-choice items on true/false scale with a total of 100 points, covered general information about nutrition and obesity.
2.3. Statistical analysis

SPSS v.20.0 (SPSS Inc., Chicago, Illinois), as well as GraphPad Prism v.8.0, were used to perform the analysis. P < 0.05 was considered a statistically significant difference.

3. RESULTS AND DISCUSSION

3.1. Characteristics of studied subjects

This study was conducted on 343 students aged 15-17 years in the suburbs of Hanoi, Vietnam, to evaluate the general knowledge as well as evaluate the effect of educational intervention in changing students’ awareness about nutrition, overweight, and obesity. There was no significant difference in social-demographic characteristics such as gender, height, weight BMI and the proportion of obesity and underweight between the intervention and control groups (Table 1).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Control group (n=172)</th>
<th>Intervention group (n=171)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>16 (15-17)</td>
<td>16 (15-17)</td>
<td>0.63</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>65 (37.8 %)</td>
<td>69 (40.4 %)</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>107 (62.2 %)</td>
<td>102 (59.6 %)</td>
<td></td>
</tr>
<tr>
<td>Height (cm)</td>
<td>Mean (± SD)</td>
<td>161.35 (± 8.10)</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Median (Min-Max)</td>
<td>160 (145-184)</td>
<td></td>
</tr>
<tr>
<td>Weight (cm)</td>
<td>Mean (± SD)</td>
<td>50.64 (± 9.84)</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>Median (Min-Max)</td>
<td>48 (37-90)</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>Mean (± SD)</td>
<td>19.37 (± 2.80)</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>Median (Min-Max)</td>
<td>18.9 (11.8-30.4)</td>
<td></td>
</tr>
<tr>
<td>Nutritional</td>
<td>Underweight</td>
<td>17 (9.9 %)</td>
<td>0.19</td>
</tr>
<tr>
<td>status</td>
<td>Normal</td>
<td>142 (82.6 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overweight &amp; Obese</td>
<td>13 (7.6 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18 (10.5 %)</td>
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</tbody>
</table>

3.2. Knowledge about overweight and obesity

The general knowledge of participants about nutrition as well as overweight and obesity could be evaluated through the total score of questionnaires at the time before intervention (Table 2). In this pre-intervention period, both the control and intervention groups had an approximately equal knowledge at an average level, 54.72 (± 8.75)/100 and 54.71 (± 8.34)/10, respectively, with no statistical difference.

Our findings revealed that students' understanding was at an intermediate level, reflecting about 50/100 points of the questionnaire on average. Students were shown to have a solid understanding of risk factors as well as the vital role of physical activities and food in preventing obesity, with more than 80 % of answers being correct. That information is such basic information that students can easily access via mass media. However, due to difficulties in socioeconomic conditions and facilities in suburban areas,
the figure for correct answers was lower than 30% in more in-depth questions such as the classification of the nutritional status based on BMI, the concept of a proper diet or even the consequences of overweight and obesity. The shortage of awareness toward health risks related to obesity among students may lead to their neglect in obese prevention (Lawrence, Hazlett and Hightower, 2010).

**Table 2.** Evaluation results of knowledge about overweight and obesity before and after intervention (comparing control group and intervention group)

<table>
<thead>
<tr>
<th></th>
<th>Control group (N=172)</th>
<th>Intervention group (N=171)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before intervention</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (± SD)</td>
<td>54.72 (± 8.75)</td>
<td>54.71 (± 8.34)</td>
<td>0.84</td>
</tr>
<tr>
<td><strong>1 week after intervention</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (± SD)</td>
<td>61.05 (± 8.79)</td>
<td>88.7 (± 6.29)</td>
<td>&lt; 0.001**</td>
</tr>
<tr>
<td><strong>1 month after intervention</strong></td>
<td></td>
<td></td>
<td>&lt; 0.001**</td>
</tr>
<tr>
<td>Mean (± SD)</td>
<td>64.30 (± 8.04)</td>
<td>86.71 (± 7.31)</td>
<td></td>
</tr>
</tbody>
</table>

3.3. The effects of educational intervention on the knowledge about overweight and obesity

After 1 week of intervention, in the intervention group, the knowledge about overweight and obesity was significantly improved, reflected in the rapid increase in the number of correct answers compared to before the intervention (from 54.71 (± 8.34) to 88.7 (± 6.29), p < 0.001) (Table 2). At the time of 1 month after educational intervention, there was a slight decline in the total score of students in the intervention group compared to their score at 1 week after intervention. Meanwhile, the score of students in the control group was increased from 61.05 (± 8.79) at 1 week after the intervention to 64.30 (± 8.04) at 1 month after intervention (p < 0.001). However, the score of students in the intervention group was remarkably higher than that in the control group both times after taking the nutritional course (Figure 1).

With the support of nutritional courses, students in the intervention group have remarkably increased the percentage of correct answers as well as a total score of the questionnaire compared to those in the control group, which reflected the effectiveness of educational intervention in raising students’ awareness about nutrition, obesity and healthy dietary. This result was consistent with a similar study by Wang et al. (2015) in China. The authors also confirmed the efficacy of education programs about nutrition in promoting positive change on not only knowledge but also attitudes, behaviors and, health outcome of adolescence (Wang et al., 2015). Nevertheless, Wadolowska et al. (2019) also proved the effectiveness of education programs in reducing unhealthy habits and the risk of obesity as well as improving nutrition knowledge via a 9-month follow-up research in 464 Polish students (Wadolowska et al., 2019). Thus, although no significant difference in BMI or weight was observed in this study due to the shorter time of research, we had scientific evidence to expect a positive change in behaviors and health outcomes of students thanks to our educational intervention.
3.4. The relationship between the nutritional status to the knowledge about overweight and obesity or educational intervention

The level of knowledge about nutrition as well as overweight and obesity in overweight and obese students was significantly lower than those in underweight and normal weight students in the control group before intervention with $p < 0.05$. However, there was no significant statistical difference in students' knowledge in the different nutritional status groups at the time after intervention in both the control and intervention groups.

This study had several limitations. Firstly, due to human and financial constraints, we were only able to conduct this study at one high school in the suburban area, decreasing our results' representation. Secondly, our research time was short, and we could not collect enough data to evaluate the practical impact of educational intervention on the change of students’ eating patterns or exercise habits. Finally, the questionnaire was self-administrated, in which bias is inevitable. Since the role of adolescents’ diet and lifestyle are undebatable (Woods and Nies, 2020), we intend to apply the educational intervention on a large scale with the participation of family members and teachers in our future study.

**Figure 1.** Comparing the knowledge about overweight and obesity between the control group and intervention group at 3 times: before intervention, 1 week and 1 month after intervention
A longer follow-up is also needed to investigate the change in students’ habits and health outcomes after the intervention.

4. CONCLUSION

The shortage of knowledge about the classification of nutritional status and consequences of obesity may lead to an increasing prevalence of obesity among students. In this study, we found that educational intervention is an effective way to raise students’ awareness of nutritional problems. Further studies need conducting to evaluate its long-term effect on changing students’ lifestyles and health outcomes.

REFERENCES


KIẾN THỨC VỀ THỪA CÂN BÉO PHÌ VÀ TÁC ĐỘNG CỦA CAN THIỆP GIÁO DỤC LÊN ĐỐI TƯỢNG TRẺ VỊ THÀNH NIÊN ĐỐ TƯỢNG 15-17 TẠI NGOẠI THÀNH HÀ NỘI, VIỆT NAM

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Abstract. Nghiên cứu này nhằm đánh giá thực trạng cùng như hiệu quả của can thiệp giáo dục trong việc thay đổi kiến thức của trẻ vị thành niên ở khu vực ngoại thành Hà Nội về dinh dưỡng và béo phì. Phương pháp: Nghiên cứu can thiệp được thực hiện từ tháng 11/2019 đến tháng 1/2020 trên 343 học sinh từ 15-17 tuổi tại một trường THPT. Đối tượng tham gia được lựa chọn ngẫu nhiên và chia thành nhóm đối chứng và nhóm can thiệp. Nhóm can thiệp được yêu cầu tham gia một khóa học về dinh dưỡng. Tất cả học sinh được yêu cầu hoàn thành cùng một bảng câu hỏi tại 3 thời điểm: trước can thiệp, 1 tuần và 1 tháng sau khi can thiệp. Kết quả: Trước can thiệp, cả hai nhóm đều có mức độ hiểu biết về dinh dưỡng và béo phì ở mức trung bình, với tổng điểm trung bình lần lượt là 54,72 (± 8,75) và 54,71 (± 8,34), không có sự khác biệt có ý nghĩa thống kê. Sau khóa học dinh dưỡng, tổng điểm ở nhóm can thiệp đã tăng lên đáng kể lên 88,7 (± 6,29, p <0,001) ở thời điểm sau 1 tuần và 86,71 (± 7,31, p <0,001) ở thời điểm sau 1 tháng, trong khi tổng điểm này chỉ thay đổi nhỏ ở nhóm chứng. Kết luận: Kết quả của nghiên cứu phản ánh tác động không nhỏ của can thiệp giáo dục đối với việc nâng cao hiểu biết liên quan đến dinh dưỡng và béo phì ở trẻ vị thành niên và làm mạnh chứng thức đẩy việc áp dụng chương trình đào tạo này trên quy mô lớn.

Keywords: Kiến thức, thừa cân béo phì, can thiệp giáo dục, trẻ vị thành niên, Việt Nam.

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