Development of a sport-specific curriculum addressing self-efficacy to optimize carbohydrate and calorie intake among male and female high school cross-country runners

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Abstract

Prior research documents that endurance runners largely consume below-recommended levels of carbohydrate. This may contribute to runners’ increased risk of developing low energy availability, which may disrupt growth, gonadal, thyroid, and adrenal hormone levels and increase risk of sustaining a bone stress injury.

The current project aims to develop a 6-week nutrition education curriculum, for administration by a Sports Dietitian, that promotes an adequate intake of nutrient-dense, carbohydrate foods for optimizing energy availability among male and female high school cross-country runners. To facilitate behavior modifications necessary to increase carbohydrate intake, the curriculum also addressed barriers to change, motivational factors, and self-efficacy. Each 36-45 minute lesson emphasized a specific topic pertaining to nutrition dense carbohydrates.

This curriculum may promote adequate intake of carbohydrate and calories among this population representing increased risk.

Introduction

• Adequate energy is required during adolescence or the time-period between puberty and adulthood; to meet both the growth and developmental needs of the individual, as well as the substrate demands associated with general physical activity, training and competition.1

• Low energy availability is the amount of energy available for the body’s functions after the energy expended for training is deducted from the energy consumed from food.2

• Adolescent athletes fail to match their energy intake to expenditure on an acute and chronic basis due to (1) lack of time due to school and exercise demands, (2) lack of knowledge as to the importance of replenishing the body’s, and (3) lack of energy from exhaustive physical activity.3

• Energy deficit is reported to occur more frequently in athletes participating in certain sports such as aesthetic sports, endurance sports, and sports with weight classes.4

Table 1. Expert Review Form, Averages and Standard Deviations for All Four Panels

<table>
<thead>
<tr>
<th>Curriculum Review Statements</th>
<th>Descriptive (1-5)</th>
<th>Average (1-5)</th>
<th>Standard Deviation (0.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The objectives of the curriculum were clear</td>
<td>3.75</td>
<td>1.26</td>
<td>0.53</td>
</tr>
<tr>
<td>The power point presentation for each lesson would stimulate athlete learning</td>
<td>4.5</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>The small group activities enhance each lesson and are relevant to the weekly topic</td>
<td>4.5</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>The weekly “assignment” provides athletes an opportunity to apply each lesson topic to their specific dietary behaviors</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>The language and format of the curriculum was appropriate for adolescent athletes</td>
<td>4.5</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>The instructions are easy for adolescent athletes to follow</td>
<td>4.5</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>This curriculum is visually appealing for adolescent athletes</td>
<td>4.75</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>The layout is appropriate for adolescent athletes</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>I feel that the activities and assignments are appealing to an adolescent athlete population</td>
<td>4.5</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>The content was relevant to an adolescent athlete</td>
<td>4.75</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>I am confident an adolescent athlete can complete the materials</td>
<td>4.25</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Overall, I am satisfied with the content</td>
<td>4.5</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>I would recommend the use of this curriculum?</td>
<td>4.5</td>
<td>0.38</td>
<td></td>
</tr>
</tbody>
</table>

Methods

PROJECT OBJECTIVES:
1. Conduct a review of recent literature to evaluate adolescent runners’ daily carbohydrate and calorie needs, levels of intake, factors contributing to intake, consequences of undernutrition, nutrition education programs using self-efficacy and theory based interventions
2. Conduct a review of prior nutrition intervention programs and outcomes related to behaviour change and nutrient intake
3. Develop a 6-part, sport-specific nutrition curriculum targeted towards high school cross-country runners that addresses nutrition knowledge, barriers to change, motivational factors, and self-efficacy
4. Develop engaging activities, for participants to complete during each session and between sessions, that encourage active involvement and application of concepts to real life situations
5. Develop a survey tool that can be used to evaluate the effectiveness of the curriculum by an expert review panel

CURRICULUM DEVELOPMENT:
1. Overview of carbohydrates
2. Visualizing pre- and post-exercise carbohydrate needs
3. Meal planning to optimize nutrient-dense carbohydrate intake
4. Carbohydrate nutrition timing
5. Ideal for preparing carbohydrate rich snacks
6. Applying lessons to “prepare and share” a favorite recipe containing nutrient-dense carbohydrate foods

LESSON OVERVIEW
1. Reflection/Discussion
2. “Plan of the Day” Overview
3. Objectives
4. Nutrition Education
5. Activity
6. Summary
7. Assignment

PROGRAM EVALUATION
• Pre- and post-study questionnaires
• Additional information to nutrition education slides (glycogen stores, dense carbohydrate snacks)
• Clarifications and revisions in wording, punctuation and grammar
• Additional slides

MODIFICATIONS:
• Clarifications and revisions in wording, punctuation and grammar
• Additional information to nutrition education slides (glycogen stores, dense carbohydrate snacks)
• Clarifications and revisions in wording, punctuation and grammar
• Additional slides

EVALUATION BY EXPERTS:
• Highest rating 5 or “strongly agreed” – Assignments provided athletes an opportunity to apply each lesson topic to their specific dietary behaviors
• The appropriateness of the layout
• Lowest rating 1.75 or neither agreed nor disagreed: - Objectives of the curriculum being clear

FEEDBACK:
Panel member A: “A certain percentage of adolescents simply don’t care enough to do what you are asking, but the right ones will”
Panel member C: “I am confident an adolescent athlete can complete the materials
Panel member D: “Very exciting, useful to the betterment of athletes, and well organized
Objectives slides were “too detailed” and “could include far less material”

CONCLUSION
A sport-specific nutrition education curriculum emphasizing the social cognitive theory is essential to optimize healthy eating behaviors for athletes to improve their current sports nutrition knowledge through application based activities.

The “Running to Sweet Success” program offers activities and assignments that address common issues like inadequate sports nutrition knowledge, lack of time or energy, and directions on how to prepare meals/snacks on the go that may prevent adolescent athletes from optimizing their energy and carbohydrate intake.

This program may support the optimal development of young runners, their accumulation of bone mineral, performance, recovery, and overall health.

References


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For more information

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