

# **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 30-45 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 timeperiod 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.<sup>1</sup>
- 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.<sup>2</sup>
- 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<sup>3</sup>, (2) lack of knowledge as to the importance of replenishing the body <sup>4</sup>, and (3) lack of energy from exhaustive physical activity.<sup>5</sup>
- 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.<sup>6</sup>

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### Methods

#### **PROJECT OBJECTIVES: CURRICULUM DEVELOPMENT:** Conduct a review of recent literature to evaluate adolescent runners' daily . Overview of carbohydrates carbohydrate and caloric needs, levels of intake, factors contributing to intake, consequences of undernourishment, nutrition education programs 4. Carbohydrate nutrient timing 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 nutrient-dense carbohydrate foods 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 **LESSON OVERVIEW** Develop engaging activities, for participants to complete during each session Reflection/Discussion and between sessions, that encourage active involvement and application of "Plan of the Day"/ Overview concepts to real life situations 3. Objectives Nutrition Education 5. Develop a survey tool that can be used to evaluate the effectiveness of the 5. Activity curriculum by an expert review panel 6. Summary 7. Assignment Activity! **PROGRAM EVALUATION** 1. Tell me which carbohydrate sources are nutrient-rich What nutrient-rich carbohydrate foods do you eat on most days • Pre- and post-study questionnaires: "Running to Sweet Success" Program LESSONS: 1-6 SPORTS-SPECIFIC NUTRITION EDUCATION **DATA COLLECTION** Reflection/Discussion ssignmer espond to the statements below Enhance one m hack per day by dding a nutrient arbohydrate foo 1. What comes to mind when you hear the word carbohydra 2. What types of foods do you eat that contain carbohydrates? . Why are carbohydrates important to runners? education Take a picture o Rate the following statemen ach food you eat a ompile them into 4. I feel confident in my ability to provide my body with the carbohydrates eed to fuel my exercise each day 5: strongly agree, 4: agree, 3: undecided, 2: disagree, 1: strongly disagree ] include: 3. Post it on the acebook group p adolescent athletes Provide additional comments

### Results

<b>Curriculum Review Statements</b>	Descriptive (x & s)	
The objectives of the curriculum were clear	3.75	1.26
The power point presentation for each lesson would stimulate athlete learning	4.5	0.58
The small group activities enhance each lesson and are relevant to the weekly topic	4.5	0.58
The weekly "assignment" provides athletes an opportunity to apply each lesson topic to their specific lietary behaviors	5	0
The language and format of the curriculum was appropriate for adolescent athletes	4.5	0.58
The instructions are easy for adolescent athletes to follow	4.5	0.58
This curriculum is visually appealing for adolescent athletes	4.75	0.5
The layout is appropriate for adolescent athletes	5	0
feel that the activities and assignments are appealing to an adolescent athlete population	4.5	0.58
The content was relevant to an adolescent athlete	4.75	0.5
am confident an adolescent athlete can complete the naterials	4.25	0.5
Overall, I am satisfied with the content	4.5	0.58
would recommend the use of this curriculum?	4.5	0.58

2. Visualizing portion sizes and carbohydrate needs

3. Meal planning to optimize nutrient-dense carbohydrate intake

5. Ideas for preparing convenient and nutritious carbohydrate-rich snacks 6. Applying lessons to "prepare and share" a favorite recipe containing

- food frequency, disordered eating/dietary restraint, and self-efficacy

• Formative evaluation to review educational-based curriculum

- 4-member expert review panel with background in:
  - Nutrition and dietetics, exercise physiology, adolescent health and
- Panel members critique curriculum using a "Expert Review Form", which
- Area of expertise, education level, job title, experience working with
- Rating of statements regarding curriculum using a Likert scale

### **IODIFICATIONS:**

- Clarifications and revisions in wording, punctuation and grammar Additional information to nutrition education slides (glycogen stores, serving sizes, dietary fat needs, nutrient timing, and preparing meals and snacks)
- Alternative options to activities and assignments
- Recommendations for educational handouts

#### **VALUATION 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 = 3.75 or neither agreed nor disagreed:
- Objectives of the curriculum being clear

#### **EEDBACK:**

anel member A:

"A certain percentage of adolescents simply don't care enough to do what you are asking, but the right ones will" anel member C:

"Very exciting, useful to the betterment of athletes, and well organized Objectives slides were "too detailed" and "could include far less content"

Plan of the Day! Reflection/Discussion Myths of Carbohydrates What are carbohydrates?

Why are carbohydrates important? Sources of nutrient-rich carbohydrates Meal & snack options Summary Assignment

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

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### Conclusion

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.



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### For more information

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