RESEARCH
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Evaluation of a Theory-Based Intervention Aimed at Improving Coaches' Recommendations on Sports Nutrition to Their Athletes

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ABSTRACT

Background Coaches are a major source of nutrition information and influence for young athletes. Yet, most coaches do not have training in nutrition to properly guide their athletes.

Objective The aim of this study was to evaluate the effectiveness of an intervention aimed at improving the accuracy of coaches' recommendations on sports nutrition.

Design This was a quasi-experimental study with a comparison group and an intervention group. Measurements were made at baseline, post-intervention, and after a 2-month follow-up period. Coaches' recommendations on sports nutrition during the follow-up period were recorded in a diary.

Participants/setting High school coaches from various sports (n=41) were randomly assigned to a comparison group or an intervention group.

Intervention Both groups attended two 90-minute sessions of a theory-based intervention targeting determinants of coaches' intention to provide recommendations on sports nutrition. The intervention group further received an algorithm that summarizes sports nutrition guidelines to help promote decision making on sports nutrition recommendations.

Main outcome measures Nutrition knowledge and accuracy of coaches' recommendations on sports nutrition.

Statistical analysis performed χ^2 analyses and *t*-tests were used to compare baseline characteristics; mixed and general linear model analyses were used to assess the change in response to the intervention and differences in behaviors, respectively.

Results Coaches in the intervention vs comparison group provided more nutrition recommendations during the 2-month post-intervention period (mean number of recommendations per coach 25.7±22.0 vs 9.4±6.5, respectively; P=0.004) and recommendations had a greater accuracy (mean number of accurate recommendations per coach 22.4±19.9 [87.1%] vs 4.3±3.2 [46.1%], respectively; P<0.001). Knowledge was significantly increased post-intervention in both groups, but was maintained only in the intervention group during the 2-month follow-up ($P_{group*time}$=0.04).

Conclusions A theory-based intervention combined with a decision-making algorithm maintained coaches' sports nutrition knowledge level over time and helped them to provide more accurate recommendations on sports nutrition.
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SPORTS NUTRITION PLAYS AN IMPORTANT ROLE IN athletic performance.[1] Adolescent athletes have particular dietary needs to meet requirements of daily training, but also to ensure optimal growth and health.[2] A significant proportion of adolescent athletes have a relatively low energy intake, inadequate intakes of certain nutrients, or adopt dietary practices that are not always in accordance with guidelines.[3-6] It has been reported that although young athletes generally have adequate protein intakes, they do not consume enough carbohydrates daily[4-9] and have suboptimal hydration status both before and during training.[10-12]

Coaches are recognized as a major source of information and influence for young athletes regarding food and supplement choices, as well as nutritional behaviors.[13-17] Yet most coaches do not have specific or formal training in nutrition, and studies have characterized their knowledge in sports nutrition as being insufficient to properly guide their athletes on this topic.[13,17-19] It has been reported that 46% of high school coaches intended to recommend consumption of foods rich in carbohydrates to their athletes, while proportions were 45% for foods rich in proteins and 92% for hydration (R. Jacob, MSc, RD; B. Lamarche, PhD; V. Provencher, PhD, RD; É. Morissette, MSc, RD; S. Couture, MSc, RD;

P. Valois, PhD; C. Goulet, PhD; V. Drapeau, PhD, RD: unpublished data, May 2011). Based on the theory of planned behavior (TPB), subjective norm (ie, the perceived social pressure to engage or not to engage in a behavior) was also identified as the main significant determinant of coaches' intention to recommend carbohydrates and proteins (R. Jacob, MSc, RD; B. Lamarche, PhD; V. Provencher, PhD, RD; É. Morissette, MSc, RD; S. Couture, MSc, RD; P. Valois, PhD; C. Goulet, PhD; V. Drapeau, PhD, RD: unpublished data, May 2011). In order to develop a successful intervention, it is appropriate to rely on theoretical frameworks (such as the TPB), because these models have been identified as a factor of the success of an intervention.[20]

To the best of our knowledge, no study has yet investigated the effectiveness of a theory-based intervention designed to specifically improve the accuracy of coaches' recommendations on sports nutrition to their athletes and to enhance their nutrition knowledge. Based on our previous work, the main purpose of this study was to evaluate the effectiveness of a TPB-based intervention combined with a decision-making algorithm, aimed at improving coaches' recommendations on sports nutrition to their athletes compared with a TPB-based intervention only. The intervention was also intended to increase sports nutrition knowledge among coaches. It was hypothesized that adding the use of a decision-making algorithm that informs on proper sports nutrition recommendations improves nutrition knowledge retention as well as the number and accuracy of recommendations to a greater extent than a theory-based intervention only.

METHODS

Participants

Coaches of athletes aged 12 to 17 years were recruited through e-mail and phone contact within local competitive sport communities in 2013. To take part in this study, coaches had to work with adolescent athletes during the entire length of the study. Participants were met by the study coordinator to explain the study purpose and procedures. The Research Ethics Committee of Laval University approved study procedures and written informed consent was obtained from all participants before the study. All participants received a gift certificate at a local sports store at the end of the study. Participants were randomly assigned to the comparison group (ie, an intervention based on the TPB) or the intervention group (ie, the same intervention with the addition of a decision-making algorithm regarding recommendations on sports nutrition). Randomization was stratified by types of sports (aesthetic, eg: gymnastic, cheerleading, figure skating; endurance, eg: cycling, cross-country skiing, triathlon; or power/team, eg: swimming, basketball, tennis) to ensure similar numbers in each group because dietary needs might differ more between the types of sports than within sports of the same type. Coaches from the same team or club were randomized as a "group" into either condition to reduce contamination bias. Coaches were not aware of the two conditions.

Theory-Based Intervention Common to Both Groups

Participants from both groups attended two 90-minute meetings delivered during a 2-week period, during which specific determinants of coaches' intention to recommend different sports nutrition recommendations were targeted. Participants received nutrition information about current recommendations for healthy eating and sports nutrition in adolescent athletes with focus on macro- and micronutrients and hydration to achieve and maintain good health; carbohydrates, proteins and lipids, and their food sources, with particular focus on recommendations related to consumption of carbohydrates to achieve training requirements and sport performance; optimal hydration practices to achieve training requirements and sport performance; dietary and hydration strategies before, during, and after training and competitions; optimal food choices while eating out; and relevance of optimizing dietary strategies vs supplement use in improving performance in young athletes. The intervention was developed and implemented by a registered dietitian (RD). More specifically, the intervention was a lecture-based format with interactions between participants and the RD.

Two specific behavior change strategies were used in both groups to improve coaches' recommendations on sports nutrition to their athletes. In order to induce more rational decision making in coaches, strategies aimed at ensuring that subjective norm had less influence on the intention to pursue this behavior were used. First, persuasive communication, which involved use of arguments and repeated exposure to the message, was used to establish a positive attitude (ie, subjective analysis of advantages and disadvantages related to a given behavior) toward the impact of appropriate dietary and hydration practices on athletic performance, with focus on carbohydrate consumption as a major source of energy.[20] Resistance to social pressure, which represents another specific behavior change strategy, was also used to enable coaches to convince parents and athletes of the importance of sound dietary strategies to improve sport performance.[20]

Intervention Group

In the intervention group, all coaches also received, at the end of the second meeting, an algorithm aimed at facilitating decision making regarding sports nutrition recommendations in order to help coaches increase their perceived behavioral control (ie, perceived level of ease or difficulty regarding the adoption of a given behavior) over their nutrition recommendations. A decision-making algorithm is defined as a type of advance organizer,[21] which is a schematic representation of a content, that is used to increase knowledge.[20] Knowledge can positively influence perceived behavioral control by reducing barriers related to the lack of information or abilities and increasing the perceived ease to perform a behavior.[22]

More specifically, this decision-making algorithm illustrated evidence-based sports nutrition information in specific contexts (eg, before, during, and after training and competition). It also presented an example of an optimal plate for an athlete and provided examples of food sources of carbohydrates, proteins, best sources of lipids, and suggestions for recovery snacks, what to eat during effort/competition, and what to eat in particular situations (eg, not hungry before a competition). A different decision-making algorithm was made for each type of sports and coaches were provided with one algorithm. Understanding of the decision-making algorithm by coaches was reinforced through case studies.[20]