Weekly Educational Newsletters Improve High-School Athlete's General and Sports related Nutrition Knowledge to Prevent a Risk of Relative Energy Deficiency in Sport

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ABSTRACT

Objectives: To assess the effectiveness of educational nutrition newsletters on nutrition knowledge in high school athletes, designed to reduce the risk of relative energy deficiency in sport (RED-S) through improved dietary habits.
Design: Quasi-experimental
Data Collection: General nutrition knowledge, sports nutrition knowledge and eating habits and patterns in high school athletes were compared using pre- and post- surveys. Athletes' nutrition related knowledge was evaluated by comparing final grades of the surveys. Athletes eating habits and patterns were evaluated by comparing specific survey questions. The intervention was developed utilizing the social cognitive theory.
Setting: New York (online/remote)
Participants: 6 high-school athletes scored on the pre- and post-surveys received the weekly newsletters. 4 athletes were female, and 2 athletes were males.
Intervention: A series of 4 weekly newsletters were emailed to participants at the start of each week. Topics of the newsletters pertained to RED-S and included an overview of RED-S, carbohydrates, protein, and vitamin D/calcium.)
Intervention: A series of 4 weekly newsletters were emailed to participants. Topics pertained to RED-S and included an overview of RED-S, carbohydrates, protein, and vitamin D/calcium.
Results: Weekly newsletters significantly increased high school athletes' knowledge pertaining to RED-S, general nutrition, and sports related nutrition ($p < 0.05$). 33% of participants showed an improvement in dietary habits and behaviors. The weekly newsletters had no significant effect on improving eating habits or eating patterns ($p > 0.05$).
Conclusions and implications: Online weekly educational newsletters utilizing the social cognitive theory is an effective mass media teaching technique to significantly improve high school athletes' general and sports nutrition knowledge. Further research is needed on interventions to improve dietary habits.

INTRODUCTION

- Energy balance must be maintained for optimal performance and health. Unbalanced energy states for prolonged periods of time lead to relative energy deficiency in sport (RED-S) and can be caused by insufficient intake of calories and/or excessive energy expenditure.[1]
- RED-S disrupts body functions such as bone health, menstrual function, hormone function, metabolic rate, immune function, organ function, cardiovascular health, and psychological health, and leads to decreased coordination, concentration, glycogen stores, muscle strength, endurance performance, and increases injury risk. [1,2]
- RED-S is a major risk in high school aged athletes, due to frequent under consumption of food, increased energy expenditure, and a nutrition-related knowledge deficit[1]
- The purpose of this study was to assess the effectiveness of educational nutrition newsletters on nutrition knowledge in high school athletes, ultimately preventing the risk of RED-S through improved dietary habits.

DATA COLLECTION

- This study was conducted online over a 6-week period with high school aged athletes in New York.
- The intervention group had 6 participants who received the weekly newsletter and completed the pre- and post-questionnaire.
- The newsletters consisted of 4 nutrition related topics: an overview of RED-S, carbohydrates, protein, and vitamin D/calcium
- Athlete nutrition knowledge was evaluated by comparing the final scores from a pre- to post-questionnaire
- Changes in dietary habits/patterns were measured by comparing pre- to post-questionnaire answers on Likert scaled questions and categorizing students as having a positive, or no change in their dietary habits.
- Quantitative data (nutrition knowledge, changes in dietary habits/patterns scores) were compared using t-tests if data was normally distributed and Mann Whitney U tests If data was nonparametric.
- Qualitative data (specific eating habits surrounding sporting events) were evaluated by common themes classified as positive, negative, or neither.

RESULTS

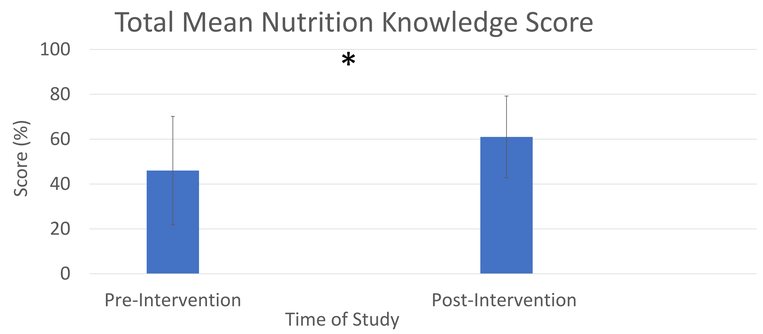

Figure 2. Mean scores of participants from pre- to post- intervention; total summed score (%) and standard deviation, Wilcoxon rank tests * $p < 0.05$

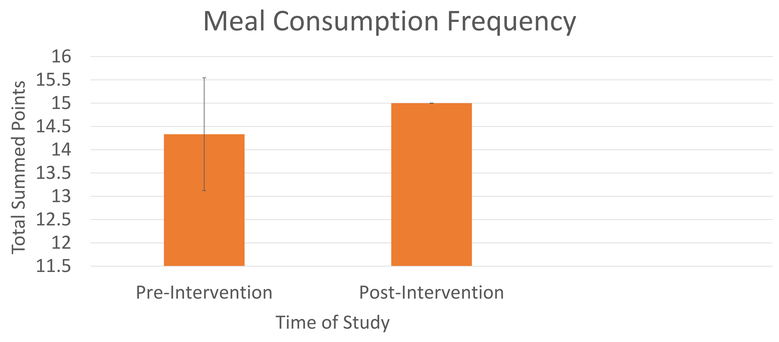

Figure 3. Participant mean total score of meal frequency consumption did not significantly increase from pre-intervention to post-intervention total points; means and standard deviation. ($p = .285$)

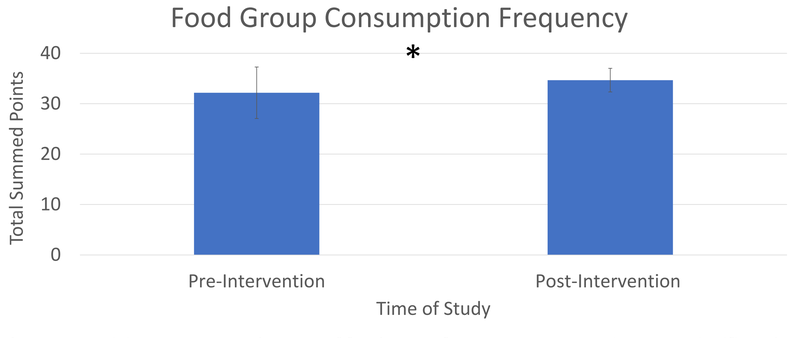

Figure 4. Participant mean total scores of food group frequency consumption were significantly increased from pre-intervention to post-intervention total points; means and standard deviation. T-test * $p < 0.05$

RESULTS, CONTINUED

Table 2. Common themes of answers for open-ended questions from pre- to post-intervention

Table 2. RED-S Intervention Group Eating Habits Surrounding Sporting Events	
Question/Response	Number of Participants (n)
Pre-Test	
Do you change your intake before sporting events?	
Yes	1
No	3
Not Sure	2
What snacks do you typically eat?	
Carbohydrate based	2
Carbohydrate and Protein based	2
Carbohydrate, Protein, and Fat based	1
Post-Test	
Do you change your intake before sporting events?	
Yes	2
No	3
Not Sure	1
How do you change your intake?	
Eat Less Dairy	1
Eat more carbohydrates	1
What snacks do you typically eat?	
Carbohydrate based	2
Carbohydrate and Protein based	2
Carbohydrate, and Fat based	1

DISCUSSION

The main findings of the study demonstrate that an online educational nutrition newsletter was effective at improving general and sports related nutrition knowledge and knowledge surrounding RED-S. This improvement was supported by statistically significant improvements in pre- to post- multiple choice survey scores ($p < 0.05$), supporting the primary hypothesis. 33% of participants demonstrated improved dietary habits however contrary to the hypothesis, participation in weekly educational newsletters is not significantly associated with a change in knowledge and improved eating behaviors ($p = 0.423$). Uncontrolled factors may have been an aspect in the insignificant results. The conclusion is supported by similar findings in separate studies. Heikkila et al. found that nutrition improved following education sessions, yet dietary habits and behaviors did not significantly improve.[3] Dunne et al. concluded that digital professional education should be supported as a nutrition teaching method. [4]

CONCLUSION

The online educational nutrition newsletters utilizing the social cognitive theory improved overall general and sport related nutrition knowledge and knowledge surrounding RED-S. However, participation in weekly educational newsletters and a change in knowledge did not have a significant effect on improved eating behaviors. Future studies and education programs should consider the engagement of parents and/or caregivers alongside high school athletes when implementing an online educational nutrition newsletter for RED-S prevention.

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