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Sarah Bent

bents@mail.sacredheart.edu

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# Knowledge of Iron Deficiency vs. Toxicity in College-level Distance Runners



**EXERCISE SCIENCE**  
SACRED HEART UNIVERSITY

**Sarah Bent** [Mentor: Beau Greer, PhD]

College of Health Professions

Department of Physical Therapy and Human Movement Science

**EXERCISE SCIENCE**  
SACRED HEART UNIVERSITY

## ABSTRACT

Distance runners' knowledge regarding iron deficiency has been previously examined. Knowledge of the acute or chronic effects of iron toxicity, however, has never been assessed. The purpose of the present study was to investigate college distance runners' knowledge about issues related to basic nutrition and iron toxicity, as well as influences on the choice to supplement with iron. Ninety-eight college distance runners (54 F; 44 M) were recruited from three Division 1 programs in the northeastern U.S. to participate in a 22-question, pen-and-paper survey. Major findings were that the mean score for a 10-item question asking respondents to identify high-iron sources of food was only 43 out of 100 possible points, while 73.6% of respondents reported either moderate or high confidence in the ability to identify iron-rich foods. Additionally, while only 29.6% have been diagnosed with an iron deficiency at any point in life, 37.9% are currently taking a multivitamin that contains iron. Of those supplementing with iron, 88.9% reported taking more than 45 mg/day, the tolerable upper limit. The mean score was 7.5 out of 24.0 possible points when given a scale of statements related to positive and negative health and performance effects of iron supplementation. 52% of respondents reported that a coach at some point in their running career had suggested taking an iron supplement. In conclusion, college distance runners did not show a high level of knowledge regarding the potential negative effects of high iron intake, and many may be at risk for iron toxicity.

## INTRODUCTION

Iron deficiency (ID), a common condition in female distance runners, is characterized as a level of red blood cells that is below normal. In iron deficient individuals, the amount of oxygen that can be carried to the body is limited, leading to a sudden and dramatic decrease in performance.<sup>4</sup> Conversely, iron toxicity is characterized as a level of iron storage that is above normal, and like ID can be associated with negative health effects. While ID research is abundant in the medical field, research related to iron toxicity is still in its infancy. The available studies about iron toxicity suggest that very high levels of stored iron may lead to serious health complications, specifically colorectal cancer, atherosclerosis, Parkinson's, and Alzheimer's disease.<sup>1,2,3</sup> Iron supplementation is often recommended for distance runners who have been diagnosed with ID. In order to decrease the potential effects of chronically high, unneeded iron ingestion, it is important that supplementation is properly dosed and not overly used.<sup>4</sup> Only distance runners who have received an ID diagnosis should use supplementation, but many distance runners may be unaware of this.

## PURPOSE

The purpose of the present study was to investigate college distance runners' knowledge about issues related to basic nutrition and iron toxicity, as well as influences on the choice to supplement with iron.

## PARTICIPANTS

Forty-four male and fifty-four female college-level track and cross country distance runners were recruited to participate in this survey-based research study. The subjects were recruited through an email sent to their coaches. Student-athletes were selected from three Division 1 programs in the northeastern U.S. Age range of the subjects was between 18 and 23 years old. All respondents were required to have at least three years of competitive distance running experience. The study did not exclude injured or red-shirted athletes and did not take athletes' level of competitive performance into consideration. There was no incentive provided for participation.

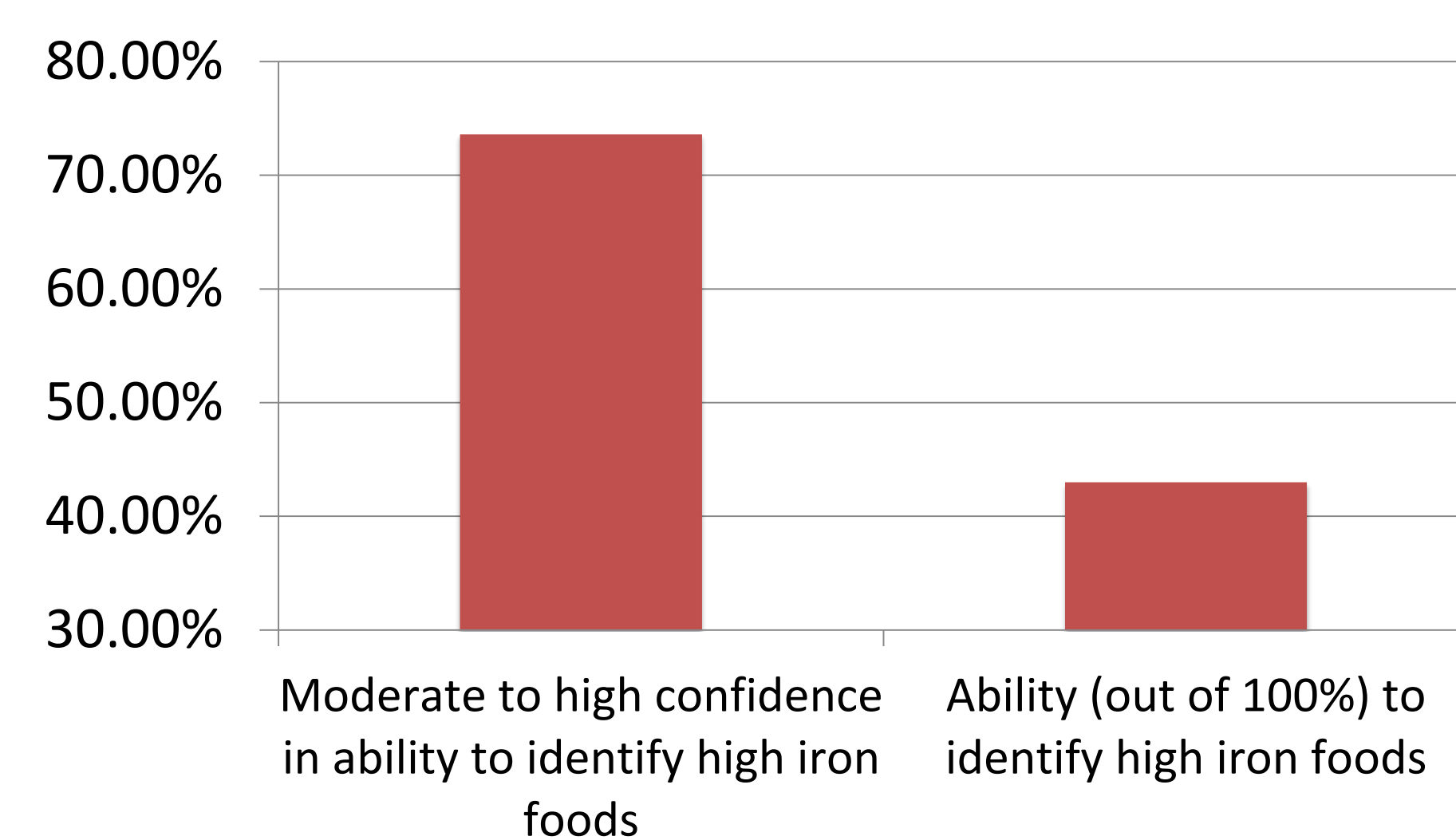
## PROCEDURES

All respondents provided informed consent and were asked to complete a survey by hand regarding their knowledge of issues related to iron deficiency, toxicity, and supplementation. The survey asked respondents to provide their gender, age, academic year, weekly mileage, and years of distance running experience. The respondents were asked to indicate whether they have ever been tested for ID and whether they have been diagnosed as iron deficient or anemic. The respondents were then asked to indicate the following: their confidence level in determining iron-rich foods and how often they consume iron-rich foods; if and at what academic level they have taken a nutrition class; if and how often they take a multivitamin that contains iron; whether they regularly take an iron supplement independent of multivitamins, and if so, the number of milligrams consumed; if applicable, how long they have been routinely consuming an iron supplement; whether a coach or a teammate has ever suggested taking an iron supplement and at what academic level this recommendation was made; and finally, a series of eight statements regarding the effects of iron were provided. Respondents indicated that they agreed, strongly agreed, disagreed, or strongly disagreed with these statements of varying accuracy.

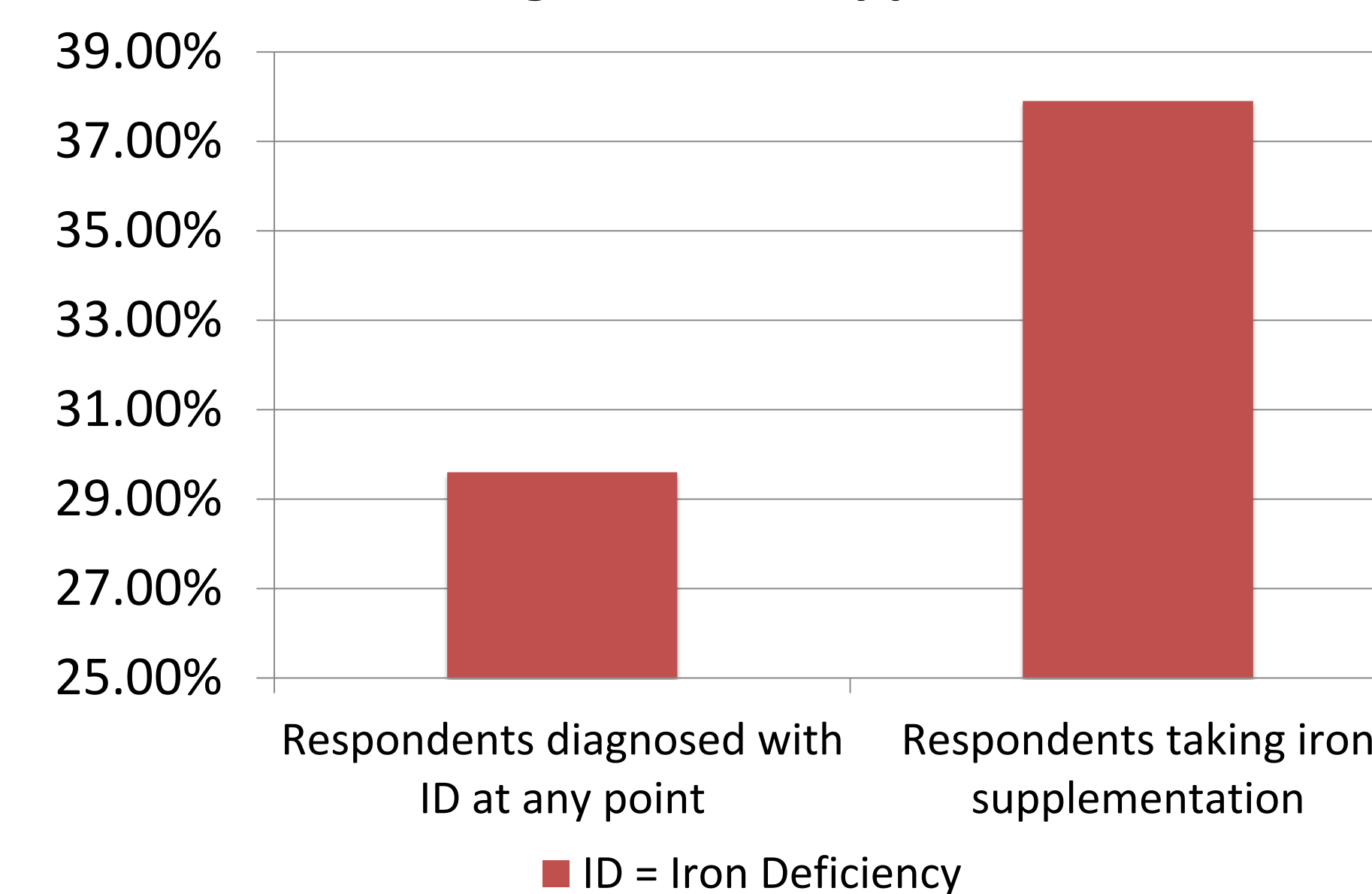
## RESULTS

The mean score for a 10-item question asking respondents to identify high-iron sources of food was 43 out of 100 possible points, while 73.6% of respondents reported either moderate or high confidence in the ability to identify iron-rich foods. Additionally, while only 29.6% have been diagnosed with ID at any point in life, 37.9% were taking a multivitamin that contains iron. 63.5% reported that they take their supplement 6-7 days per week. 27.8% of respondents were also taking an iron supplement independent of the multivitamin. Of those supplementing with iron, 88.9% reported taking more than 45 mg/day, the tolerable upper limit. The mean score was 7.5 out of 24.0 possible points when given a scale of statements related to positive and negative health and performance effects of iron supplementation. 52% of respondents reported that a coach at some point in their running career had suggested taking an iron supplement.

**Confidence in vs. Ability to Identify High Iron Foods**



**ID Diagnosis vs. Supplementation**



## DISCUSSION

Overall, the data indicate that more college distance runners are supplementing with iron than those that have ever been diagnosed as iron deficient. Half of the respondents in this study indicated that a coach suggested taking an iron supplement at some point in their running career. The high level of iron intake in distance runners could be due to social factors, particularly the high frequency of persuasion to consume supplements from teammates and coaches, who may not be educated about iron toxicity or qualified to recommend iron supplements. The respondents showed a high level of confidence in their knowledge of iron-rich foods and the positive and negative consequences of consuming iron, but a very low number could correctly define these foods and consequences. This suggests that college distance runners require more education about iron consumption, and more importantly the potential health consequences of long-term, high iron diets.

## TAKE HOME MESSAGES

- College distance runners did not show a high level of knowledge regarding the potential negative effects of chronically high iron intakes, and may be at risk for the potential long term consequences of high iron diets.
- It is necessary for college distance runners to receive proper education from a qualified professional about the risks of excessive iron intake.

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