Iron deficiency among athletes and physically active individuals in relation to body fat percentage

Thelma Rún Rúnarsdóttir master’s student in sports nutrition

Supervisors:
Anna Sigríður Ólafsdóttir professor, University of Iceland and
Michael Svensson associate professor, Umeå University.

Introduction and objective

- Iron is a nutrient essential for supporting basic metabolic life functions.
- Iron deficiency is one of the most widespread nutrient deficiencies in the world.
  - estimated to be the cause of anemia in 50% of females and 43% of children.
- Reported to be more frequent among athletes and physically active individuals.
  - Female athletes twice as susceptible compared to their sedentary counterparts.
  - 25% to 36% of females competing in sports, 15% among male basketball players.
  - Can have considerable effects on athletic performance.
- Increased risk due to iron poor diet, hemolysis, increased iron losses (gastrointestinal, hematuria, and sweat), or altered intestinal iron absorption.
- Prevalence of iron deficiency is higher among obese individuals, which could be explained due to inflammation.
- **Objective:** To assess the relationship between body fat percentage and iron deficiency among athletes and physically active individuals.
Data collection and processing

- Dataset from studies performed at the School of Sport Science at Umeå University.

<table>
<thead>
<tr>
<th></th>
<th>Female (n=122)</th>
<th>Male (n=144)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>17.74 (2.02)</td>
<td>17.37 (0.95)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>21.01 (2.52)</td>
<td>21.29 (2.31)</td>
</tr>
<tr>
<td>% body fat</td>
<td>25.90 (4.47)</td>
<td>15.91 (4.13)</td>
</tr>
<tr>
<td>Training (hours/week)</td>
<td>10.33 (2.06)</td>
<td>11.64 (3.46)</td>
</tr>
<tr>
<td>Ferritin (µg/L)</td>
<td>37.30 (21.14)</td>
<td>66.18 (32.13)</td>
</tr>
<tr>
<td>Hemoglobin (g/L)</td>
<td>130.32 (8.32)</td>
<td>145.86 (8.47)</td>
</tr>
<tr>
<td>Erythrocytes (10¹²/L)</td>
<td>4.50 (0.30)</td>
<td>4.99 (0.27)</td>
</tr>
<tr>
<td>Mean corpuscular hemoglobin (µg)</td>
<td>29.03 (1.74)</td>
<td>29.23 (1.30)</td>
</tr>
<tr>
<td>Mean corpuscular volume (fL)</td>
<td>87.63 (4.46)</td>
<td>86.88 (3.70)</td>
</tr>
</tbody>
</table>

Table shows mean and standard deviation.

Results

- The results are intended to determine if there is a relationship between fat % and prevalence of iron deficiency in athletes.
  - Those with ↑ or ↓ percentage more likely to suffer from iron deficiency?
- Iron deficiency is defined using:
  - Plasma ferritin cut-off: 30 µg/L
  - Hemoglobin cut-off: 120 g/L (female); 130 g/L (male)

- Secondary objective: Is there a relationship between training amount and prevalence of iron deficiency in athletes?