COMPARING SPORTS NUTRITION KNOWLEDGE, PERCEIVED DIETARY INTAKE, AND BODY COMPOSITION MEASUREMENTS IN MALE AND FEMALE DIVISION II COLLEGIATE ATHLETES

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Kinesiology

INTRODUCTION

Athletes are challenged every day to perform at the highest levels in both academic and sports performance. Mindful and healthful eating habits and behaviors, while taking both the correct quantity and quality of food into consideration, are essential to support not only the athletes' athletic performance, but also, their overall health and wellbeing (Aragon et al., 2017; Holtzman & Ackerman, 2019; Mielgo-Ayuso & Fernandez-Lazaro, 2021). Sports nutrition encompasses a variety of components that play a role in influencing the dietary habits of athletes. **Purpose:** To compare student-athletes' nutritional knowledge and perceived dietary intake to their measured body composition.

METHODS

Participants: 40 male and female (age 22 ± 2.1 years) Division II collegiate athletes (soccer, basketball, track and field, softball, and volleyball)

- **Male (n=10):** height 183.9 ± 11.2 cm; body mass 80.8 ± 16.8kg; fat-free mass 64.9 ± 11.2 kg; fat mass 15.9 ± 9.5kg; body fat percentage 18.8 ±7.0%;
- **Female (n=30):** height 168.2 ± 8.8 cm; body mass 64.5 ± 10.2kg; fat-free mass 48.2 ± 7.9kg; fat mass 17.5 ± 6.1kg; body fat percentage 26.3 ± 6.5%)

Body Composition: Measurements were assessed using a Bio-Electrical Impedance Analysis (BIA) machine for evaluations of fat mass (FM), fat-free mass (FFM), and body fat percent (BF%). Participants were instructed to avoid eating, consuming caffeine, and performing exercise for 4 hours prior to the time of testing, to avoid consuming alcohol for at least 24 hours beforehand, and to arrive wearing lightweight clothing. Additionally, the participants were instructed by their coaches to properly hydrate before coming in for testing. A single trial was conducted and recorded. The subjects spread their arms at a 30° angle away from their bodies. This posture and position were maintained for the entirety of the analysis, and the subjects refrained from moving or talking until the measurement was complete.

Perceived Dietary Requirements Questionnaire (PDRQ):
Perceived dietary requirements, including perceptions of one day of macronutrient and energy intake, were assessed through an online questionnaire via Qualtrics. The questionnaire consisted of 25 questions, in which the subjects were asked to provide their current body weight goals and whether they were seeking to gain, maintain, or lose weight (Jagim et al., 2021).

Abridged Nutrition Sport Knowledge Questionnaire (A-NSKQ):
Subjects were asked to complete the validated A-NSKQ consisting of 51 questions to assess demographic information, general nutrition knowledge, and sports nutrition knowledge. After completing the questionnaire, the scores were automatically calculated. The results were interpreted as either "poor" knowledge with results ranging from 0–49%, "average" knowledge ranging from 50–65%, "good" knowledge ranging from 66–75%, or "excellent" knowledge ranging from 75–100% based on previously published methods (Jagim et al., 2021; Trakman et al., 2017; Trakman et al., 2018; Trakman et al., 2019).

Division II Collegiate Athletes have a **low level** of **sports nutrition knowledge** and there is **no significant relationship** between their **nutritional knowledge** and **body composition measures.**
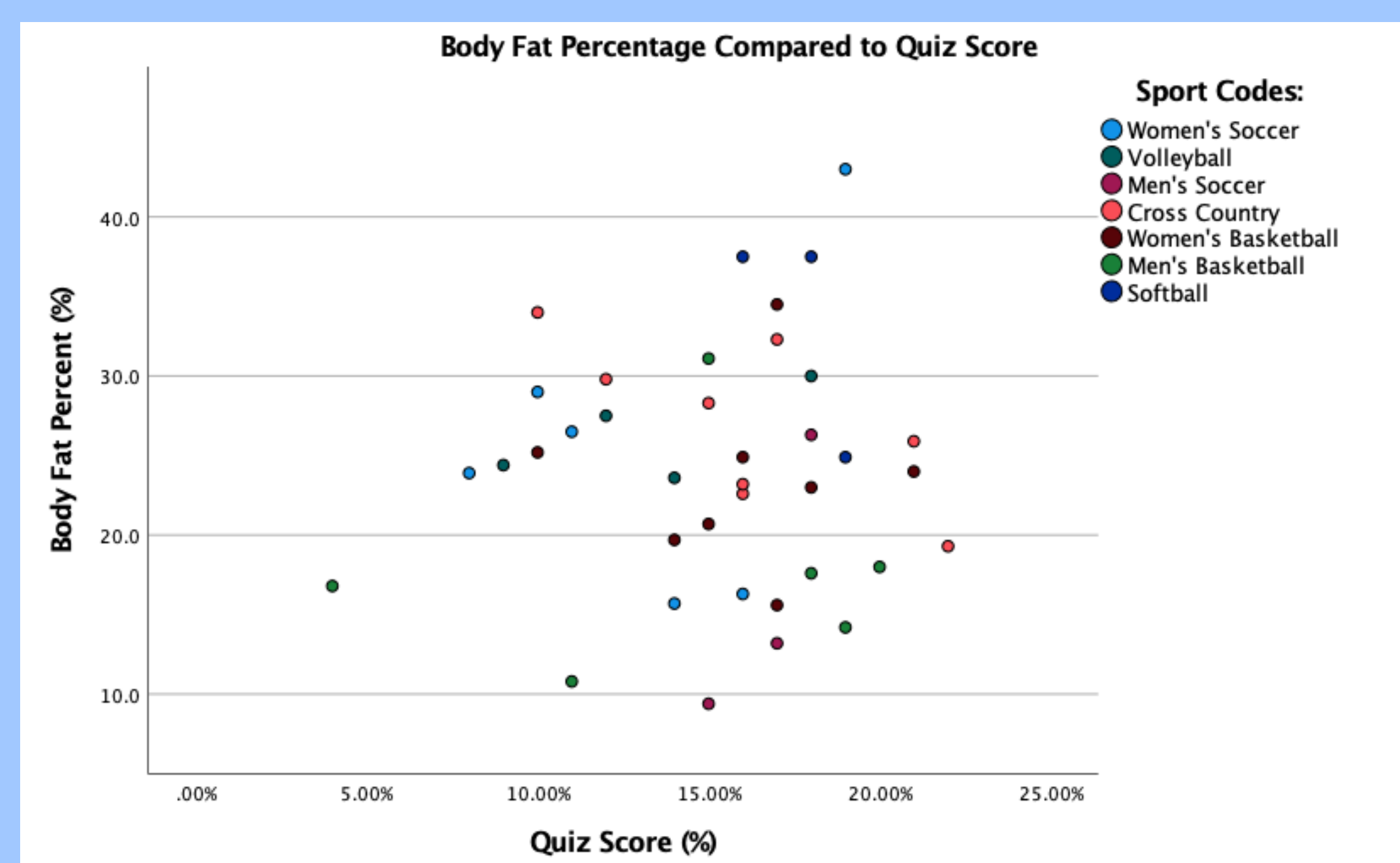

Figure 1. No significant relationship between quiz scores and body fat percentages.
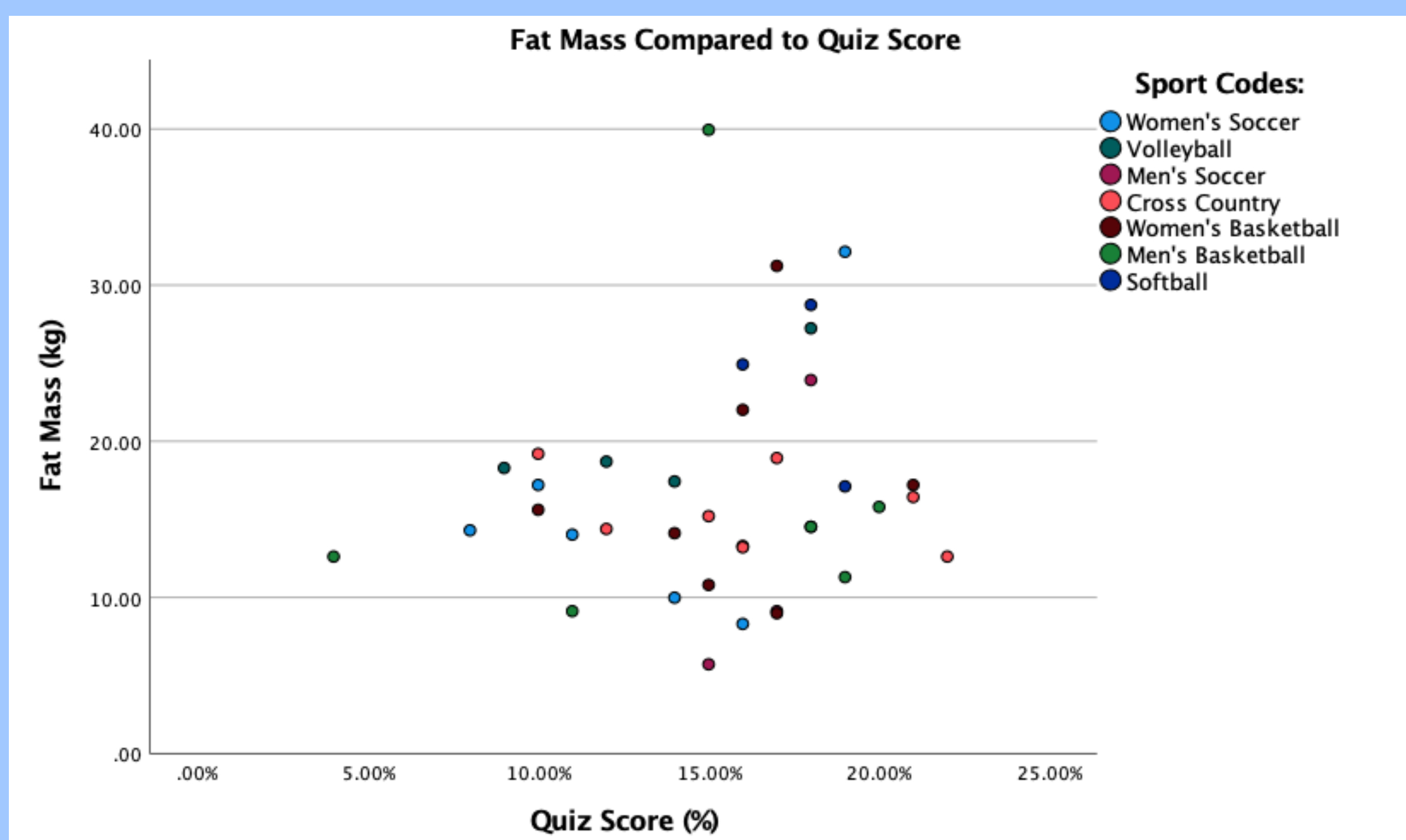

Figure 2. There was no significant relationship between quiz scores and fat mass.

Figure 3. No significant relationship between quiz scores and fat free mass.

RESULTS

The athletes answered 15.2 ± 4% of the questions correctly with no differences observed between the sexes (females: 15.2 ± 3.7% vs. males: 15.2 ± 4.9%; $p = 0.99$). A one-way ANOVA revealed no significant differences between each of the sports' teams and their quiz scores ($F_{(6,31)} = 0.852$, $p = 0.540$). Pearson correlation coefficients were utilized to assess the relationships between BF%, FM, FFM, and sports nutrition knowledge results from the two questionnaires. There were no significant correlations found between quiz scores and fat mass ($r = 0.16$, $p = 0.32$), fat free mass ($r = 0.14$, $p = 0.41$), or body fat percentage ($r = 0.06$, $p = 0.76$). A significant difference was found between the athletes measured and perceived body fat percentages (measured = 24.4 ± 7.5%, perceived = 20.4 ± 11.3%; $p = 0.02$)
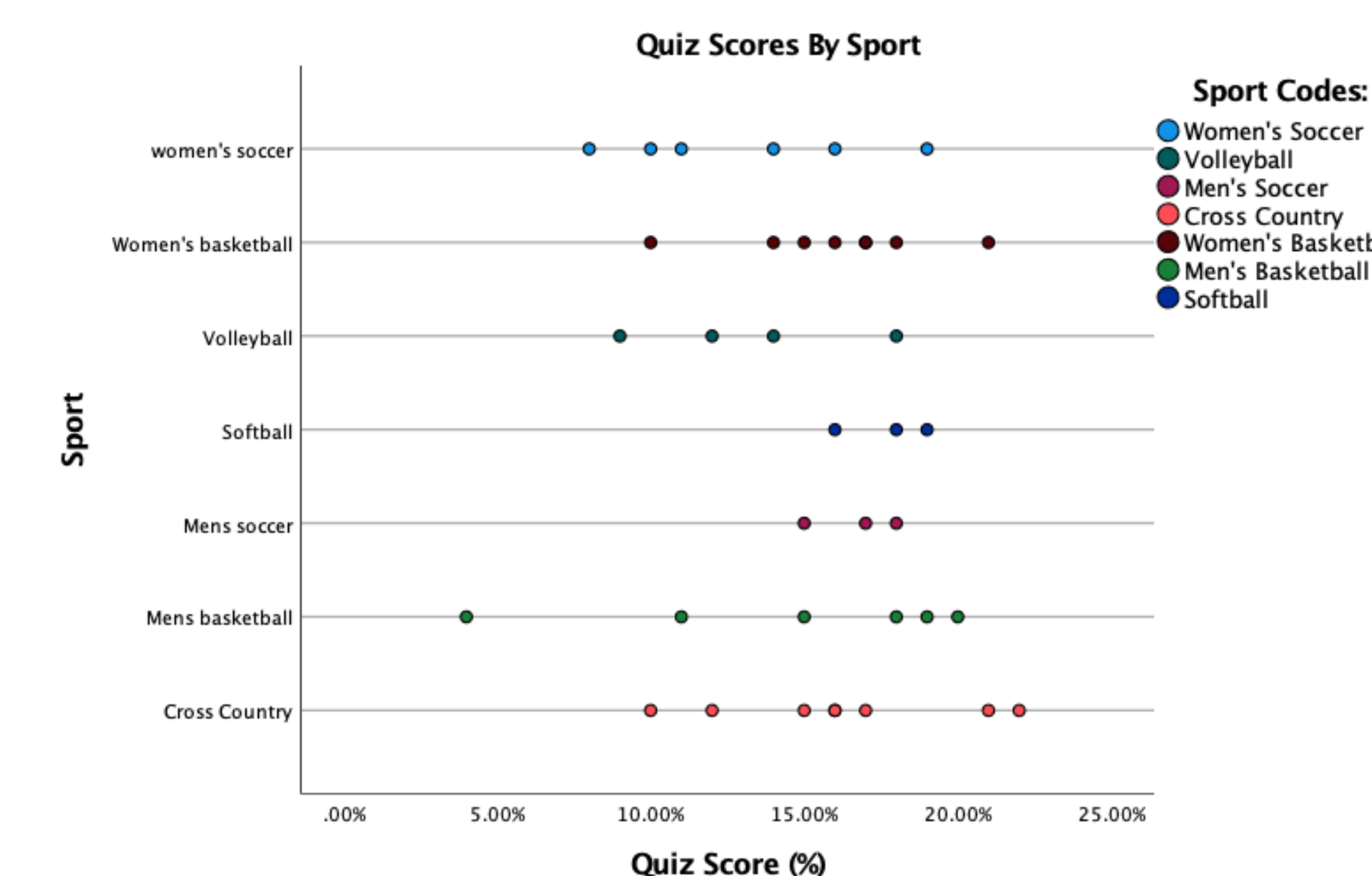

Figure 4. There was no significant relationship between quiz scores among each sport.

CONCLUSIONS

Division II collegiate athletes have a low level of sports nutrition knowledge and there is no significant relationship between their nutritional knowledge and their body composition measures. Furthermore, athletes significantly underestimate their actual body fat percentage.

PRACTICAL APPLICATIONS

The results of the present study suggest that athletes might benefit from sports nutrition education. Additionally, the results suggest that body fat percentage goals should be determined through body composition testing, rather than perceptions of body fat percentages.

REFERENCES

1. Aragon, A. A., Schoenfeld, B. J., Wildman, R., Kleiner, S., VanDusseldorp, T., Taylor, L., Earnest, C. P., Arciero, C. W., Kalman, D. S., Stout, J. R., Willoughby, D. S., Campbell, B., Arent, S. M., Bannock, L., Smith-Ryan, A. E., & Antonio, J. (2017). International society of sports nutrition position stand: Diets and body composition. Journal of the International Society of Sports Nutrition, 14(16). https://doi.org/10.1186/s12970-017-0174-y
2. Holtzman, B. & Ackerman, K. E. (2019). Measurement, determinants, and implications of energy intake in athletes. Nutrients, 11(3), 665. https://doi.org/10.3390/nu11030665
3. Jagim, A. R., Fields, J. B., Magee, M., Kerksick, C., Luedke, J., Erickson, J., Jones, M. T. (2021). The influence of sport nutrition knowledge on body composition and perceptions of dietary requirements in collegiate athletes. Nutrients, 13(7), 2239. https://doi.org/10.3390/nu13072239
4. Mielgo-Ayuso, J. & Fernández-Lázaro, D. (2021). Nutrition and Muscle Recovery. Nutrients, 13(2), 294. https://doi.org/10.3390/nu13020294
5. Trakman, G. L., Brown, F., Forsyth, A., & Belski, R. (2019). Modifications to the nutrition for sport knowledge questionnaire (NSKQ) and abridged nutrition for sport knowledge questionnaire (ANSKQ). Journal of the International Society of Sports Nutrition, 16(26). https://doi.org/10.1186/s12970-019-0293-8
6. Trakman, G. L., Forsyth, A., Hoye, R. & Belski, R. (2018). Development and validation of a brief general and sports nutrition knowledge questionnaire and assessment of athletes' nutrition knowledge. Journal of the International Society of Sports Nutrition, 15(17). https://doi.org/10.1186/s12970-018-0223-1
7. Trakman, G. L., Forsyth, A., Hoye, R., Belski, R. (2017). The nutrition for sport knowledge questionnaire (NSKQ): Development and validation using classical test theory and Rasch analysis. Journal of the International Society of Sports Nutrition, 14(26). https://doi.org/10.1186/s12970-017-0182-y