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Comparison of Body Composition Assessment Techniques in Women's Collegiate Swimmers and Divers

Megan Larson

Bowling Green State University, larsmeg@bgsu.edu

Mary-Jon Ludy

Bowling Green State University, mludy@bgsu.edu

Jessica Kiss

Bowling Green State University, jekiss@bgsu.edu

Amy Morgan

Bowling Green State University, amorgan@bgsu.edu

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Comparison of Body Composition Assessment Techniques in Women's Collegiate Swimmers and Divers

Authors: Larson ME, Ludy MJ, Kiss JE, Morgan AL

- Megan Larson larsmeg@bgsu.edu
- Mary-Jon Ludy mludy@bgsu.edu
- Jessica Kiss jekiss@bgsu.edu
- Amy Morgan amorgan@bgsu.edu

Learning Objective (Upon completion, participant will be able to....): Describe methods for assessing body fat percentage in women's collegiate swimmers and divers.

Learning Need Code: 3030 Anthropometrics / Body composition

Track: Nutritional Assessment and Diagnosis (primary), Wellness and Public Health (secondary)

BACKGROUND: Healthy body composition supports athletic performance. The objective of this study was to compare three methods for assessing body fat percentage (%BF), as well as body mass index (BMI), in women's collegiate swimmers and divers.

METHODS: Collegiate women's swimmers (n=9, 20.1±1.3 years, 70.9±7.7 kg, 170.6±5.7 cm) and divers (n=4, 20.5±1.7 years, 62.4±1.9 kg, 161.4±4.9 cm) were recruited from an NCAA Division I team. Methods used to assess %BF were air displacement plethysmography (ADP), bioelectrical impedance (BIA), and underwater weighing (UWW). Risk was assessed using American Council on Exercise %BF ranges for women (10-13% essential fat, ≥32% obese). BMI was calculated from measured height and weight (<18.5 kg/m² underweight, ≥25.0 kg/m² overweight/obese)

RESULTS: Mean %BF and BMI were in the healthy range for swimmers (ADP 22.1±5.0%, BIA 22.7±5.5%, UWW 23.3±5.7%, BMI 24.3±2.4 kg/m²) and divers (ADP 20.6±1.5%, BIA 22.1±0.7%, UWW 20.0±1.2%, BMI 24.1±1.3 kg/m²). No significant differences were noted between ADP, BIA, and UWW (p>0.05). While one swimmer was identified as having excess fat per ADP, BIA, and UWW, three swimmers and one diver were identified as overweight per BMI. No swimmers or divers were identified as underfat or underweight.

CONCLUSIONS: ADP, BIA, and UWW yielded comparable levels of %BF in women's collegiate swimmers and divers. A larger sample size is required to confirm similarity between techniques. BMI identified two swimmers and one diver as being overweight, despite healthy %BF. Thus, both %BF and BMI should be measured to provide a better understanding of body composition in this population.

Funding Source: Research Dietetic Practice Group Mead Johnson Student Pilot Grant; Bowling Green State University Center for Undergraduate Research and Scholarship Grant

Comparison of Body Composition Assessment Techniques in Women's Collegiate Swimmers and Divers

Megan Larson^{1,2}, Jessica Kiss³, Amy Morgan³, Mary-Jon Ludy¹

BGSU Food and Nutrition Program¹
 VA San Diego Healthcare System²
 BGSU Exercise Science Program³

BACKGROUND

Healthy body composition supports athletic performance

AIM

Compare three methods for assessing body fat percentage (%BF), as well as body mass index (BMI), in NCAA Division 1 women's collegiate swimmers and divers

METHODS

Participants

- Swimmers (n=9)
 - 20.1±1.3 years, 70.9±7.7 kg, 170.6±5.7 cm
- Divers (n=4)
 - 20.5±1.7 years, 62.4±1.9 kg, 161.4±4.9 cm

Procedures

- Single 45-minute test visit
- %BF assessment methods
 - Air-displacement plethysmography (ADP or BODPOD)
 - Bioelectrical impedance analysis (BIA)
 - Underwater weighing (UWW)
- BMI: calculated from measured weight and height

Statistics

- IBM SPSS

Air-displacement plethysmography, bioelectrical impedance analysis, & underwater weighing are equivalent methods for assessing body composition in women's collegiate swimmers and divers.



RESULTS

- No significant differences between the three methods for measuring swimmer and diver body composition (p>0.05)
- BMI identified two swimmers and one diver as being overweight, despite healthy %BF

| Test Group | BMI (kg/m ²) | ADP (%BF) | BIA (%BF) | UWW (%BF) |
|--------------------|--------------------------|-----------|-----------|-----------|
| Swimmers (n=9) | 24.3±2.4 | 22.1±5.0 | 22.7±5.5 | 23.3±5.7 |
| Overweight/Overfat | n=3 | n=1 | n=1 | n=1 |
| Divers (n=4) | 24.1±1.3 | 20.6±1.5 | 22.1±0.7 | 20.0±1.2 |
| Overweight/Overfat | n=1 | n=0 | n=0 | n=0 |

American Council on Exercise
 10-13% essential fat, ≥32% obese

BMI ranges
 <18.5 kg/m² underweight
 ≥25.0 kg/m² overweight/obese

CONCLUSIONS

- Both %BF and BMI should be measured to provide a better understanding of body composition in this population

FUTURE DIRECTIONS

- Expand sample size
- Include masters athletes

FUNDING

- Research Dietetic Practice Group Mead Johnson Student Pilot Grant
- BGSU Center for Undergraduate Research and Scholarship Grant

