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Comparison of Methods to Assess Adiposity in Middle-to-Older Adult Women

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Learning Outcome: The participants will be able to describe methods for accurately assessing body composition of middle-to-older adult females.

Background: As the aging population increases, so does the need to accurately assess chronic illness risk. While adiposity and chronic illness are positively correlated, there is considerable debate over the accuracy of adiposity assessments. This is potentially complicated by changes in body composition that are common in women during the transition from middle age to older adulthood. This study's purpose was to compare adiposity assessment methods for middle-to-older adult women.

Methods: In a single visit study, 36 Caucasian females (aged 57.9±6.8 years) were assessed for body mass index (BMI: 26.4±6.2 kg/m^2, 25.0% obese); sagittal abdominal diameter (SAD: 20.4±4.6 cm, 66.6% obese); waist circumference measured at the umbilicus (90.8±13.8 cm, 52.8% obese) and narrowest area (83.5±12.9 cm, 36.1% obese); waist-to-height ratio measured at the umbilicus (0.55±0.09, 72.2% obese) and narrowest area (0.51±0.08, 41.6% obese); and body fat percent by bioelectrical impedance analysis (BIA: 33.5±9.5%, 22.2% obese) and air-displacement plethysmography (ADP: 35.9±8.7%, 36.1% obese).

Results: According to all adiposity measures, 19.4% of participants were classified as obese whereas 22.2% were classified as healthy. Variable results were found in 58.3% of participants. All measurements were strongly correlated (r≥0.713, p<0.001).

Conclusions: When using ADP as the criterion method, BMI, BIA, and narrowest area waist measurements classified a similar segment of the population as obese (approximately one-quarter to one-third). Despite their high correlations, SAD and umbilicus area waist measurements had a tendency to overestimate adiposity (approximately one-half to three-quarters). Accurate adiposity-risk classification has associated long-term effects related to cost, intervention, and educational programming.

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Abstract

Background:
As the aging population increases, so does the need to accurately assess chronic illness risk. While adiposity and chronic illness are positively correlated, there is considerable debate over the accuracy of adiposity assessments. This is potentially complicated by changes in body composition that are common in women during the transition from middle age to older adulthood. This study's purpose was to compare adiposity assessment methods for middle-to-older adult women.

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Introduction

➢ The accuracy of Body Mass Index (BMI), a frequently used measurement to assess adiposity in individuals and indicator in the prevalence cardiometabolic risk, has been long debated.[1]

➢ This is a significant concern in the elderly population as body fat increases and muscle mass decreases with age, particularly in females.[2]

➢ Other assessment techniques such as waist circumference at the narrowest area and umbilicus area (WCN and WCU respectively), sagittal abdominal diameter (SAD), bioelectrical impedance analysis (BIA), and air displacement plethysmography (ADP) have been debated to be more accurate measurements of adiposity, as they use either central adiposity or body fat percentage to assess obesity related risk.[3-5]

Methods

Body Mass Index (BMI). Mean BMI was 26.4±6.2 kg/m² . Obesity-related risk (≥30 kg/m²) was noted in 25.0% of participants.
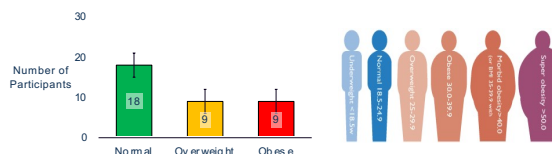

Sagittal Abdominal Diameter (SAD). Mean SAD was 20.4±4.6 cm. Obesity-related risk (>19.3 cm) was noted in 66.6% of participants.


Waist Circumference (WC, ▮). Mean WC was 90.8±13.8 cm at the umbilicus and 83.5±12.9 cm at the narrowest area. Obesity-related risk (>88 cm) was noted in 52.8% and 36.1% of participants, respectively.

Waist-to-Height Ratio (Wt:Ht, ▮). Mean Wt:Ht was 0.55±0.09 at the umbilicus and 0.51±0.08 at the narrowest area. Obesity-related risk (>0.5) was noted in 72.2% and 41.6% of participants, respectively.
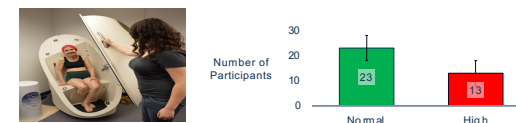

Narrowest   **Umbilicus**
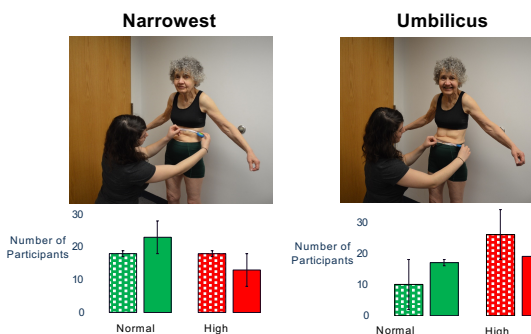
Methods

Bioelectrical Impedance Analysis. Mean % fat was 33.5±9.5%. Obesity-related risk (>42%) was noted in 22.2% of participants.
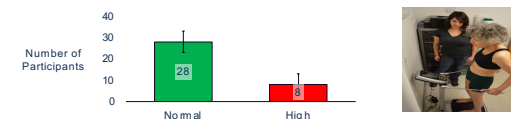

Air Displacement Plethysmography. Mean % fat was 35.9±8.7%. Obesity-related risk (>42%) was noted in 36.1% of participants.

Results and Discussion

➢ Variable results were found in 58.3% of participants.

➢ All adiposity measures indicated 19.4% and 22.2% of participants were lean or obese, respectively.

➢ All measurements were found to be highly correlated (r≥0.713, p<0.001).

Obese, 7, 20%; Healthy, 8, 22%; Variable, 21, 58%
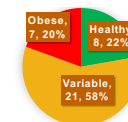
Conclusions

➢ While all assessment techniques were highly correlated with one another, it was determined that SAD and waist circumference at the umbilicus measurements had the tendency to overestimate adiposity.

➢ BMI, waist circumference measurements at the narrowest, BIA, and ADP should be used in tandem with each other in order to better predict the prevalence of increased adiposity in older adult females.

➢ Due to the high proportion of variable results, it was concluded that there was a lack of standardization in adiposity measures in assessing older adult females.
  ➢ This impacts the capability of health care professionals to adequately assess adiposity and make appropriate interventions.

Acknowledgments

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