Which Anthropometric Index Is Most Strongly Correlated with Percent Body Fat Changes in Older Adults with Obesity?

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Introduction:

Identifying practical indices to evaluate body composition changes in older adults could assist Registered Dietitians in assessing patients' obesity-related risk for cardiometabolic disease.

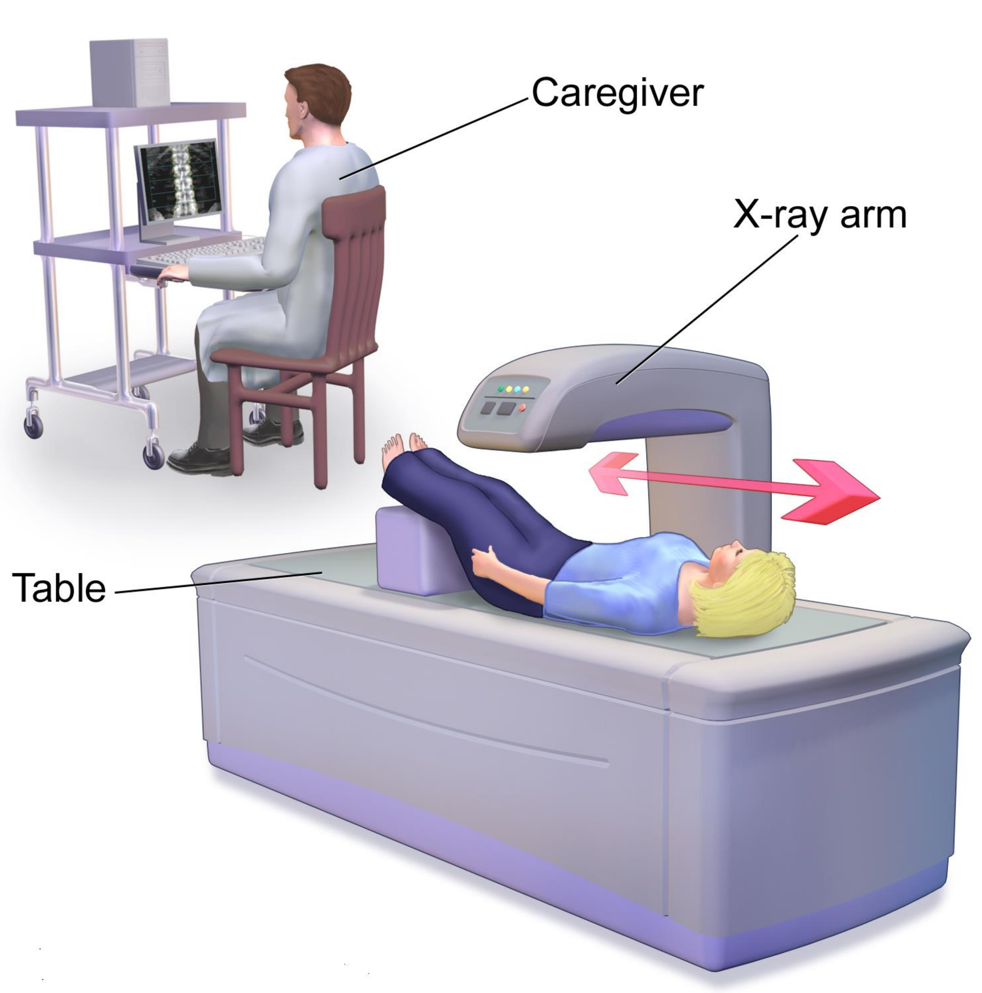
Body mass index (BMI) is the standard anthropometric index used clinically. However, relying solely on body mass index (BMI) to measure obesity can be inadequate, as it cannot differentiate between fat mass, fat-free mass, and how adipose tissue is distributed. This is especially important to keep in mind when assessing BMI in older adults, as loss of height can lead to incorrect interpretations. With advancing age, adipose depots are also redistributed such that subcutaneous adipose tissue decreases and intra-abdominal adipose tissue increases.

Robust measures such as dual-energy X-ray absorptiometry (DXA) are rarely available for body composition assessment in clinical settings. Other anthropometric indices estimate body fat, but the accuracy of these indices in older adults is unknown. This secondary analysis of a larger clinical trial compared four anthropometric indices to the gold standard of DXA.

This study aimed to identify cost-effective and reliable measures to be used in clinical setting to monitor body fat changes in older adults with obesity.

Methods:

Data were available for 45 men and women with obesity, aged 65-84, who participated in a one-year weight loss and exercise intervention. Height, weight, waist circumference (WC), and fat mass (DXA with regional analysis for trunk fat) were measured at baseline and month 12.
Four anthropometric indices were calculated: weight-adjusted-waist index (WWI), conicity index (C-I), and two different waist-to-height ratios (WHTR and WHT.5R). Changes over time in each index, percent body fat, and trunk fat were examined by Wilcoxon tests. Associations between change scores were examined by Spearman correlations.



Results:

Table 1. Baseline Demographics

variable	Sample(N=45)
Age	70.3 ± 4.8
Male, sex, no. %	23 (41.8)
Race/ethnicity, no. %	
African American	12 (21.8)
Asian American	1 (1.8)
European American	42 (76.4)
Education, no. %	
High school	4 (7.3)
Some college/technical	16 (29.1)
2 or 4 year college	19 (34.5)
Graduate degree	16 (29.1)

Plus-minus values are mean±SDs.
All demographic information was based upon self-report.

Anthropometric Indices

Index	Formula
WHTR	$\frac{Wc(cm)}{Ht(cm)}$
WHT.5R	$\frac{Wc(cm)}{Ht^{0.5}(cm)}$
C-Index	$\frac{wc(m)}{(0.109 * \sqrt{\frac{Wt(kg)}{Ht(m)}})}$
WWI	$\frac{wc(cm)}{\sqrt{wt(kg)}}$

Ht = Height, Wc= Waist circumference, Wt = Weight

Results:

- There were significant decreases over one year in WHTR (p=.003), WHTR.5 (p=.003), and C-I (p=.043) as well as trunk fat (p<.001) and percent body fat (p<.001).
- Change in percent body fat was correlated with WHTR change (r=.496, p<.001) and WHTR.5 change (r=.494, p<.001).
- Change in trunk fat was also correlated with WHTR change (r=.493, p<.001) and WHTR.5 change (r=.491, p<.001).

Conclusion:

The results suggest that WHTR and WHTR.5 indices may be cost-effective, practical, and valid methods to evaluate body fat changes among older adults in clinical settings. However, further research with larger samples and more diverse populations is needed to confirm the results.

References:

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