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Age and Waist Circumference Modify Discordance of Body Fat Measurements in Adults with Obesity

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Body composition assessments are a chief component on the evaluation of adipose tissue and its relation to lean tissue within the body in clinical weight management settings. However, due to differences in body type some composition assessments may not be appropriate for certain patient populations. Additional research is needed addressing the validity of body fat estimates within more specific sub-populations such as adults with obesity. **PURPOSE**: The objective of this study was to investigate the concurrent validity of percent body fat (%BF) measures estimated by multifrequency bioelectrical impedance analysis (MFBIA) and air displacement plethysmography (ADP) in adults with obesity. **METHODS**: This retrospective study examined the %BF in 94 adults with obesity (BMI >30kg/m^2) measured through ADP and MFBIA at the same appointment. Differences in %BF measured from ADP and MFBIA were evaluated for associations with age, gender, BMI, and waist circumference (WC). **RESULTS**: The 94 adults (44 male, 50 female) included 53% female with a mean age of 50.1 ± 9.9 years, and mean BMI of 38.8 ±7.5 kg/m^2. In the overall group, %BF from MFBIA (42.1% ± 9.7%) was significantly ($p<0.0001$) lower than %BF from ADP (44.7% ± 9.5%). When stratified by age (<50 n=46; 50+ n=48), the differences in %BF between MFBIA and ADP were lower ($p=0.0017$) within those aged <50 (44.1 ± 9.9 versus 45.5 ± 10.0) as compared to those age 50+ (40.2 ± 9.2 versus 43.9 ± 9.0). A smaller subset (n=27) of our sample population was associated with MFBIA having greater underestimation of %BF relative to ADP ($r = -0.42$, $p=0.029$). Differences in %BF from ADP and MFBIA were not associated with BMI ($p=0.238$) or gender ($p=0.114$). **CONCLUSION**: Agreement between %BF from ADP and %BF from MFBIA was applicable for patients with obesity of younger age and smaller waist circumference. Caution should be used when interpreting %BF measurements in adult patients with obesity of older age or larger waist circumference.