ABSTRACT

INTRODUCTION: The Department of Defense (DoD) developed body composition standards that require service personnel to meet sex- and branch-specific body mass index criteria. Failing to meet these criteria leads to body fat percentage (%BF) estimation via the DoD’s circumference method. Service members exceeding these standards face administrative action and a possible premature discharge, thus emphasizing the importance of accurately estimating %BF with this method. PURPOSE: To compare the predictive accuracy of the DoD’s circumference-based equation to estimate %BF compared to hydrostatic weighting (HW); segmental and whole-body bioelectrical impedance analyses (BIA), and sex-specific skinfold thickness assessments. METHODS: Physically active men (n = 35, 25 ± 4.7 yrs, 79.6 ± 21 kg, 176.3 ± 6.7 cm) and women (n = 34, 24.7 ± 5.1 yrs, 63.6 ± 8.6 kg, 166.0 ± 7.3 cm) participated. Population-specific equations were used to compute body density (Db) from ΣSKF and HW and to convert Db to %BF. Sex-specific repeated measures ANOVAs with Bonferroni’s multiple comparisons tests were applied. Agreement between the DoD and the other %BF results were quantified via Bland-Altman 95% limits-of-agreement plots. Statistical significance was set at p<.05. RESULTS: The DoD method predicted a significantly (p<.05) higher %BF (27.1 ± 6.3%) compared to upper body BIA (23.1 ± 4.9%) and SKF (21.9 ± 4.8%) for the women only. For men, the DoD method estimated a significantly lower (p<.05) %BF (12.9 ± 5.5%) compared to lower body BIA (17.5 ± 5.7%). Wide limits-of-agreement (> ±3.5 %BF) for mean differences in %BF were observed between the DoD method and all assessments for both men and women. CONCLUSION: Our findings suggest that at the group level, the DoD’s current method of assessing %BF produces similar values compared to whole-body vertical BIA and HW. However, DoD estimates of %BF at the individual level lack predictive accuracy given the wide limits-of-agreement. Since the DoD method is applied at the individual level, caution is needed when determining if administrative action is necessary.