Comparison of surrogate measures of percentage body fat with bioelectric impedance in Nigerians

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Background: Quantifying the body fat percentage (%BF), its scientific and clinical implications is critical to timely intervention as it has been proven to be a better measure of patient’s risk of cardiovascular diseases than the BMI. Several techniques have been developed to assess BF including imaging, DEXA, bioelectric impedance analysis (BIA), and underwater weighing. The use of anthropometric indices to derive %BF provides an inexpensive surrogate. There are very few studies comparing this surrogate with direct measurements of %BF in Nigeria.

Objective: To determine the relationship between %BF determined with BIA and anthropometric indices.

Methodology: The study was a cross sectional study carried out on 129 (73 females and 56 males) apparently healthy subjects. BIA was used to determine the %BF using the standard protocol. Anthropometric measurements were taken and BMI was derived from the raw data. Duremberg formula, Rope and Choke equation were used to predict %BF from anthropometric indices. Anthropometric indices and %BF obtained were expressed as means and S.D.s. The estimates of %BF by BIA and the anthropometric indices were compared using Student’s t-test and correlation test between the various %BF determined. P value <0.05 was regarded as significant and r>0.800 considered very strong.

Results: One hundred and twenty nine subjects comprising 73 females and 56 males were studied. Mean age was 27.91±6.9 years. The mean BMI was 23.11±4.97 kg/m² for females and 24.22±3.94 kg/m² for males. The mean %BF composition obtained by BIA was 31.79±9.53%, 20.67±8.04%, Duremberg formula 28.35±6.79%, 19.84±5.74%, and Rope and Choke equation 29.94±9.73%, 29.93±8.03% for females and males respectively. There is a strong correlation between the %BF obtained using BIA and the anthropometric indices, r=0.832 and 0.814 for females and 0.887 and 0.832 for males.

Conclusion: There is a strong correlation between BF estimation using BIA and the anthropometric indices. These surrogate measures can be used reliably to estimate %BF and hence determine the cardiovascular risk.