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Is there any relationship between Body Mass Index (BMI), selected anthropometric parameters and body fat percentage?

A.A.M.D.D.N. Amarathunga[1, 3*], D.N.A.W. Samarakoon[2, 3] and P.P.R. Perera[4]

[1]Department of Pharmacy, Faculty of Allied Health Sciences, General Sir John Kotelawala Defense University, Sri Lanka,[2]KIU, Battaramulla, Sri Lanka, [3]B.Pharm Programme Unit, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka, [4]Department of Biochemistry, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka
[*]dinithinuwanga@gmail.com

In clinical practice, use of Body Mass Index (BMI) and anthropometric parameters as indicators of obesity is easy, but their reliability as tools for measuring body fat on an individual level can be questioned. A cross-sectional study was conducted among randomly selected 367 female undergraduates residing in hostels of University of Sri Jayewardenepura to determine the relationship between BMI, selected anthropometric parameters and Body Fat percentage (BF%).

Weight, height, mid upper arm circumference (MUAC), mid-thigh circumference (MTC), waist circumference (WC) and hip circumference (HC) were measured in accordance with WHO standards. Total BF% was estimated using Karada Scan®; body fat analyser (Bioelectrical Impedance Analysis). Descriptive statistics, Pearson correlations and Chi-square (χ^2) test were performed in the analysis (SPSS 21.0).

The means of BMI, total BF%, WC, MUAC, MTC, WHR and WTR were, 19.59 ± 3.56 kg/m^2, 28.23 ± 4.71 %, 72.43 ± 8.92 cm, 25.27 ± 3.69 cm, 43.64 ± 5.42 cm, 0.81 ± 0.07 and 1.67 ± 0.16 respectively. According to WHO categorization for Asians, 41.4 % were underweight (<18.5 kg/m^2), 7.9 % were overweight (23.0 - 24.9 kg/m^2), 7.6 % were obese (≥25.0 kg/m^2). 28.9 % and 7.9 % were with high BF% (30.0 % - 34.9 %) and very high BF% (35.0 % - 50.0 %) respectively. According to WHO cut-off points for anthropometric parameters, 17.4 %, 1.1 %, 9.0 %, 56.4 % and 57.8 % of the study population had a high risk levels for WC (>80.0 cm), MTC (≥60.0 cm), MUAC (>30.5 cm), WHR (>0.80) and WTR (≥1.65) respectively while 39.0 % had under nutrition level for MUAC (<24.0 cm). A significant association was observed between total BF% with BMI, WC, WHR and MUAC (p-value <0.05). A significant correlation was observed between total BF% with BMI, WC, HC, MUAC, MTC, WHR and WTR.

These results highlight that more than half the population is nutritionally abnormal and other anthropometric parameters also show high risk in some of the participants. Dietary interventions and education on nutrition and regular exercises may be necessary for this group of females as they are the future of the country.