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Receiver operating characteristic curve analysis of anthropometric physiological and biochemical indices and a comparison between four international definitions JSS, mATP-III, IDF and mATP-III for screening metabolic syndrome among pre-and postmenopausal rural females of Amritsar, Punjab

Randhawa Ramanpreet Guru Nanak Dev University, India

Background: Metabolic Syndrome (MS) is one of the major causes of morbidity and mortality across the globe. Limited data is available on the prevalence of MS in India especially among rural females in context to their menopausal status. Therefore, this study was undertaken to determine the prevalence of MS and its components using four international diagnostic criteria in the premenopausal and postmenopausal rural females of Amritsar (Punjab).

Methods: This cross-sectional study was conducted among 500 rural females (289 premenopausal and 211 postmenopausal) of Amritsar (Punjab) during the period from September 2013 to June 2014. The age range of females was 25-55 years. Two anthropometric measurements (height and weight) were taken on each subject. From height and weight measurements, Body Mass Index (BMI) was calculated for the assessment of general obesity. Waist circumference (WC) and Hip circumference (HC) were measured for the assessment of abdominal obesity. Waist-to-Height ratio (WHtR) and Waist-to Hip ration was also calculated. Percent Body Fat (PBF) and Total Body Water (TBW) were estimated using body fat analyser (Bodystat-1500) with the help of Bioelectrical Impedance Analysis. Moreover, Fat Mass Index (FMI) was calculated. Systolic Blood pressure (SBP) and Diastolic blood Pressure (DBP) of each participant was also measured. Fasting blood samples were taken and analysed for the estimation of Total Serum Cholesterol (TC), Triglycerides (TGL), High Density Lipoproteins-Cholesterol (HDL-C) and Fasting Blood Glucose (FBG). Low Density Lipoproteins-Cholesterol (LDL-C) and Very Low Density Lipoproteins-Cholesterol (VLDL-C) were also calculated. The prevalence of Diabetes among rural females was also assessed using guidelines of American Diabetes Association. The prevalence of MS was assessed using four international criteria namely Joint Scientific Statement, modified National Cholesterol Education Program Adult Treatment Panel-III, International Diabetes Federation and National Cholesterol Education Program Adult Treatment Panel-III criteria. SPSS-15 package was used for data analysis and the mean and standard deviation were calculated. Further Student's t-test, chi-square test and kappa statistic were also applied. Receiver Operating Characteristic (ROC) curve analysis was used to determine optimal cut off values for WC, HC, WHtR, WHR, BMI, PBF, TBW, FMI ,SBP, DBP, TC, TGL, HDL-C, LDL-C and FBG among Punjabi rural females.

Results: In the pooled sample, the postmenopausal women had significantly higher values of WC, HC,WHR, WHtR, BMI, SBP, DBP, PBF and FMI than their premenopausal counterparts. In context to lipid profile variables, the values were again significantly higher among postmenopausal females as compared to premenopausal females .According to WHO (2000) criterion, 65.87% postmenopausal and 47.40% premenopausal females were found to be obese. On the basis of WC cut offs given by Snehalatha et al.(), the prevalence of abdominal obesity was also calculated and it was found that postmenopausal (71.56%) females were abdominally more obese than premenopausal (48.78%) females.The prevalence of MS was 33.8 %, 29.66%, 26.60% and 24.20% using JSS, mNCEP ATP-III, IDF and NCEP ATP-III criteria, respectively. The postmenopausal females were observed to have significantly higher prevalence of MS than premenopausal females. Among 500 rural females, 18.2% (91) females were screened positive for MS by all the four criteria. According to ROC curve analysis, anthropometric parameters WC, HC and WHtR, physiological parameters SBP and PBF and biochemical parametersFBG, TGL and HDL-C showed the greatest area under the ROC curvein premenopausal as well as postmenopausal females.

Conclusion: This preliminary study concludes that MS is quite prevalent in rural women of Amritsar using all the three criteria. This high prevalence in this study suggests that primary prevention should be initiated in rural population.

raman.randhawa19@gmail.com