Randhawa Ramanpreet et al., J Women's Health Care 2019, Volume 8
DOI: 10.4172/2167-0420-C1-023

Assessment of metabolic syndrome among urban and rural adult females of Amritsar, Punjab

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Background: Metabolic Syndrome (MS) is a major, widely prevalent and escalating public health challenge in both developed and developing countries. It has gained attention because individuals with metabolic syndrome have two-fold risk of developing Cardiovascular Diseases (CVDs), three-fold risk of heart attack and five-fold risk of developing Type 2 Diabetes Mellitus (T2DM) than without metabolic syndrome subjects. Among women all over the world, CVD is one of the main causes of mortality because during menopausal transition the metabolic changes that take place increases the risk of occurrence of obesity, T2DM, hypertension and dyslipidemia which are main components of metabolic syndrome. It is apparent from the published literature that there is limited data on the prevalence of metabolic syndrome from Punjab especially among females. Therefore, in the present study, an attempt has been made to generate baseline data about the prevalence of metabolic syndrome among adult urban and rural females of Amritsar (Punjab).

Materials & Methods: The present cross-sectional data was collected from adult upper middle class Jat-Sikh females ranging in age 40 65 years and residing in various urban and rural areas of Amritsar district. The study group included 1520 females, out of which, 800 females (Pre-M: 396 and Post-M: 404) were urban and 720 women (Pre-M: 395 and Post-M: 325) were rural. Four anthropometric measurements (weight, height, waist circumference and hip circumference) were taken on each subject using standard methodology. From weight and height, BMI was calculated to assess general obesity. In addition to this, abdominal obesity was assessed by measuring Waist Circumference (WC) and calculating Waist-to-Hip Ratio (WHR) and Waist-to-Height Ratio (WHtR) cut-ffs. The blood pressure of each subject was recorded to detect hypertension status. Fasting blood glucose (FBG) of each subject was checked in the fasting stage with capillary finger prick method using a standardized digital Glucometer to predict diabetes. For studying lipid profile, 3 ml of venous blood was withdrawn from each subject in the fasting stage and various biochemical tests were performed to predict the levels of Total Cholesterol (TC), Triglycerides (TGL), High Density Lipoproteins-Cholesterol (HDL-C), Low Density Lipoproteins-Cholesterol (LDL-C) and Very Low Density Lipoproteins-Cholesterol (VLDL-C). From these biochemical parameters, dyslipidemia was disgnosed. From this information, assessment of Metabolic Syndrome (MS) was accomplished using five internationally renowned and valid criteria named as World Health Organization (WHO, 1999), National Cholesterol Education Program Adult Treatment Panel-III (NCEP ATP-III, 2001), International Diabetes Federation (IDF, 2005), modified NCEP ATP-III (mNCEP ATP III, 2005), and Joint Interim Statement (JIS, 2009) also known as Harmonized Asian-Specific Diagnostic Criterion among adult urban and rural premenopausal and postmenopausal females of Amritsar. Statistical Analysis was done using Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA version 21).

Results: In the pooled data, the prevalence of general obesity was 27.8% (≥30 kg/m2) and 61.4% (≥25 kg/m2) according to WHO (1998) and WHO (2000) criteria of BMI, respectively. The overall prevalence of abdominal obesity was 70.5%, 71.3% and 73.5% according to WC, WHR and WHtR cut-offs, respectively among studied females. In the whole sample, 11.8% females were diabetic, while 21.2% females were prediabetic. The overall prevalence of hypertension in the present sample was 24.8% whereas 47.0% females were prehypertensive. Reduced levels of HDL-C , hypercholesterolemia and hypertriglyceridemia were observed in 79.1%, 3.5% and 8.9% females, correspondingly. The percentage prevalence of metabolic syndrome among adult females of Amritsar was found the maximum using JIS (2009) Harmonized Asian-specific criterion (52.1%) followed by mNCEP ATP-III (47.5%), IDF (46.4%), ATP-III (41.5%) and WHO (13.1%) guidelines. The JIS (2009) criterion yielded four times higher prevalence of metabolic syndrome than WHO criterion. On applying kappa statistic, the almost perfect agreement (k=0.90) was observed between JIS (2009) and mNCEP ATP-III (2005) criteria followed by JIS with IDF (k=0.88) and mNCEP ATP-III with IDF (k=0.83) guidelines. Further, venn diagram was drawn to see all the possible logical relations between the used criteria for the assessment of MS. It is interesting to note that 10.5% (160) females were commonly diagnosed with MS by using five criteria of interest all-together. Overall, WHtR obesity index postulated the strongest and highly significant ($p<0.001$) correlation with all the components of metabolic syndrome. The maximum predictive efficacy in terms of AUCs to diagnose metabolic syndrome was also exhibited by WHtR among all the obesity indices followed by WC, FMI, PBF, WHR and BMI, respectively.

Conclusion: This preliminary study highlights that the prevalence of metabolic syndrome is quite high among adult females of Amritsar irrespective of the region and menstrual status. There is a need of further reinforcing study to support these observations with a bigger sample size of longitudinal nature.

Biography

Ramanpreet Randhawa has earned her PhD in 2018 in Human Genetics with a focus on women health, burden of non-communicable diseases and epidemiology from Guru Nanak Dev University, Amritsar, Punjab, India . She has published research papers, review articles and chapters in various national and international journals as well as books. She has also presented research papers in national and international conferences. In addition to this, she is always on forefront being a resource person in hands-on workshops conducted in her concerned research field.

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