Neck Circumference: An Independent Diagnosis Criteria for Metabolic Syndrome in Thai Populations

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Background: The measurement of waist circumference to predict metabolic syndrome (MS) has some limitations that may be unreliable. Currently, there are efforts to find anthropometric indices that are easier. The neck circumference (NC) is easy to measure and yet may be associated with MS and cardiovascular risk factor.

Objective: The aim of this study was to investigate the NC between people with and without MS, the NC to predict MS separated by gender, the correlation between NC, metabolic risk factor, and other anthropometric indices, and also the contribution of NC to the prediction of cardio-metabolic risks.

Methods: A total of 390 medical personnel (73 men and 317 women), aged 18 years, were recruited from Health Examination Center at Out-patient Department of Siriraj Hospital, Bangkok, Thailand between February 2016 and January 2017. Anthropometric indices, biochemical and clinical parameter were measured. Receiver operating characteristic, partial correlation and logistic regression analyses were employed to evaluate the NC between those with and without MS.

Results: Mean neck circumference in MS was significantly higher than no MS (35.83 cm and 32.44 cm, respectively). The NC of ≥ 38 for men and ≥ 33 for woman were the best cut-off points for metabolic syndrome. There was positively correlated between NC with Age (r=0.125), Height(r=0.448), Weight (r=0.794), BMI (r=0.673), WsC (r=0.730), HpC (r=0.637), W-HtR (r=0.592), W-HpR (r=0.334), SBP (r=0.458), DBP (r=0.311), TG (r=0.403), TC (r=0.169), LDL-C (r=0.235), FBS (r=0.350), and negative correlated with HDL-C (r=-0.390). The result was similar between both genders, except Age, TG, HDL-C in male and Height in female, with no statistical significance. The ORs (95% CIs) of NC in men and women were respectively 1.283 (1.046-1.574) and 1.252 (1.095-1.431) for high BP, 1.260 (1.005-1.580) and 1.301 (1.134-1.493) for increased TG, 0.959 (0.719-1.279) and 1.279 (1.143-1.431) for low HDL-C, 1.105 (0.886-1.379) and 1.441 (1.226-1.693) for increase FBS, and 2.367 (1.523-3.677) and 2.340 (1.908-2.870) for central obesity.

Conclusion: Neck circumference is significantly associated with metabolic syndrome and metabolic risk factor, while contributes to the prediction of cardio-metabolic risks in Thai adults.

Keywords: Metabolic syndrome, Thai, Neck circumference, Central obesity, Hypertension, Impair fasting glucose, Hypertriglyceridemia, Hypoalphalipoproteinemia