OBESITY INCREASES THE RISK OF DEVELOPING INSULIN RESISTANCE AND PROMOTE METABOLIC SYNDROME: A STUDY AMONG OBESE AND NON-OBESE NON-DIABETIC SUBJECTS

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International Diabetes Federation defines, central obesity indicated by increased waist circumference (WC) as the primary criteria of metabolic syndrome. In addition, insulin resistance (IR), impaired fasting serum glucose, hypertension and dyslipidemia are considered as other criteria for assessing metabolic syndrome. Hence the aim of this study was to identify the potential risk factors for the development of metabolic syndrome in obese subjects. This study was conducted at Faculty of Medical Sciences, University of Sri Jayewardenepura as a case control study, in subjects who were not diagnosed as diabetics and had fasting serum glucose level < 100 mg/dL (n = 100), aged 20-40 years, consisting obese as the case group (Body Mass Index $\geq$ 25 kgm^{-2}, n = 50) and non-obese as the control group (Body Mass Index < 25 kgm^{-2}, n = 50). WC > 80 cm in females and WC > 90 cm in males were considered as cut-off values for central obesity. Venous blood sample (4 mL), was obtained. Fasting serum glucose (GOD/POD kit method), fasting serum insulin (ELISA method) were assessed. Insulin resistance was calculated using the homeostasis model assessment-estimated insulin resistance (HOMA-IR).

$$HOMA\text{-}IR = \frac{\text{Fasting insulin } (\mu U/ml) \text{ X fasting glucose } (mmol/l)}{22.5}$$

HOMA-IR $\geq$ 2.6 was considered as insulin resistant. Data were analyzed using SPSS and Microsoft Excel 2010. Among the obese group, 38% of the subjects had HOMA-IR $\geq$ 2.6 (4.37 ± 2.22 µIU/mL), whereas in non-obese group only 8% had HOMA-IR $\geq$ 2.6 (4.30 ± 2.49 µIU/mL). In obese group 82% had central obesity (males = 96.7 ± 5.1 cm, females = 89.4 ± 8.5 cm) while in non-obese group there were only 14% with central obesity (males = 92.8 ± 3.1 cm, females = 84.2 ± 2.3 cm). Among the obese group, 34% had both high HOMA-IR and central obesity, but in non-obese group only 2% had both insulin resistance and central obesity. Apart from this, the obese subjects had significantly higher (p value < 0.05) mean insulin resistance value (2.82 ± 1.86) compared to the mean IR value (1.91 ± 0.99) of non-obese subjects.

Even in apparently normal non-diabetic subjects, high percentage of obese subjects had increased WC. Further, a good percentage of these obese subjects also had increased HOMA –IR indicating obesity alone could give rise to insulin resistance and promote the risk of developing metabolic syndrome.

Keywords: Insulin resistance, Waist circumference, central obesity, obesity, HOMA-IR