**ABSTRACT**

**Rationale:** Parallel to the global epidemic of Obesity, is the escalating prevalence of the more potent Abdominal Obesity, resulting in a concomitant rise in Noncommunicable Diseases (NCDs) such as Hypertension, Diabetes, Dyslipidemia and Metabolic Syndrome (MS). This concern is pertinent for populations from developing countries like India that are in a phase of Nutrition Transition. High cardio-metabolic risk is evident at younger ages and at lower levels of assessment criteria such as Body Mass Index (BMI) and Waist Circumference (WC) among Asian Indians compared to Caucasians. Consequently, World Health Organization (WHO, 2000b) has suggested that these criteria may require a revision in the Asian Indian population. However, there exists a lack of sufficient documentation in this region to formulate guidelines on the optimal cutoffs of anthropometric indicators for early NCD screening. Further, scarcely any studies have examined the role of diet and activity, either in isolation or in combination with abdominal obesity in examining the NCD risk. Our study was therefore undertaken to systematically investigate these imperative issues.

**Methods:** Present investigation is a cross-sectional study covering adult men (n=302) aged 30-60 years from urban affluent population in Pune city, Maharashtra, India. Rotary Clubs were approached and Obesity Assessment camps were organized for voluntarily participating club members. Information on socio-economic aspects, habitual diet and activity patterns and lifestyle factors was collected. Anthropometric measurements included weight, height, BMI, percent body fat (BF %); circumferences at the waist (WC), abdomen (AC) and hip (HC) and skinfolds at triceps (TSF), biceps (BSF), sub-scapular (SSF) and supra-iliac (SUF). NCD risk assessment was done for hypertension, disturbed glucose and insulin metabolism, dyslipidemia and metabolic syndrome (MS).

**Salient findings:**
- Prevalence of obesity based on BF (73.5%) was much larger than that based on BMI (57.3%), and half of it was attributable to abdominal obesity (33%).
- Prevalence of NCDs viz. hypertension (36.4%), high FBG (10.6%), high insulin (25.2%), high HOMA-IR (24.4%), dyslipidemia (52.3%), high TG/HDL (36.1%), MS (13.9%) was also quite high among the study subjects.
• Both overall and abdominal obesity increased with total calorie intake, however, fat intake was significantly associated only with abdominal obesity based on WC. High consumption (> 2/week) of fried snacks and sweets significantly increased risk for overall and abdominal obesity.

• Inactive behavior including recreation and nap time (>4 hours/day) was significantly positively, while higher outdoor activity (≥60 min/day) was significantly inversely associated with risk of abdominal obesity.

• High consumption (> 2/week) of fried foods was significantly associated with disorders of glucose and insulin metabolism as well as MS, while high fish consumption (>1/week) was negatively associated with risk of MS.

• Increased recreation time (>3 hours) significantly increased risk of MS, while increase in outdoor activity time (≥60 min/day) significantly reduced risk for high HOMA-IR. However, in the presence of diet, it was only the inactive time that independently predicted risk of MS.

• Abdominal obesity as assessed by WC had higher sensitivity for predicting maximum and multiple NCD risk, that too at much lower levels. WC showed highest predictability for insulin resistance (HOMA-IR) than hypertension or dyslipidemia. An independent association of WC with NCD risk existed even after BMI adjustment.

• An optimum cutoff of WC (86 cm) was identified for NCD risk assessment that was lower than the suggested WHO cutoff of WC (90 cm) for Asian men. This finding has important implication since almost 21.5% of our subjects at risk of NCDs would not have been identified using the current WHO cutoff.

• Finally, when all the major confounders i.e. BMI, WC, diet and activity were considered together, WC emerged to be the significant independent predictor for risk of most NCDs. Among the diet patterns, outside snack and meal consumption retained their significance, while inactive time lost its significance in the presence of diet and adiposity, indicating that perhaps it operates through abdominal obesity.

• Above observations underscore the potential of our simple FFQ and activity questionnaire in revealing associations between diet, activity, obesity and NCD risks. Further, WC being a simple indicator, our observations highlights its use for screening NCD risks in large populations. It will also be a useful indicator for monitoring purposes, but needs to be validated.

*******************