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ORIGINAL ARTICLE

Prevalence of overweight/obesity and central obesity and its associated factors among a sample of university students in India

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Summary
Background: Obesity and the lifestyle characteristic of Indian society lead young people to conditions of potential cardiovascular risk. The purpose of this study was to assess the prevalence of overweight/obesity and central obesity and its associated factors in a sample of Indian university students.
Methods: In a cross-sectional survey assessed anthropometric measurements and a self-administered questionnaire among a sample of randomly selected university students. The sample included 800 university students from non health (mainly sciences) courses Gitam University in India. The students were 541 (67.6%) males and 259 (32.4%) females in the age range of 17—20 years (M age 18.2 years, SD = 1.0).
Results: 37.5% were overweight or obese, 26.8% overweight (≥23—27.4 BMI) and 10.7% obese (≥27.5 kg/m^2), 11.7% underweight (<18.5 kg/m^2) and 16.4% central obesity (WC ≥90 cm for men and ≥80 cm for women). In multivariate analysis among men lack of non-organised religious activity (odds ratio = OR 0.85, confidence interval = CI 0.77—0.95), lower dietary risk knowledge (OR = 0.64, CI = 0.41—0.99), tobacco use (OR = 2.23, CI = 1.14—4.38), and suffering from depression (OR = 1.59, CI = 1.00—2.47) were associated with overweight/obesity, and younger age (OR = 0.32, CI = 0.12—0.90), lives away from parents or guardians (OR = 1.79, CI = 1.04—3.07), healthy dietary practices (OR = 1.95, CI = 1.02—3.72) and 9 or more hours sleep duration (OR = 0.28, CI = 0.09—0.96) were associated with central obesity. In bivariate analysis among women, lack of social support, lower dietary

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risk knowledge, tobacco use, and 9 or more hours sleep duration were associated with overweight/obesity and lives away from parents or guardians and abstinence from alcohol associated with central obesity.
Conclusions: The study found a high prevalence of overweight/obesity and central obesity. Several gender specific health risk practices were identified including lack of dietary risk knowledge, shorter sleep duration, living away from parents or guardians, tobacco use and lack of social support and religiousness that can be utilised in health promotion programmes.

Globally, overweight and obesity are rising in both the developing and developed world [1]. Over the past 20 years, the rate of obesity has tripled in developing countries including South Asia as they become more urbanised and adopt a lifestyle of higher caloric intake combined with a more sedentary lifestyle [1,2]. First year university students gain weight [3] and students who gained weight during this period tended to continue a slow, steady gain in weight [4].

Studies among university students in transitional societies seem to show emerging high prevalences of overweight and obesity: Mexico: 31.6% [5], Iran 12.4% [6], Saudi females: 47.9% [7], Oman: 28.2% [8], Kuwait: 42% [9,10], Malaysia: 20—30.1% [11,12], Thailand: 31% [13], Pakistan: 13—52.6% [14,15], and India: 17.8—29.6% [16], females (11%) [17], 3.5% of rural and 31.9% of urban Indian College students [18].

Factors identified to be associated with overweight and obesity among university students or (young) adults include (1) *Sociodemographic factors* (female gender [6]; male gender [12,13,19—22], older age [6,22,23] and higher socioeconomic status [24]; (2) *Social factors*: lack of social support, capital [25,26], lack of religiousness [21], misperception of body image [7]; (3) *Dietary behaviour*: consumption of fried food [13], intakes of fibre [6], consumption of red meat [20], skip breakfast more often [15,27], high number of meals [20], infrequent consumption of snacks [20,28,29], frequent snacks intake [15], fast eating rate [30], lack of weight-control and diet-control drug use [5] and dieting [9,10]; and (4) *Health risk behaviour and mental health risk*: physically inactivity [13,15,21,23,31,32], sedentary behaviour [13,15], frequent alcohol use [5,7,20], smoking [5,6,22], short sleep duration [28,33], poor mental health (depression, anxiety [34,35], posttraumatic stress [36], and severe levels of psychological distress [37]. Further, nutrition knowledge about behaviour-health links (or risk awareness) [8,38] and perceived benefits of dietary health behaviours [38] may be associated with overweight or obesity.

The majority of studies have used body mass index (BMI) as the general obesity index. Central obesity might have higher predictive value with regard to health problems than BMI [39]. It has been established that abdominal obesity, assessed by waist circumference (WC), predicts obesity-related health risk [40—42]. Various studies have shown a high prevalence of abdominal obesity in South Asians [43]. In this ethnic group, abdominal obesity has been recognised as an important risk factor for Type 2 Diabetes Mellitus, the metabolic syndrome and cardiovascular disorders [44—46]. It is hypothesised that socio-demographic, social, nutritional and health behaviour variables are associated with BMI and central obesity. The purpose of this study was to assess the prevalence of overweight/obesity and central obesity and its associated factors in a sample of Indian university students.

Methods

Sample and procedure

The sample included 800 university students from non health (mainly engineering and sciences) courses chosen at random from the Institute of Technology and Institute of Sciences at GITAM (Gandhi Institute of Technology and Management) University, Visakhapatnam campus, in India. Visakhapatnam is a port city on the southeast coast of India with a population of about 2 million [47]. For each of the 12 departments in the two GITAM institutes, undergraduate courses offered by the department were randomly ordered, with larger classes having a greater probability of being near the beginning of the list and smaller classes having a greater probability of being near the end. Data were collected by a self-administered questionnaire in a class room situation (all students