
Prevalence of Overweight in Rural Sedentary Human Resources in Southern Part of West Bengal, India

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ABSTRACT

Development couples economic growth with social equity. Development of any region therefore essentially demands social equity, which has access to quality education, healthcare facilities as an essential prerequisite. Access to quality education necessitates involvement of healthy human resources who will serve as role models and impart quality education to children, that is needed for children's as well as area's holistic development. Obviously rural areas in India are no exception. Simultaneously the Indian rural society is undergoing a major lifestyle transition through last few decades due to growing affluence in a section of the society. In this backdrop, a study was conducted to assess the prevalence, if any, of being overweight and/or obese in human resources involved in imparting education to children on a fulltime basis in rural areas. 48 male (age 38.7 ± 7.56 y) and 36 female (age 38.0 ± 8.36 y) individuals fulfilling the inclusion criteria volunteered for the study. Anthropometric (body height, body weight, BMI) and body composition variables (whole body fat, fat free mass, subcutaneous and visceral fat percentage) were measured and information on demographic and socio economic condition, experience (year), total working hours, occupational sitting time was recorded. It was found from the study that a significant fraction of individuals engaged in teaching in rural areas, a sedentary avocation, falling under upper middle class category as per modified Kuppaswami Scale, irrespective of gender, are showing indications of being overweight, as per WHO classification for South Asians. It may be concluded that this particular nature of sedentary occupation has significant negative impact on body composition in both the genders. Comprehensive workplace health promotion programs (alteration in occupational activities, transport mode and leisure time) should be considered particularly for this type of professions required to have high social impact especially in view of the fact that there is less availability for health fitness centre compared to urban regions, to reverse the growing trend of being overweight for preventing further metabolic complications.

Key words: life style transition, obesity, disease of affluence, occupational sitting time, social equity

INTRODUCTION

Changes in transport systems, industrial production modes, innovations in domestic and workplace communication and laborsaving technologies of cities have led to reduction in the energy required to perform the tasks of everyday life¹. Developing countries are not exception to this trend. Individuals of developing countries are undergoing a major lifestyle transition through last few decades due to growing affluence in a section of the society. The result is that there is an increase in the duration of sedentary behavior, an immobile state of the body (e.g., sitting) resulting in energy expenditure close to the resting metabolic rate^{2,3,4}. Unfortunately it was only in the last decades that research and public health initiatives have started focusing on the sedentary behavior and its association with disease risk and mortality. In light of the emerging long lasting health outcomes of sedentary behavior, there is the need for descriptive epidemiology

findings that can guide public health approaches. Not only different sedentary behaviors, sedentary occupation may have an impact on body composition of the individuals engaged in as individuals spent a significant proportion time of a day in the workplace. Imparting education or teaching is a novel sedentary avocation and providing quality education is an essential prerequisite for development of any region. Access to quality education necessitates involvement of healthy human resources who will serve as role models and impart quality education to children, that is needed for children's as well as area's holistic development.

This particular occupation generally require low amount of physical effort, and thereby there may be a chance of imposing negative health impact of the human resources involved in the occupation for a long period of time. Keeping this in consideration, present work has been undertaken to assess the prevalence, if any, of being overweight and/or obese in human resources involved in imparting education to children on a fulltime basis in rural areas of south Bengal, India.

MATERIALS AND METHODS

Area and population: For the present cross sectional study, on obtaining required consents, data have been collected from adult Bengalee men and women residing in rural areas of southern part of West Bengal. The study population of the present investigation consisted of randomly selected adult occupationally engaged 48 male and 36 female individuals. They are involved in teaching occupation on a full time basis for a period of at least five years and belonged to the Bengalee Hindu Caste Population (BHCP). Individuals with any regular sports activity and self reported disease history were kept out of the purview of the study. Ethical approval was obtained for the study protocol.

Data collection: On the scheduled dates, arranged on mutual convenience, a face-to-face interview was conducted using a standardized questionnaire for gathering socio-demographic information⁵. Information regarding experience in teaching in year, total working hours, occupational sitting time was also recorded. A total of six metric measurements were taken including anthropometric and bioelectrical variables. Body height (to the nearest accuracy of 0.1 cm) using an anthropometric rod and body weight (to the nearest accuracy of 0.1 kg), using a pre calibrated weighing scale, was recorded with subjects in light clothing and without shoes. Body Mass Index (BMI) was then calculated and obesity status was assessed. Both International BMI classification⁶ and Asian cut off⁷ were utilized for the assessment of overweight. Total body fat including subcutaneous and visceral fat percentages separately were measured from impedance method⁸. Fat and fat free mass were calculated.

Data management and analyses: Data were collected in a pre-designed format and finally transferred onto a computer spreadsheet. Standard descriptive statistics (mean \pm Standard deviation) were found out for directly measured and derived variables. Obtained data were analyzed using suitable statistical analysis with significance set at $P < 0.05$.

RESULTS

Descriptive characteristics of participating volunteers of the present study are presented in Table 1. The participating individuals of the study were adult male (n=48) and female (n=36) individuals engaged in teaching occupation of rural area of Hooghly district, West Bengal (WB), India. Participating individuals belonged to Bengalee Hindu Caste population.

Table 1: Basic profile and background information of the study participants

Variables	Male (48)	Female (36)
Socio-demographic factors		
Age	38.7 ± 7.56	38.0 ± 8.36
Marital status	52% married	All Married
Race	Bengalee	Bengalee
Education	University or more	University or more
Monthly income	25000-35000	25000-35000
Socio economic category	Upper middle	Upper middle
Working condition		
Nature of occupation	Sedentary	Sedentary
Institution engaged in	Public funded	Public funded
Work experience (years)	12.3 ± 6.36	9.0 ± 4.88
Working hours per week	33	33
Occupational sitting time (hours/day)	4-5 hours	4-5 hours

No significant difference between male and female individuals in age was detected. All female individuals were married where as 48% male were unmarried. Both male and female individuals were engaged in the specific occupation for a period of ≥ 5 years and on average, both male and female individuals spent more than 4 hours per day in sitting.

In Fig1 comparison between male and female individuals in terms of body composition parameters defining overweight have been presented. From Figure 1 it has been found that mean values of body weight was higher in male individuals compared to their female counterparts. For defining overweight and obesity, BMI is the most common parameter and in the present study it has been found that mean values of BMI of male and female individuals were 24.9 and 26.3 respectively. According to International classification of BMI, mean value of BMI of female individuals of the present study population have already crossed the cut-off limit being referred to as overweight whereas male individuals are just below the cut-off; but on consideration of the Asian cut-off, the mean BMI value of female individuals has crossed the obesity cut-off; whereas male individuals are following the trend. Mean value of fat mass was higher in females compared to male individuals and in case of fat free mass the trend is opposite. Whole body subcutaneous fat percentage was higher in female compared to male individuals where as for visceral fat percentage it is just the opposite.

Prevalence of overweight in terms BMI of International and Asian cut off have been presented in Fig 2.

From Fig 2.i it could be observed that the prevalence of overweight for both male and female individuals was 50% and obesity were 4 and 8%; where as if Asian cut off is considered overweight percentage decreases to 19% in male and 28% in female; on the other hand, obesity percentages increases to 54% in male and 55% in females.

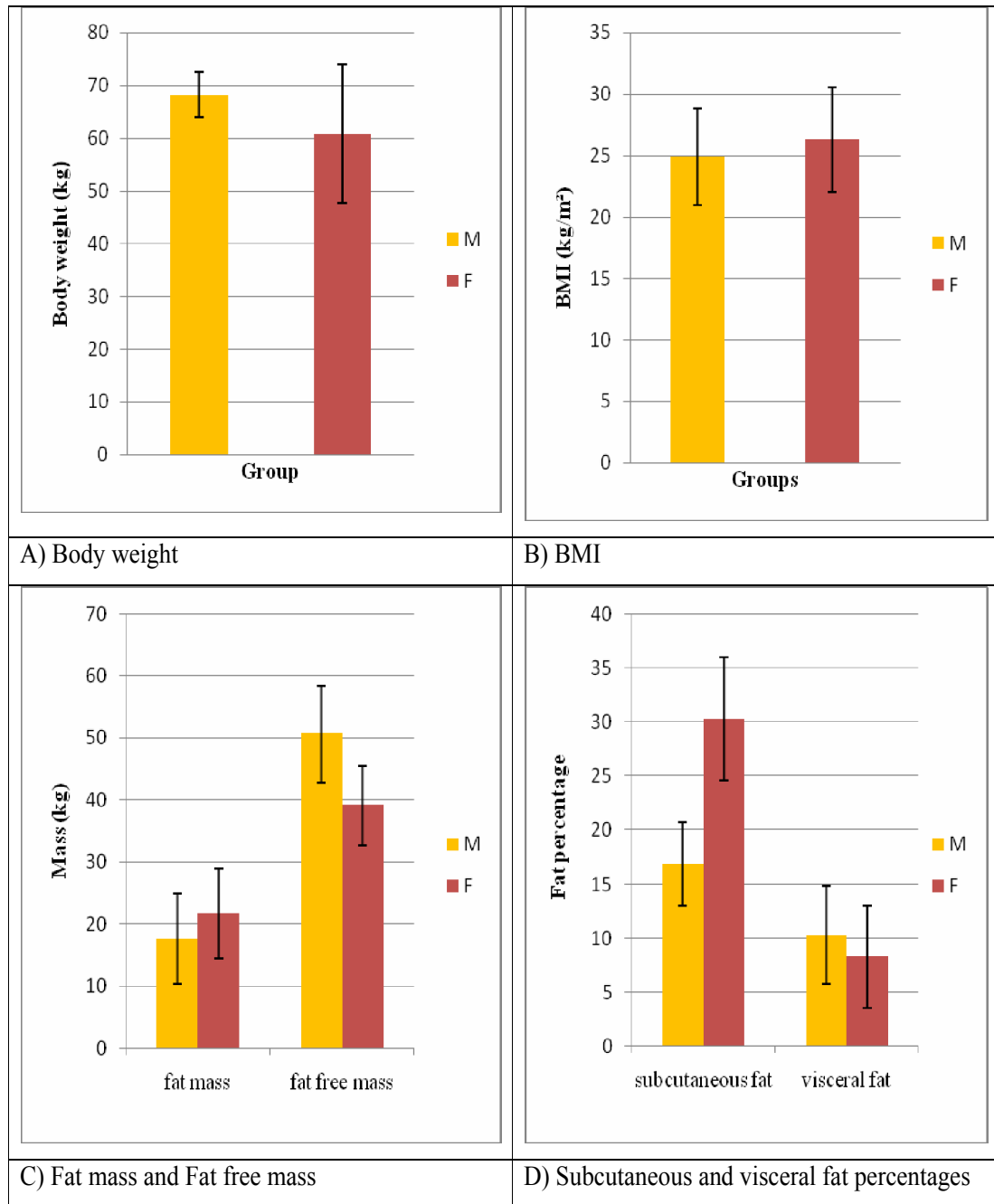


Fig 1: Comparison between male and female individuals in terms of body composition parameters

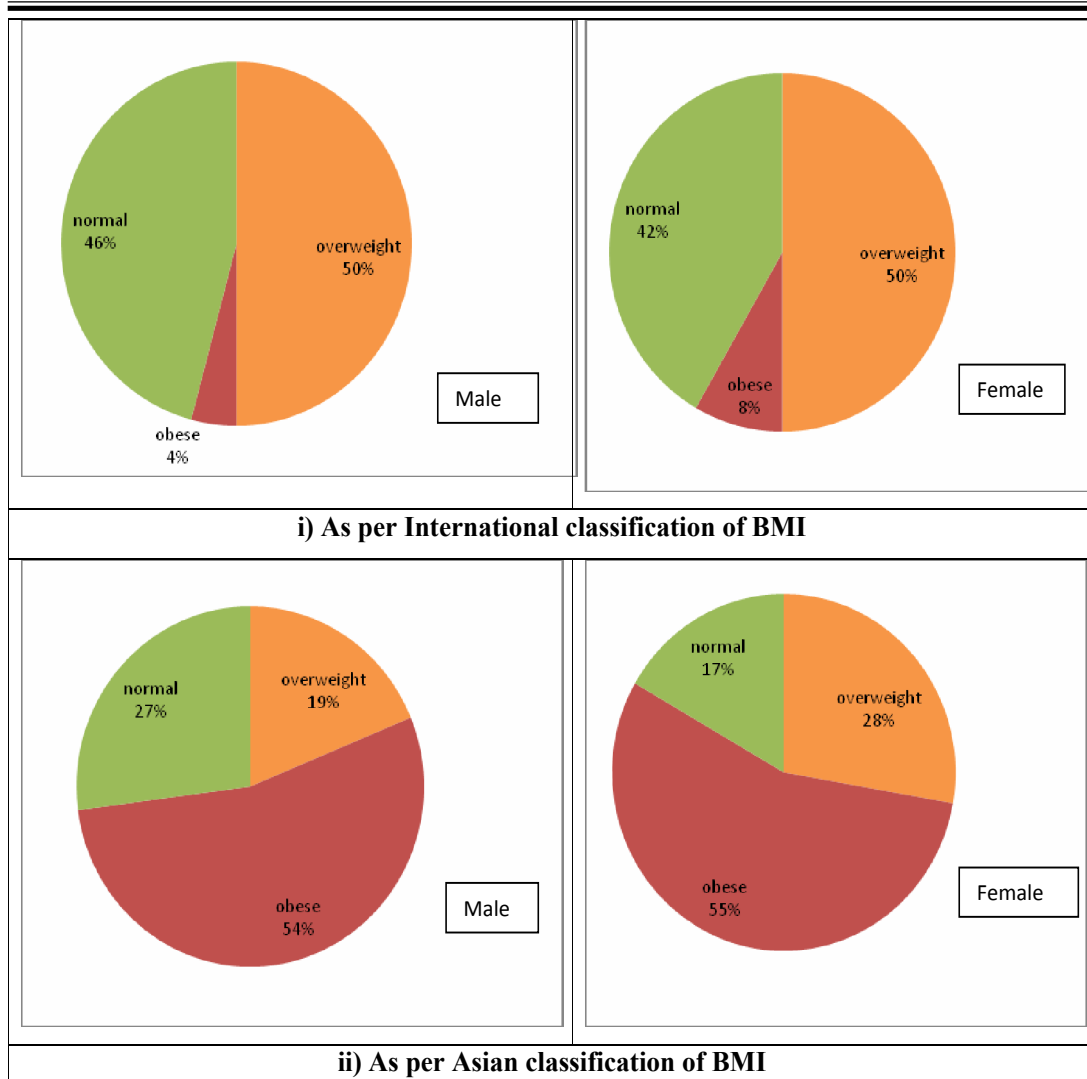


Fig 2: Prevalence of overweight and obesity in male and female individuals in terms of BMI as per WHO and Asian cut off

DISCUSSION

Physical inactivity and sedentary behavior, characterized as one of the major risk factor for Non Communicable Disease^{9,10,11} especially due to immobility, has been received less scientific and policy attention than required based on its high prevalence¹² and massive negative health consequences¹³. Sitting is a central component of sedentary behavior and in our study it has been found that the occupational sitting time of the participating volunteers is more than 4 hours; similar results have been found where it has been reported that 41.5% of the adults

worldwide spend four or more hours per day in sitting condition¹². However, the majority of findings so far reported have been derived from studies in high-income countries and in urban settings. Therefore, there is a need of studies in low- and middle income countries and particularly in rural areas, because the patterns of sedentary behavior are likely to be influenced by variations in social, cultural and economic contexts¹⁴. Here as the volunteers are school teachers they spent 5 full days with 6 hours per day and 1 half day with 3 hours and the total working hours is 33 for both the gender as all of them are engaged in similar type of occupation, i.e. teaching. In a similar study on US workers, it has been found that risk of obesity has been increased when they worked longer than 40 hours per week¹⁵. In the present study it has been found that mean BMI of the male workers is 24.9 which is just below the level of being referred to as overweight as per WHO recommendation; on the other hand, female individuals have crossed the limit of WHO recommended overweight class. From figure 2 total overweight percentages for both male and female individuals was 50% as per WHO recommended cut off of BMI. While if Asian cut off is considered total overweight percentages are 19% and 28% in male and female individuals respectively.

Although BMI is a common worldwide used indicator of overweight and obesity it does not take into account fat and fat free mass and thus it cannot give the true picture of disease risk. It is known that for a given BMI Asians have higher body fat¹⁶ so going to further detail, whole body fat percentage was estimated and fat mass and fat free mass were calculated.

In the present study the earlier recommended cut off point for body fat percentage has been followed; for male it is 25% and for female it is 30%^{17,18}; in the present study it has been found that mean values of body fat percentage of both male (25.2) and female (35.2) individuals have crossed the cut-off limit.

Visceral adipose tissue (VAT) is considered to be one of the most dangerous fat depots within the body, as it is strongly related to cardio metabolic risk factors and insulin resistance¹⁹ and a significant positive association has been reported between VAT and all-cause mortality in adults. In the present study mean value of visceral fat percentage is higher in male individuals compared to their female counterparts. In case of subcutaneous fat the trend is opposite.

In addition to genetic predisposition at least three mechanisms have been suggested to explain the accumulation of body fat due to sedentary behavior. First, very low muscular activity may lead to a positive energy balance, second higher energy intake during the sedentary activity and third sedentary behavior would replace the time spent in physical activities.

Recent findings suggest that replacing sedentary time with light-intensity activities is likely to be beneficial to health. So lifestyle modification is an urgent need for the present study population. The findings of the present study provide support to conclude that such kind of sedentary occupation may be contributing to the obesity prevalence even in developing countries. Comprehensive workplace health promotion programs (alteration in occupational activities, transport mode and leisure time) should be considered particularly for this type of professions

required to have high social impact especially in view of the fact that there is less availability for health fitness centre compared to urban regions, to reverse the growing trend of being overweight for preventing further metabolic complications.

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CONFLICTS OF INTEREST

Nil

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