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Correlates of Socioeconomic Status and Anthropometric Measurements along with Dietary Status of College Going Girls in Lucknow

Abstract

Objective: This study assessed the influence of socioeconomic status (SES) on anthropometric measurements in college going young females in Lucknow, India. Method: This was cross sectional study of 400 females between 18 to 21 years of age selected by random sampling from 10 different colleges, two colleges from each region viz., North, South, East, West and Central region of Lucknow, India. Anthropometric measurements like Body mass Index (BMI) and percent body fat (PBF) as well as Dietary Status was measured using standard techniques. SES was assessed using modified Kuppuswamy's socioeconomic status scale (2014). Results and Conclusion: BMI and Percent Body Fat as well as dietary status were observed to be more in the study population from upper SES group as compared to lower and middle SES groups. This study thus confirms that there is a significant correlation between socioeconomic status and anthropometric measurements in the sample group.

Keywords: Anthropometric measurements, socioeconomic status, BMI, PBF, FM, FFM

Introduction

Obesity is a major public health issue in India and worldwide and its prevalence is increasing. Obesity is associated with many health disorders such as diabetes mellitus, hypertension, dyslipidemia, and coronary heart disease especially when fat accumulation is in the abdominal area (visceral compartment). Indian population have tendency to accumulate fat in the abdominal region.

Young adulthood is a unique and critical period of development during which unmet health needs and disparities in access to appropriate care, health status and mortality are high. Obesity as this phase is associated with irregular and changed food habits, periods of inactivity during leisure combined with physiological change which promote increased fat deposition [2]. Therefore, it is imperative to monitor the body composition in this particular age group in order to prevent the accumulation of excess body fat [3].

Socio-economic status (SES) is considered as an important determinant of health and well-being because it influences people's attitudes, experiences, and exposure to several health risk factors [4]. It is known to be positively associated with better nutrition, housing, schooling, and recreation [5]. In children, SES would affect a wide array of health and socio- emotional outcomes [6]. SES is known to be a confounding factor in development of obesity [7]. The study thus aims to assess the influence of SES on anthropometric measurements in college going young females in Lucknow.

Review of Literature

Sobal *et al.* reviewed 144 published studies to assess the relationship between SES and obesity [8]. Primary finding included the observation of a strong direct relation between obesity and socioeconomic status for women, men, and children in developing societies. Another study supported this finding wherein it concluded that as one moved from high- to medium- to low-HDI (Human Development Index) countries, the proportion of positive associations increased and the proportion of negative associations decreased, for both men and women [9].

Swati Ahluwalia
Research Scholar,
Dept. of Home Science,
MUIT,
Lucknow, U.P., India

Trupti Singh
Head,
Dept. of Home Science,
RBS College,
Agra, U.P., India

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Methodology

      This was a cross-sectional study which included 400 college going females in the age groups of 18 to 21 years selected through convenient sampling from five different zones of Lucknow and from each zone 2 colleges were randomly selected as per the convenience of the researcher. This particular age group was selected for this study as majority of the changes associated with young adulthood take place and complete in this phase [9]. College going Girls living far away from their families such as hostel or as paying guests, Girls on reducing diet or any type of crash diet and also married girls were excluded from this study.

      The modified Kuppuswamy Socioeconomic Status scale was used to assess the SES status of the young females. [10]. Based on Kuppuswamy Socioeconomic Status scale, the females in this study were classified in 3 SES groups: Upper SES (SES score 26-29), Upper Middle SES score 11-25) and Lower Middle SES (and SES score < 11).

      Body Mass Index (BMI) is the most commonly used measure which is only an indirect measure of fatness and was calculated using the Quetelet's Index [12] by taking the sample's weight (in kg) and dividing by the height (in meters) squared. Subjects were classified into four categories (Underweight, Normal, Overweight or Obese) based on the BMI cut-off. Subcutaneous fat was measured through skinfold caliper at triceps, biceps, suprailiac and subscapular site [14]. Percent body fat was computed through these measurements using the Durnim Womersley formula20', dietary status was calculated using 24 hr recall method.

Hypothesis [H_0]

      Socio- economic status has no effect on the anthropometric and dietary status of the college going girls

Results

      The data was analyzed using SPSS version 16. One-way ANOVA was used to compare the means of the anthropometric measurements between the three SES groups. The level of significance was set at <0.001

Table : Frequency distribution of socio-economic status in study population.

SES	Frequency	Percent
UPPER	124	31.0
UPPER MIDDLE	176	44.0
LOWER MIDDLE	100	25.0
Total	400	100.0

Table 1: shows the frequency of subjects according to their SES. Overall, 31% of the girls belonged to upper socio-economic class, 44% girls belonged to upper middle Socio economic class and only 25% girls belonged to lower middle Socio economic class. The same data is presented in figure 1.
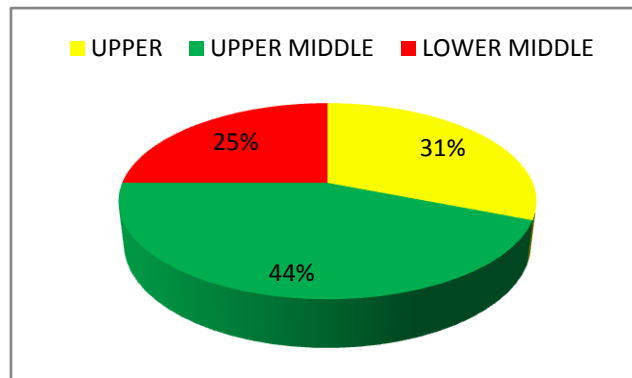

Figure 1 Socio-economic status of the subjects

Relationship of BMI and SES

      BMI is largely affected by the Socio economic status of the subjects. It is positively correlated to the SES status. Table 2 gives the categorization of BMI as per the socio economic status

. **Table 2: BMI as per the socio-economic Status of the selected subjects**

		SES			
		UPPER	UPPER MIDDLE	LOWER MIDDLE	Total
BMI	Underweight	12	4	8	24
		3.0%	1.0%	2.0%	6.0%
	Normal weight	96	148	88	332

	24%	37%%	22.0%	83.0%
Pre obesity	12	24	4	40
	3.0%	6.0%	1.0%	10.0%
Obesity class I	4	0	0	4
	1.0%	.0%	.0%	1.0%
Total	124	176	100	400
	100.0%	100.0%	100.0%	100.0%

Applied χ^2 test for significance p-value=0.001; consider very significant

Table 2 shows the data that maximum normal weight subjects belonged to upper middle class (37%) while the obese subjects belonged to the upper class. The correlation is very significant between BMI and SES after applying chi square for significance test at p- value= 0.001

Correlates of body composition and SES

As the BMI is strongly correlated by the socio economic status of the selected subjects, in the same way body composition too is strongly and positively associated with SES. Table 3 and Fig. 3show the correlation between SES and Body composition.

	SES						p-value
	UPPER		UPPER MIDDLE		LOWER MIDDLE		
	Mean	SD	Mean	SD	Mean	SD	
Percentage BODY FAT	31.73	3.69	30.41	4.61	29.76	2.83	0.001
FAT MASS	17.46	4.03	16.86	4.00	14.20	2.45	<0.001
FAT FREE MASS	38.01	6.62	38.00	5.48	33.30	3.04	<0.001

Applied one way ANOVA for significance

Table 3: correlates of Body Composition and SES

Table 3 shows mean distribution of body composition (PBF, FM, FFM) according to three socioeconomic status groups. Higher mean of body composition was found in Upper socioeconomic group. The one way analysis of variance at p<0.001 showed that there was significant difference among means of different socio-economic groups.
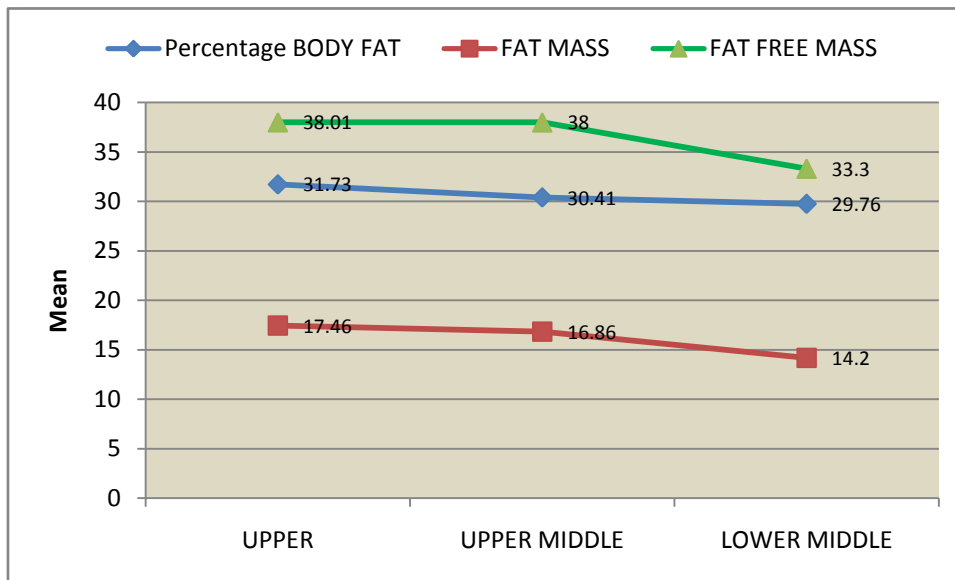

Figure 3: **Correlation between SES and body composition**

Overall, higher mean of body composition was found in Upper socioeconomic group. The one way analysis of variance (ANOVA) showed that there was significant difference among the means of body composition and Socio Economic Status.
Correlates of Dietary Status and SES

The type of diet consumed by the selected subjects is very much affected by her socio- economic status. The higher the SES, higher mean of energy and protein intake is observed. Like the BMI and body composition, dietary intake is also influenced by socio-economic status of the subject. Table 4 clearly

shows the mean of energy (kcal) and protein (gm) categorized in the various SES groups.

	Socio Economic Status						p-value
	UPPER		UPPER MIDDLE		LOWER MIDDLE		
	Mean	SD	Mean	SD	Mean	SD	
ENERGY (kcal)	2200.48	229.78	2138.45	191.30	1951.24	202.35	<0.001
PROTIEN (grams)	49.86	3.48	49.07	3.54	45.15	4.50	<0.001

Table 4: Dietary energy and protein intake as per the different SES categories
Applied one way ANOVA for significance.

Table 4 shows mean distribution of dietary status according to three socioeconomic status groups. Higher mean of dietary status was found in Upper socioeconomic group. The one way analysis of variance showed that there was significant difference among groups mean of SES.

Discussion

Excess increase in body weight and body fat is the result of an energy imbalance due to energy intake having exceeded energy expenditure over a period of time[16]. Energy intake is in the form of food that is consumed by an individual while energy expenditure is through the physical activity or exercise performed by the person. The results in this study indicate that socioeconomic status does play a role in the development of percent body fat.

Subjects from upper SES are more prone to increase in body weight and body fat as compared to those from middle and lower SES while more underweight sample subjects were seen in lower SES. Possible explanation for the different SES-overweight and obesity relationship is that SES may influence people's lifestyles such as diet, food consumption patterns, and access to public services such as health care and transportation and physical activity [11].

Literature reports a replacement of the traditional diet of coarse grains and millets by refined wheat and rice as the staple cereal which has reduced the consumption of fibre content [17,18]. A parallel increase in consumption of fats, oils, sugars, and western-style fast foods is also observed in the urban affluent. [17,18]. Food cost might also play a significant role in determining eating patterns [19]. Increase in cost of fruits and vegetables lead to a decrease in their access to people of lower SES[20,21]. In addition, fast food culture is an emerging trend among the younger generation. The ready availability, taste, marketing strategies and peer pressure make them popular with children and adolescents [21]. This has led to more frequent consumption of meals at fast-food outlets, consumption of high calorie foods such as high fat, low-fiber foods, consumption of oversized portions at home and at restaurants and intake of sweetened beverages. These behaviors are more common in sample group from upper SES where the high calorie food is abundant, affordable, available, and easy to consume with minimal preparation as compared to children from middle and lower SES who probably have an occasional access to it [20].

All these factors may be leading to an increase in BMI and Percent Body Fat observed in selected sample from upper SES as against middle and lower SES.

In addition to food consumption, physical activity may also act as a confounding factor in altering the body composition in adolescents. A general decrease in physical activity levels was observed in children irrespective of the socioeconomic status [22]. This may also contribute to decrease in energy expenditure thus leading to an excess increase in body fat. Selected samples from middle SES probably fall in between the two extremes of abundance in upper SES and inadequacy in the lower SES and thus may be spared from the extreme influence of the various confounding factors.

Aims of the Study

The study aims to assess the influence of SES on anthropometric measurements i.e. BMI, Percent Body Fat, and Dietary Status in college going young females in Lucknow. The study also aims to find out the relationship between SES and anthropometric measurements.

Conclusion

From the results of this study, we can conclude that socioeconomic status did have a direct influence on the anthropometric measurements like BMI, and percent body fat, fat mass, fat free mass and also the dietary status in college going girls. i.e. H_0 is rejected and alternate hypothesis will be accepted.

Conflict of Interest

Nil

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