Effect of Socio Economic Status on Anthropometry Measurements and Food Consumption for Women Aged 35-45 Years

Riddhi Shah[1], Rupali Sengupta[2]

[1]Student (MSc CND-2), Department of Clinical Nutrition and Dietetics, Dr. BMN College of Home Science, NAAC-Re-Accredited "A+ "Grade with CGPA 3.69/4 (Autonomous), 338, R.A. Kidwai Road, Matunga (E), Mumbai: 400019, Maharashtra, India.
172riddhi[at]gmail.com

[2] Head of the Department, D2partment of Clinical Nutrition and Dietetics, Dr. BMN College of Home Science, NAAC-Re-Accredited "A+" Grade with CGPA 3.69/4 (Autonomous), 338, R.A. Kidwai Road, Matunga (E), Mumbai: 400019, Maharashtra, India

Abstract: *The female gender plays an important role in a family, managing children and other family members. In this course, the health of the women is adjusted to a large extend. Socioeconomic status plays an important role in maintaining a healthy lifestyle. Socio economic status (SES) could indicate a difference in dietary diversity in individuals The following study was conducted to know the nutritional status of the women in Mumbai. The purpose of the study was to assess the consumption of different food groups among the higher socio-economic status and lower economic status sample. The study was conducted to find the correlation between the food consumption and anthropometric measurements. Consumption of the various food groups by different socio-economic status was noted using the semi quantitative Food Frequency Questionnaire. Due to the prevalence of COVID-19 lockdown, the string method was used (Ashwell, 2010), which indicated the preponderance of abdominal obesity in women. Socioeconomic status was calculated using BMC classification which included Ration Card details, Annual Income detail. Results showed that low socioeconomic status women did not focus much on healthy eating habit, and were found to have less abdominal fats (p = 0.002). Prevalence of high calorie food consumption was found in higher socioeconomic status.(p= 0.001). Imbalance of food group consumption was observed between different SES and quality of food consumption was compromised. It can be concluded that healthy food options should be made available at lower rates for lower SES, making changes in government policies can help to achieve a balance in nutrition among different SES.*

Keywords: Women, Socio economic status, dietary pattern, Anthropometry

1. Introduction

Female gender plays an important role in a family and experiences a lot of stress. In a study it was found that women have higher levels of stress as compared to men, particularly stress about money was observed by the author Wheeles et al. 2001. In year 2009, Mbada et al., conducted a systematic research showing a negative association between SES and BMI in Nigeria (i.e. a developing country). Different categories of SES were considered for the study. It was concluded that the trend for being overweight and obesity, was noted in developed countries, and it was also observed in developing countries too. This change might be due shift from traditional diets to western diets and reduced levels of physical exercise. In addition, a rapid increase in the level of sedentary jobs had a major role in the development of the current epidemic of being overweight or obesity. (Khan et al., 2014).

World Health Organization (WHO) defines overweight and obesity as abnormal or excessive fat accumulation that presents a risk to health. A simple measure commonly used to classify overweight and obesity in adults is body mass index (BMI). BMI is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m2). WHO identifies overweight when BMI is greater than or equal to 25; and obesity when BMI is greater or equal to 30. In Asians, the cut-offs for overweight ($\geq$23.0kg/m2) and obesity ($\geq$25.0kg/m2) are lower than WHO criteria due to risk factors and morbidities. (WHO, 2020)

A cross-sectional study from the Florey Adelaide Female Aging Study determined that the increase in percent FM- fat mass was mostly due to reduced lean mass. The increase in abdominal percent FM was due to more FM deposited in the abdominal region. The study showed the impact of aging on resting metabolic rate (RMR) and macronutrient oxidation rates as a potential cause for the observed body composition changes during aging. Result showed that changes in body composition was due to alterations in energy balance, with a positive energy balance leading to weight gain and a negative balance resulting in weight loss. It concluded that body composition change was associated with aging. It occurred in the absence of weight fluctuation. It was also found that changes in RMR during aging may be due to changes in body composition. (Flier et al., 2004)

2. Aim

To study the effect of socio economic status on anthropometry measurements and food consumption for women aged 35-45 years

2.1 Objectives

- To assess the consumption of different food groups among the higher socio economic status and lower economic status sample.
- To evaluate the anthropometric measurements of the samples..
- To identify the food groups that is majorly consumed by different socio economic status samples
- To find the correlation between the food consumption and anthropometric measurements amongst the sample.

3. Material and Methodology

Target group selection:
Women from selected wards and falling under different socio-economic groups were selected by random, stratified random. (35-45 years age group). Subjects are selected from lower socioeconomic status and higher socioeconomic status group.

Socioeconomic status
SES was estimated in Kuppuswami classification which considering indicators like material possessions, highest education, highest occupation, and type of house. The modified Kuppuswami classification is based on occupation, education, and income which were modified in 2010. Type of schooling was one of the important indices used by Indian authors where school fees, medium of education, and type of school (public or private) were factored in the composite SES indicator.

Table 1: Kuppuswami 2010 classification

| Education of head of family	Score	Occupation of head of family	Score	Total per capita family income per month (as given originally in 1976)	Score
Professional degree	7	Professional	10	2000 and above	12
Graduate	6	Semi profession	6	RS 1000-1999	10
Intermediate/diploma	5	Clerical/shop/farm	5	RS 750-999	6
High school	4	Skilled worker	4	RS 500-749	4
Middle school	3	Semiskilled worker	3	300-499	3
Primary school	2	Unskilled worker	2	RS 101-299	2
Illiterate	1	Unemployed	1	Less than RS 100	1

questionnaire

Dietary pattern
A food frequency questionnaire was designed to obtain information on overall dietary quality rather than nutrient composition and intake. The food frequency examined how often samples eats certain foods, and the size of the portions. This method is quick and inexpensive but under-reporting is common. Food item list were divided into 5 major that included cereals, pulses, dairy products, fruits and vegetables (IFCT 2020). Snacking food item consumption frequency was asked.

Anthropometric measurements
WtHR that is waist to height ratio was measured to indicate higher risk of obesity-related cardiovascular diseases; it is correlated with abdominal obesity. As due to nationwide lockdown, Dr Margaret Ashwell 2010 view was been circulated among the s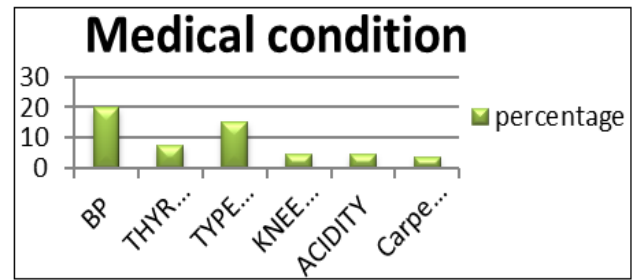amples which said start by cutting a piece of string to the length of your height. The next step was to fold the piece of string in half and wrap it around your middle. If the two ends of the string struggle to meet, your visceral fat level is too high

3.1 Method of Preparation
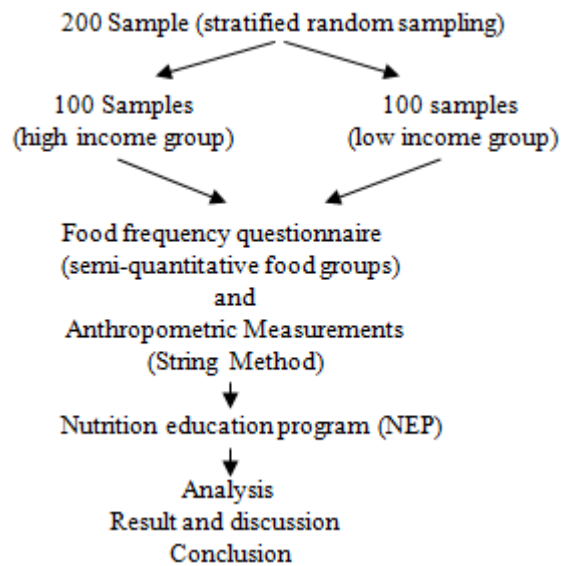
4. Results and Discussion

4.1. Medical condition

Grape 4.1: Medical condition

Lifestyle diseases are non-communicable diseases. They are caused by lack of physical activity, unhealthy eating, alcohol, substance use disorders and smoking tobacco, which can lead to heart disease, stroke, obesity, type II diabetes and many more conditions. Maximum number of the women (20%) suffered from hypertension, 15.4% of the women suffered from diabetes mellitus. Thyroid, knee pain, was also found prevalent among the age group of 35 to 45 years. Starting with daily exercise regime can help to reduce weight and thus can help to reverse many lifestyle related disorders.

4.2 Anthropometric measurements (String method)

Table 4.2: Sting Method

String method	N	Mean	Df	F-value	Significant
Less than 0.5	11	27.00± 5.21	2	2.844	.063
Exact 0.5	20	29.45± 6.85			

More than 0.5	73	26.54± 44.08			
Total	104	27.15±44.91			

Dr. Margaret Ashwell in 2010 said start by cutting a piece of string to the length of your height. The next step is to fold the piece of string in half and wrap it around your middle. If the two ends of the string struggle to meet, your visceral fat level is too high. Due to prevalence of COVID 19 pandemic lockdown, string method was utilized to know t how much abdominal (belly) fat women have. Measuring height with a piece of string, and then folding the length of string that matches height in half and check to see if it fits around waist.

It was observed that most of the women were obese that is most of the women measured more than 0.5 parameter.20 subjects had measurements exact 0.5 , which stated that the women had no excess amount of visceral fats

Very less subjects were in the category of underweight. 11 subjects measured the less than 0.5 and were under the category of underweight.

4.3 Comparison between food group and SES

Table 4.3: Comparison between food group and SES

		N	Mean	DF	Mean Square	df	Sig.
Cereal	LSES	26	43.92 ± 11.97	2	773.173	7.808	0.001
	MSES	34	50.58 ±11.44	101	99.028		
	HSES	44	41.77 ±6.97.	103			
	Total	104	45.19 ±10.58				
Pulse	LSES	26	36.30 ±10.75	2	337.242	3.402	0.037
	MSES	34	41.88 ±10.59	101	99.128		
	HSES	44	36.54± 8.90	103			
	Total	104	38.23 ±10.18				
Milk	LSES	26	19.50 ± 6.94	2	822.945	15.961	0
	MSES	34	28.44 ±8.04	101	51.56		
	HSES	44	20.27 ±.6.58	103			
	Total	104	22.75 ± 8.15				
Vegetables	LSES	26	57.76 ± 11.89	2	539.806	3.609	0.031
	MSES	34	65.64 ±15.69	101	149.564		
	HSES	44	59.68 ±7.42	103			
	Total	104	61.15 ± 12.53				
Fruits	LSES	26	32.38 ± 16.01	2	1128.276	6.451	0.002
	MSES	34	33.11 ± 12.13	101	174.905		
	HSES	44	43.77 ±12.19	103			
	Total	104	36.48 ±13.90				
Beverages	LSES	26	15.76 ± 4.90	2	309.123	7.298	0.001
	MSES	34	18.76 ± 8.19	101	42.36		
	HSES	44	13.09 ±5.77	103			
	Total	104	15.61 ± 6.89				
Bakery	LSES	26	19.92± 8.91	2	137.322	2.492	0.088
	MSES	34	15.76 ± 7.30	101	55.104		
	HSES	44	16.68 ± 6.65	103			
	Total	104	17.19 ±7.52				
Snacks	LSES	26	36.00± 19.49	2	1543.245	7.502	0.001
	MSES	34	21.77 ± 15.18	101	205.7		
	HSES	44	22.68 ± 9.22	103			
	Total	104	26.69 ± 15.22				

Above table 4.3 states the relationship between the socioeconomic status and consumption of various food products such as cereals, pulses, milk and milk products, fruits, vegetables, beverages, bakery, snack items. It was observed that consumption of cereals was higher among the middle socio economic status women than higher and lower socio economic status.

Middle socio economic status were found to consuming high amount of pulses with mean value of 41.88 ±10.59 which is highest compared to other socioeconomic strata. However the data did not show any significant difference when compared to other socioeconomic status. Study conducted by Kumar et al., showed similar results about the consumption of cereals. Considering the milk and milk product consumption, similar trend was observed with milk

and milk product consumption. MSES consumed milk and milk product on higher level with mean value of 28.44 ±8.0 as compared with higher and lower socio economic status. While comparing the data it was observed that the value for milk consumption was non-significant.

Consumption of vegetables was noted to be higher in MSES as compared to other socio economic status that is higher SES and lower SES. NFHS-4 found that consumption of food items, such as pumpkin, carrots, squash, dark green leafy vegetables, liver, heart, other organ meat, fish, shellfish, legumes and nuts, and flesh food, was significantly associated with maternal education but not with household wealth.

Fruits are generally available at higher rate in the market. The study conducted showed that higher socio economic status had higher consumption of the fruits by the mean value of 43.77 ±12.19 and after comparing the fruit consumption in different socio economic status, however the p value is less than 0.005 when the consumption of the fruits was studied among the different SES. The findings are in line with reports, confirming that family socioeconomic status and the affluence of the place of residence are both important factors in terms of fruit and vegetables intake. The (PURE) study analyzed the frequency of fruit and vegetables consumption among adults in 18 countries (including Poland) and found that the lowest intake was observed in low-income countries (2.14 serving/day), while the highest in high-income countries (5.42 serving/day)

To know the beverage consumption among the women, various intake of beverages consumption was asked to different socio economic status group people. It was noted that the consumption of beverages was high among the middle class women. A significant difference was observed among the women.
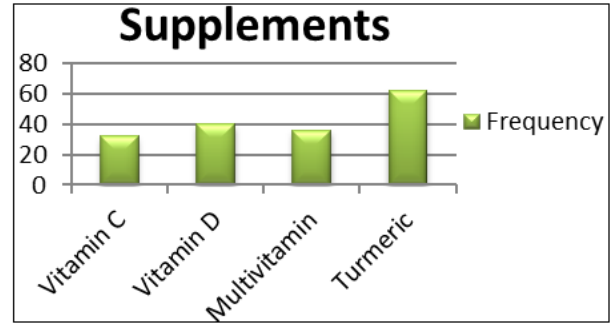
4.4 Supplement Consumption

Figure 4.3: Supplement consumption

As the study was conducted during the lockdown period of COVID-19. Consumption of various immune supplements has observed. It was observed that 59.6% of the subject consumed ready home available turmeric spices- Turmeric has antiviral and anti-bacterial properties. Turmeric is also rich in vitamin C, vitamin B6, and other antioxidants. 39% of the subjects consumed vitamin D supplements, while 30% consumed vitamin C supplements to boost immunity. Report by ASSOCHAM shows spice exports from India have gone up by 23 per cent in June 2020, compared in the same month 2019 year. Which indicates increased consumption of spice throughout the world.
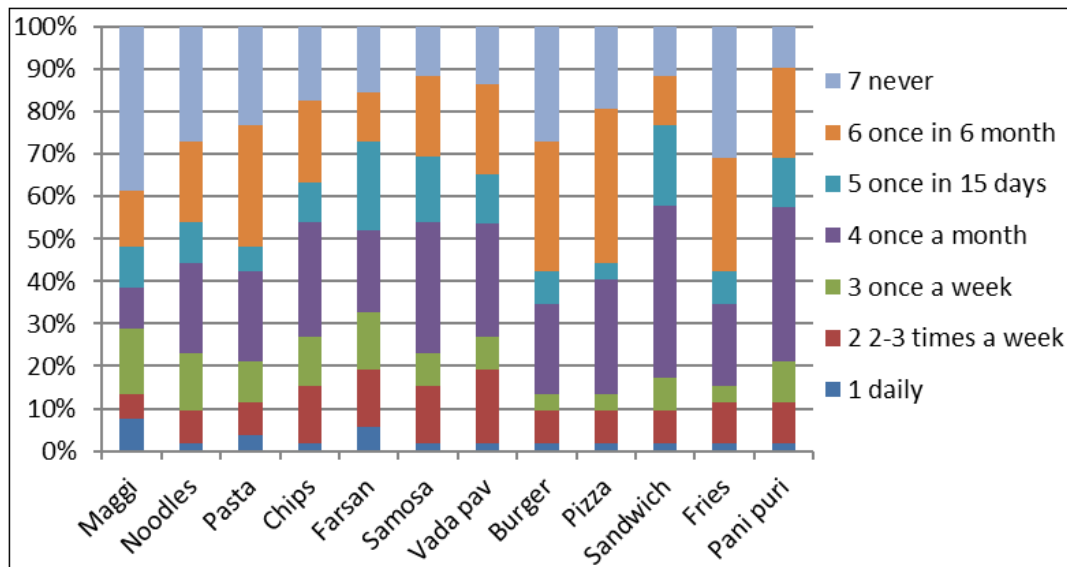
4.5 Junk food consumption

Table 4.5

Junk food are foods and drinks low in nutrients (e.g. vitamins, minerals and fibre) and high in kilojoules, saturated fat, added sugar and/or added salt. Eating too much junk food is linked to serious health problems. It was observed that junk food such as pizza, burger, sandwich, samosa, Vada pav, noodles was mostly consumed once a month by the subjects. It was noted that these junk food was not prepared at home, it was mostly purchased from the street vendors and restaurants.

Easy availability of junk food at lower prize and appealing to taste buds are the reasons that lead to increase in consumption of junk food. Cost is a massive component of

the draw to junk food. It tends to be extremely cheap. Sahana in 2011, says that, "junk food costs three times less as much to have a healthful diet as it does to eat junk food and fast-food products. When junk food is so accessible, affordable and convenient, it becomes easy to forgo nutritious food. The high sodium and sugar content may lead to unto wards consequences, but they make these foods appealing to the taste buds."

The findings of NFHS-4 (around 10% of women consume fried foods daily and 36% weekly. Aerated drinks are consumed daily by 5% of women and weekly by 20% of women.

Table 4.6: Food group and Anthropometry

		N	Mean	df	F	Sig.
Cereal	Underweight	19	40.73± 9.56	2	0.294	0.746
	normal	12	43.00± 6.61	101		
	Obese	73	45.41±11.59	103		
	Total	104	45.19±15.50			
Pulse	Underweight	19	35.73 ±9.20	2	3.446	0.036
	normal	12	32.58 ± 6.57	101		
	Obese	73	39.80 ± 0.54	103		
	Total	104	38.23 ± 0.18			
Milk	Underweight	19	23.36 ± 6.07	2	0.734	0.482
	normal	12	20.08 ±8.14	101		
	Obese	73	23.02 ± 8.62	103		
	Total	104	22.75± 8.15			
Vegetables	Underweight	19	60.81±9.74	2	0.862	0.426
	normal	12	56.83±11.63	101		
	Obese	73	61.94±13.28	103		
	Total	104	61.15 ± 2.53			
Fruits	Underweight	19	35.63±13.10	2	4.66	0.002
	normal	12	25.75±10.12	101		
	Obese	73	38.46±13.95	103		
	Total	104	36.48 ± 3.90			
Beverages	Underweight	19	13.52± 4.92	2	2.976	0.055
	normal	12	12.58 ± 3.42	101		
	Obese	73	16.65 ± 7.50	103		
	Total	104	15.61 ± 6.89			
Bakery	Underweight	19	17.42 ± 7.93	2	1.909	0.153
	normal	12	13.25 ± 5.73	101		
	Obese	73	17.78 ± 7.52	103		
	Total	104	17.19 ± 7.52			
Snacks	Underweight	19	29.00±17.05	2	0.465	0.629
	normal	12	23.58 ± 9.13	101		
	Obese	73	26.60 15.58	103		
	Total	104	26.63 ± 5.20			

Table 4.10: Food group and Anthropometry

In the above given table 4.10 comparison of consumption of various food items was made with the different BMI category.

A significant relation was observed between the consumption of the cereals and BMI (body mass index). It was observed that mean value of 45.41 ±11.59 was found in obese group consuming cereal which was highest when compared to the other BMI categories. Consumption of pulses was found to be higher in the obese people with mean of 39.80 ± 10.54, no significance was observes between the BMI category after comparison.

Milk and milk product did not show any significant difference with the level of obesity. While comparing the data it was observed that underweight and obese women consumed milk and milk products with same mean of 23.36 ± 6.07. p values was not significant.

With different fruits and vegetables comparison was made. It was found that obese women consumed more of fruits and vegetables compared to other class of BMI category. Fruit consumption had p value equal to 0.002, which is considered to be significant.

High amount of beverages consumption was observed in the obese women. 16.6575± 7.50 mean of obese women consumed beverages such as tea, coffee, milkshakes, soft drinks etc. high beverage consumptions indicates high calorie intake in the diet. Controlling the portion size of beverages in a day can help to reduce the amount of kilo calorie intake.

Unhealthy snacking pattern was observed among the underweight women. Consumption of the vada pav, samosa was observed to be higher among the underweight women.

Thus it can state that control the food item intake in the daily diet might help the women to maintain the BMI to the normal range.

Due to over consumption of various food groups there is increase in an amount of calorie consumption. With increase in the calorie intake there is direct increase in amount of fats in the body. Hence leading to obesity among the subject.

Thus it can be stated that controlling the amount of the food intake, calorie intake, might help the responses in maintaining a negative energy balance in the body. Can help to reduce the excess amount of the weight. Maintaining normal BMI can help to stay away from many non-communicable disorders

5. Conclusion

The study findings gave the importance of dietary, lifestyle, and socioeconomic determinants of obesity which were highlight mainly in adult women population living in Mumbai.. Taking the high risk approach, culturally-appropriate, community-based interventions should be initiated to help increase nutrition awareness among women of low education and socioeconomic levels. Understanding the importance of a healthy balanced diet and physical activity in the prevention of lifestyle-related diseases, regardless of genetic susceptibility, is crucial. Nutrition awareness campaigns are indeed recommended; however, strategies to improve the environments within which individual behavioral decisions are made, should be considered, mainly those related to food availability, cost of healthy foods, and access to physical activity opportunities. Most important is the delivery of a stable food security level for all the households in the six Governorates of Lebanon. Lifestyle factors are policy-relevant elements and hence, policy makers and commissioners of health services who are responsible for public health should tailor their efforts and resources to tackling obesity in light of its dynamics in the adult population.

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Author Profile

Riddhi Shah, is a Student of MSc CND-2 Department of Clinical Nutrition and Dietetics in Dr. BMN College of Home Science, NAAC-Re-Accredited "A" Grade with CGPA 3.64/4 (Autonomous), 338, R.A. Kidwai Road, Matunga (E), Mumbai: 400019, Maharashtra, India