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Assessment of the consumption of processed foods and caffeinated beverages with body mass index in young female college students in Mumbai

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Abstract: *Dietary intake patterns play a significant role in human health. Improper and inadequate dietary intake patterns especially in women of reproductive age have resulted in the deficiency of essential nutrients especially during pregnancy and lactation which pose threat to physical, mental and social well-being of women. Food preferences and meal patterns were associated with obesity, such as frequent consumption of fast food and lower intake of protein was linked to higher BMI, while whole grain, pulse, and dairy product intake was associated with obesity. Participants with higher BMI categories had wider waist circumferences, indicating increased risk for metabolic and cardiovascular diseases.*

Keywords: *Processed foods, caffeinated beverages, Body Mass Index, young female students.*

1. INTRODUCTION:

Nutritional status is an indication of the overall well-being of a population. Adequate nutritional status of young women is important for good health and increased work capacity of women themselves as well as for the health of their offspring. Poor nutrition poses health risks which necessitates continuous monitoring of their nutritional status and dietary intake especially in developing countries like India.

Another important aspect linked with good quality of life is dietary habits and intake among college students. Studies carried out on nutrient intake assessments of young adults have indicated that the majority of them were found to be having chronic energy deficiency (CED) and the frequency of CED was found to be very high among the females in comparison to males when the dietary recall was assessed.

The greatest age-related weight gain occurs in the early/mid-20s. Overall dietary quality among adolescents and emerging adults is poor, with ultra-processed foods (UPF) representing more than two-thirds of adolescents' total energy intake . UPF consumption may impact cognitive and neurobiological factors that influence dietary decision-making and energy intake. (Maria Rego et. Al, 2023)

The findings of the article will help contribute to an emerging evidence base on the impact of UPF and potentially inform future dietary recommendations.

2. MATERIALS & METHOD:

A total of 228 undergraduate undergraduate (first degree year) female students aged 17-21 years studying in a suburban college in Mumbai were recruited using purposive sampling technique. Ethics approval for the study was obtained from the ISBEC (Inter System Biomedical Ethics Committee).

Dietary intake pattern was assessed using a validated Food Frequency Questionnaire (FFQ). The Food Frequency Questionnaire (FFQ) was used to assess the routine dietary intake pattern of the participants. The FFQ assessed the dietary intake of the participants, by asking them to report the frequency of consumption and portion size of the foods consumed by them; as listed under each food group which needed to be recorded. The culturally specific FFQ questionnaire used in the study included items defined by a series of foods or beverages which are categorized into major food groups such as cereals, pulses, dairy products, vegetables, fruits, meat-poultry-fish-eggs, fats and oils, sugars, packaged foods and miscellaneous and the scale of frequency of consumption. The participants reported the frequency of consumption of each food group on the basis of levels of frequencies i.e., rarely or never; one to three times a month; one to two times a week; three to five times a week; one time a day; 2 times or more a day.
The collected data was then coded and used for data processing to assess their dietary patterns, habitual diet, energy and nutrient intake, and other dietary dimensions.

Body Mass Index was calculated as the weight of the participant in kilograms divided by the height of the person squared in meters. The Asian cut-offs for the BMI classification are as follows:

Table 1: Asian cut-offs for BMI classification

Nutritional Category	Body Mass Index (BMI) Cut-offs (kg/m2)
Underweight	<18.5
Normal	18.5–22.9
Overweight	23–24.9
Pre-obese	25–29.9
Obese	>30.0

3. RESULTS & DISCUSSION:

Out of the total 228 participants, 32.5 % (n=74) participants were in the underweight category. Although, majority of the participants (n=101) were classified as Normal BMI category, around 8 % were classified in the Overweight category (n=17) while 16 % were included in the Obese category (n=36). Packaged fried products such as chips and farsan were consumed by 11 % participants once a day and over 50% participants consumed them once a week as observed in Table 2 . Wang et al. in their study explored the effects of fat intake on body weight over a 25-year period, indicating that increased fat intake and high-fat diets were linked to increased body weight, BMI, and the risk of overweight and obesity (Wang et al., 2020). Similarly, Research has shown that although there may not always be a significant association between ultra-processed food consumption and obesity, there is a high prevalence of excess weight among adolescents consuming these foods. Studies have highlighted that ultra-processed food consumption tends to be higher among adolescents from families with higher incomes, contradicting evidence from other studies (Enes et al., 2019). Consumption of breakfast cereals such as cornflakes, granola and muesli were reported to be once a day by 5.3 % and once a week by 33 % of the participants.

Table 2 : Classification of participants based on consumption of packaged food & BMI as per food frequency questionnaire

Body Mass Index Category	None n (%)	Once a day n (%)	Once a week n (%)	Twice a week n (%)	2-3 times / day n (%)	2-3 times / month n (%)	3-6 times / week n (%)	Pearson chi square value X^2	p Value
	Popcorn, crackers								
Underweight	22 (9.7 %)	2 (0.9 %)	10 (4.4 %)	9 (4.0 %)	0 (0.0 %)	29 (12.7 %)	2 (0.9 %)	14.096	0.723
Normal	28 (12.3 %)	6 (2.6 %)	14 (6.1 %)	12 (5.3 %)	5 (2.2 %)	34 (15.1 %)	2 (0.9 %)		
Overweight	7 (3.1 %)	0 (0.0 %)	1 (0.4 %)	2 (0.9 %)	0 (0.0 %)	6 (2.6 %)	1 (0.4 %)		

Obese	6 (2.6 %)	2 (0.9 %)	6 (2.6 %)	5 (2.2 %)	1 (0.4 %)	12 (5.8 %)	3 (1.3 %)		
Total	63 (27.6 %)	10 (4.4 %)	31 (13.7 %)	28 (12.3 %)	6 (2.6 %)	82 (36.0 %)	8 (3.5 %)		
	Cookies, cake, pie, biscuits								
Underweight	10 (4.4 %)	4 (1.8 %)	12 (5.3 %)	10 (4.4 %)	2 (0.9 %)	30 (13.2 %)	6 (2.6 %)	13.570	0.757
Normal	9 (4.0 %)	8 (3.5 %)	18 (7.9%)	10 (4.4 %)	5 (2.2 %)	40 (17.5 %)	11 (4.8 %)		
Overweight	0 (0.0 %)	3 (1.3 %)	1 (0.4 %)	2 (0.9 %)	0 (0.0 %)	8 (3.5 %)	3 (1.3 %)		
Obese	4 (1.8 %)	1 (0.4 %)	6 (2.6 %)	7 (3.1 %)	1 (0.4 %)	12 (5.3 %)	5 (2.2 %)		
Total	23 (10.1 %)	16 (7 %)	37 (16.1 %)	28 (12.3 %)	8 (3.5 %)	90 (39.5 %)	25 (11.0 %)		
	Donuts, Pop tarts								
Underweight	39 (16.9 %)	2 (0.9 %)	6 (2.6 %)	3 (1.3 %)	0 (0.0 %)	21 (9.2 %)	3 (1.3 %)	11.039	0.893
Normal	43 (18.8 %)	1 (0.4 %)	10 (4.4 %)	8 (3.5 %)	2 (0.9 %)	31 (13.7 %)	6 (2.6 %)		
Overweight	5 (2.2 %)	1 (0.4 %)	3 (1.3 %)	1 (0.4 %)	0 (0.0 %)	6 (2.6 %)	1 (0.4 %)		
Obese	18 (7.9%)	1 (0.4 %)	3 (1.3 %)	4 (1.8 %)	1 (0.4 %)	8 (3.5 %)	1 (0.4 %)		
Total	105 (46.1 %)	5 (2.2 %)	22 (9.7 %)	16 (7 %)	3 (1.3 %)	66 (28.9 %)	11 (4.8 %)		
	Chips, Cheetos, pretzels, chips (Eg. Lays, Kurkure, Doritos, etc.)								
Underweight	10 (4.4 %)	8 (3.5 %)	12 (5.8 %)	6 (2.6 %)	3 (1.3 %)	29 (12.7 %)	5 (2.2 %)	21.432	0.258
Normal	9 (4.0 %)	9 (4.0 %)	27 (11.8 %)	12 (5.8 %)	4 (1.8 %)	30 (13.2 %)	9 (4.0 %)		
Overweight	1 (0.4 %)	3 (1.3 %)	2 (0.9 %)	3 (1.3 %)	0 (0.0 %)	6 (2.6 %)	2 (0.9 %)		
Obese	7 (3.1 %)	5 (2.2 %)	1 (0.4 %)	8 (3.5 %)	1 (0.4 %)	9 (4.0 %)	5 (2.2 %)		
Total	27 (11.8 %)	25 (11.0 %)	43 (18.8 %)	30 (13.2 %)	8 (3.5 %)	74 (32.5 %)	21 (9.2 %)		
	Chocolates & Desserts								
Underweight	4 (1.8 %)	8 (3.5 %)	18 (7.9%)	8 (3.5 %)	3 (1.3 %)	24 (10.6 %)	9 (4.0 %)	6.522	0.994

Normal	5 (2.2 %)	14 (6.6 %)	23 (10.1 %)	11 (4.8 %)	6 (2.6 %)	27 (11.8 %)	14 (6.1 %)		
Overweight	1 (0.4 %)	2 (0.9 %)	4 (1.8 %)	3 (1.3 %)	1 (0.4 %)	4 (1.8 %)	2 (0.9 %)		
Obese	1 (0.4 %)	5 (2.2 %)	6 (2.6 %)	8 (3.5 %)	2 (0.9 %)	11 (4.8 %)	3 (1.3 %)		
Total	11 (4.8 %)	30 (13.2 %)	51 (22.2 %)	30 (13.2 %)	12 (5.3 %)	66 (28.9 %)	28 (12.3 %)		
	Ready-to-eat cereals (Eg. corn flakes, chocos, Granola, muesli, etc.)								
Underweight	33 (14.6 %)	4 (1.8 %)	8 (3.5 %)	7 (3.1 %)	0 (0.0 %)	18 (7.9%)	4 (1.8 %)	20.099	0.327
Normal	39 (16.9 %)	5 (2.2 %)	18 (7.9%)	12 (5.3 %)	4 (1.8 %)	18 (7.9%)	5 (2.2 %)		
Overweight	7 (3.1 %)	1 (0.4 %)	2 (0.9 %)	1 (0.4 %)	0 (0.0 %)	6 (2.6 %)	0 (0.0 %)		
Obese	17 (7.5 %)	2 (0.9 %)	1 (0.4 %)	3 (1.3 %)	1 (0.4 %)	6 (2.6 %)	6 (2.6 %)		
Total	96 (42.1 %)	12 (5.3 %)	29 (12.7 %)	23 (10.1 %)	5 (2.2 %)	48 (21.1 %)	14 (6.6 %)		

Table 2.1: Classification of participants based on consumption of caffeinated beverages as per Food Frequency Questionnaire and BMI

Body Mass Index Category	**None n (%)**	**Once a day n (%)**	**Once a week n (%)**	**Twice a week n (%)**	**2-3 times / day n (%)**	**2-3 times/ month**	**3-6 times / week**	**Pearson chi square value X^2**	**p Value**
	Regular coffee								
Underweight	21 (9.2 %)	7 (3.1 %)	12 (5.3 %)	5 (2.2 %)	1 (0.4 %)	21 (9.2 %)	6 (2.6 %)	10.476	0.915
Normal	33 (14.6 %)	11 (4.8 %)	17 (7.5 %)	12 (5.8 %)	1 (0.4 %)	19 (8.3 %)	7 (3.1 %)		
Overweight	3 (1.3 %)	4 (1.8 %)	2 (0.9 %)	2 (0.9 %)	0 (0.0 %)	5 (2.2 %)	1 (0.4 %)		
Obese	14 (6.1 %)	3 (1.3 %)	5 (2.2 %)	3 (1.3 %)	1 (0.4 %)	6 (2.6 %)	4 (1.8 %)		
Total	71 (31.1 %)	25 (11.0 %)	36 (15.8 %)	24 (10.6 %)	3 (1.3 %)	51 (22.2 %)	18 (7.9%)		
	Decaf coffee								

Underweight	65 (28.5 %)	0 (0.0 %)	1 (0.4 %)	2 (0.9 %)	0 (0.0 %)	6 (2.6 %)	0 (0.0 %)	20.195	0.165
Normal	86 (37.7 %)	1 (0.4 %)	4 (1.8 %)	2 (0.9 %)	0 (0.0 %)	4 (1.8 %)	4 (1.8 %)		
Overweight	12 (5.8 %)	1 (0.4 %)	0 (0.0 %)	2 (0.9 %)	0 (0.0 %)	1 (0.4 %)	0 (0.0 %)		
Obese	32 (14.2 %)	0 (0.0 %)	2 (0.9 %)	0 (0.0 %)	0 (0.0 %)	1 (0.4 %)	1 (0.4 %)		
Total	196 (86.0 %)	2 (0.9 %)	7 (3.1 %)	6 (2.6 %)	0 (0.0 %)	12 (5.3 %)	5 (2.2 %)		
	Latte								
Underweight	57 (24.9 %)	0 (0.0 %)	3 (1.3 %)	3 (1.3 %)	0 (0.0 %)	10 (4.4 %)	1 (0.4 %)	13.471	0.566
Normal	79 (34.6 %)	2 (0.9 %)	8 (3.5 %)	1 (0.4 %)	0 (0.0 %)	9 (4.0 %)	2 (0.9 %)		
Overweight	12 (5.3 %)	0 (0.0 %)	2 (0.9 %)	1 (0.4 %)	0 (0.0 %)	2 (0.9 %)	0 (0.0 %)		
Obese	31 (13.7 %)	0 (0.0 %)	1 (0.4 %)	0 (0.0 %)	0 (0.0 %)	2 (0.9 %)	2 (0.9 %)		
Total	179 (78.5 %)	2 (0.9 %)	14 (6.1 %)	5 (2.2 %)	0 (0.0 %)	23 (10.1 %)	5 (2.2 %)		
	Cappuccino								
Underweight	57 (24.9 %)	1 (0.4 %)	3 (1.3 %)	2 (0.9 %)	0 (0.0 %)	10 (4.4 %)	1 (0.4 %)	9.653	0.841
Normal	71 (31.1 %)	1 (0.4 %)	6 (2.6 %)	5 (2.2 %)	0 (0.0 %)	12 (5.8 %)	5 (2.2 %)		
Overweight	14 (6.1 %)	0 (0.0 %)	2 (0.9 %)	0 (0.0 %)	0 (0.0 %)	1 (0.4 %)	0 (0.0 %)		
Obese	26 (11.4 %)	0 (0.0 %)	4 (1.8 %)	0 (0.0 %)	0 (0.0 %)	5 (2.2 %)	1 (0.4 %)		
Total	168 (73.7 %)	2 (0.9 %)	14 (6.6 %)	7 (3.1 %)	0 (0.0 %)	29 (12.7 %)	7 (3.1 %)		
	Americano								
Underweight	61 (26.3 %)	0 (0.0 %)	1 (0.4 %)	3 (1.3 %)	0 (0.0 %)	9 (4.0 %)	0 (0.0 %)	19.344	0.371
Normal	80 (35.1 %)	3 (1.3 %)	1 (0.4 %)	4 (1.8 %)	1 (0.4 %)	10 (4.4 %)	2 (0.9 %)		
Overweight	12 (5.8 %)	0 (0.0 %)	2 (0.9 %)	0 (0.0 %)	0 (0.0 %)	2 (0.9 %)	0 (0.0 %)		

Obese	29 (12.7 %)	0 (0.0 %)	3 (1.3 %)	0 (0.0 %)	0 (0.0 %)	3 (1.3 %)	1 (0.4 %)		
Total	183 (80.3 %)	3 (1.3 %)	7 (3.1 %)	7 (3.1 %)	1 (0.4 %)	24 (10.6 %)	3 (1.3 %)		
	Black coffee espresso								
Underweight	65 (28.9 %)	1 (0.4 %)	2 (0.9 %)	1 (0.4 %)	0 (0.0 %)	5 (2.2 %)	0 (0.0 %)	20.395	0.311
Normal	83 (36.4 %)	3 (1.3 %)	5 (2.2 %)	2 (0.9 %)	0 (0.0 %)	6 (2.6 %)	2 (0.9 %)		
Overweight	11 (4.8 %)	1 (0.4 %)	2 (0.9 %)	1 (0.4 %)	1 (0.4 %)	1 (0.4 %)	0 (0.0 %)		
Obese	29 (12.7 %)	1 (0.4 %)	4 (1.8 %)	1 (0.4 %)	1 (0.4 %)	0 (0.0 %)	0 (0.0 %)		
Total	188 (83.6 %)	5 (2.2 %)	12 (5.8 %)	5 (2.2 %)	2 (0.9 %)	12 (5.3 %)	2 (0.9 %)		
	Cold coffee								
Underweight	27 (11.8 %)	4 (1.8 %)	8 (3.5 %)	8 (3.5 %)	2 (0.9 %)	19 (8.3 %)	6 (2.6 %)	10.912	0.898
Normal	46 (20.2 %)	4 (1.8 %)	9 (4.0 %)	10 (4.4 %)	1 (0.4 %)	24 (10.6 %)	7 (3.1 %)		
Overweight	10 (4.4 %)	0 (0.0 %)	3 (1.3 %)	1 (0.4 %)	0 (0.0 %)	2 (0.9 %)	1 (0.4 %)		
Obese	19 (8.3 %)	0 (0.0 %)	2 (0.9 %)	3 (1.3 %)	0 (0.0 %)	10 (4.4 %)	2 (0.9 %)		
Total	102 (44.4 %)	8 (3.5 %)	22 (9.7 %)	22 (9.7 %)	3 (1.3 %)	55 (24.1 %)	16 (7 %)		

The above Table 2.1 indicate the consumption frequency of caffeinated beverages such as cold coffee, black coffee, latte, regular tea and coffee, brewed tea, americano. Around 5 % participants consumed these products at least once a day, while 17 % consumed them 2-3 times a day. Several research data have shown varying results regarding the impact of these beverages on weight. Some investigations have linked high intakes of fruit juice, particularly those with high fructose and sucrose content, to obesity in children aged 2–5 years (Malik et al., 2006). However, longitudinal studies have found that the consumption of fruit juice, regardless of type, does not significantly influence weight (Larson et al., 2015). On the other hand, the consumption of sports and energy drinks, which are high in sugar and caffeine, has raised concerns among health professionals due to their potential negative health effects, such as excess weight gain and tooth decay in adolescents. Zheng et al. suggested the substitution of sugar-sweetened beverages (SSBs) with water as a strategy to reduce the risk of obesity in children and adolescents (Zheng et al., 2019). While water is considered a kilojoule-free alternative that could potentially lead to weight loss by reducing energy intake, studies have shown mixed results regarding the association between water intake and obesity in adolescents (Vezina-Im et al., 2024). Additionally, the consumption of caffeinated beverages like coffee and tea has been explored as alternatives to SSBs, but the evidence regarding their impact on body weight remains inconclusive. In summary, the relationship between juice, caffeinated beverages, and BMI in adolescents is complex and influenced by various factors such as the type of beverage consumed, overall dietary patterns, and lifestyle behaviors. Further research is needed to fully understand the effects of these

beverages on weight outcomes in this population. This data suggests that lifestyle factors such as daily meal frequency, and mealtime regularity significantly impacts BMI, weight status as well as nutritional status among adolescents.

CONCLUSION :

Food preferences, influenced by sensory, psychological, and physiological factors, are linked to obesity, with obese individuals often preferring high-fat and sweet foods. This study has observed the consumption frequency of beverages and ultra- processed food among female college students. Several studies have reported the significance of link of increased BMI scores due to poor diet quality and consumption of high calorie foods. This study results indicate that the students consumption of foods rich in salt, sugar and fat could indicate the risk in development of chronic diseases.

REFERENCES :

1. Maria L.M. Rego, Emma Leslie, Bailey T. Capra, Mckenna Helder, Wenjing Yu, Benjamin Katz, Kevin P. Davy, Valisa E. Hedrick, Brenda M. Davy, Alexandra G. DiFeliceantonio, (2023): The influence of ultra-processed food consumption on reward processing and energy intake: Background, design, and methods of a controlled feeding trial in adolescents and young adults. Contemporary Clinical Trials, 135, 107381.
2. Wang, L., Wang, H., Zhang, B., Popkin, B. M., & Du, S. (2020). Elevated Fat Intake Increases Body Weight and the Risk of Overweight and Obesity among Chinese Adults: 1991-2015 Trends. Nutrients, 12(11), 3272. https://doi.org/10.3390/nu12113272
3. Enes CC, Camargo CM, Justino MIC. (2019). Ultra-processed food consumption and obesity in adolescents. Rev Nutr. 32:e18170. http://dx.doi.org/10.1590/1678-9865201932e180170
4. Maiti, S., De, D., Ali, K. M., Bera, T. K., Ghosh, D., & Paul, S. (2013). Overweight and obesity among early adolescent school girls in urban area of west bengal, India: prevalence assessment using different reference standards. International journal of preventive medicine, 4(9), 1070–1074.
5. Maki, K. C., Palacios, O. M., Koecher, K., Sawicki, C. M., Livingston, K. A., Bell, M., Nelson Cortes, H., & McKeown, N. M. (2019). The Relationship between Whole Grain Intake and Body Weight: Results of Meta-Analyses of Observational Studies and Randomized Controlled Trials. Nutrients, 11(6), 1245. https://doi.org/10.3390/nu11061245
6. Malik, V. S., Schulze, M. B., & Hu, F. B. (2006). Intake of sugar-sweetened beverages and weight gain: a systematic review. The American journal of clinical nutrition, 84(2), 274–288. https://doi.org/10.1093/ajcn/84.1.274
7. Labyak, Corinne A.; Johnson, Tammie M.; Sealey-Potts, Claudia; and Perkin, Judy E. (2019). "Fruit and Vegetable Consumption, Body Mass Index, and Dieting Behaviors among Florida Middle and High School Youth," Florida Public Health Review: Vol. 13, Article 6.
8. Larson, N., DeWolfe, J., Story, M., & Neumark-Sztainer, D. (2014). Adolescent consumption of sports and energy drinks: linkages to higher physical activity, unhealthy beverage patterns, cigarette smoking, and screen media use. Journal of nutrition education and behavior, 46(3), 181–187. https://doi.org/10.1016/j.jneb.2014.02.008
9. Awisza, K., Tobiasz-Adamczyk, B., Galas, A. et al. (2021). Changes in Body Mass Index and Quality of Life—Population-Based Follow-up Study COURAGE and COURAGE-POLFUS, Poland. Applied Research Quality Life 16, 501–526. https://doi.org/10.1007/s11482-019-09776-3
10. Zheng, M., Rangan, A., Huang, R. C., Beilin, L. J., Mori, T. A., Oddy, W. H., & Ambrosini, G. L. (2019). Modelling the Effects of Beverage Substitution during Adolescence on Later Obesity Outcomes in Early Adulthood: Results from the Raine Study. Nutrients, 11(12), 2928. https://doi.org/10.3390/nu11122928
11. Zvonar, M., Štefan, L., Kasović, M. et al. (2022). Tracking of anthropometric characteristics from childhood to adolescence: an 8-year follow-up findings from the Czech ELSPAC study. BMC Public Health 22, 727. https://doi.org/10.1186/s12889-022-13178-w
12. Vézina-Im, L. A., Beaulieu, D., Turcotte, S., Turcotte, A. F., Delisle-Martel, J., Labbé, V., Lessard, L., & Gingras, M. (2024). Association between Beverage Consumption and Sleep Quality in Adolescents. Nutrients, 16(2), 285. https://doi.org/10.3390/nu16020285