

Lifestyle Trends and Obesity among College Going Girls of Delhi

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How to cite this paper: Mangla, A.G., Dhamija, N., Gupta, U. and Dhall, M. (2019) Lifestyle Trends and Obesity among College Going Girls of Delhi. *Health*, 11, 201-210.
<https://doi.org/10.4236/health.2019.112018>

Received: January 17, 2019

Accepted: February 16, 2019

Published: February 19, 2019

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Abstract

Background: Place of food preparation and hence consumption is an important determining factor for diet intake and consequently the risk for development of obesity. **Aims:** Present study attempts to examine dietary behavior among students attending undergraduate courses at Delhi University so as to assess the prevalence of overweight and obesity status using various dietary and behavioral factors triggering obesity. **Methods:** 201 females with age ranging from 18 to 22 years were interviewed for different socio-demographic information and parameters relating to lifestyle regime using a standardized proforma. Anthropometric and physiological measurements were taken according to standard techniques. Analysis was done using SPSS 20.0. **Results:** Family history for obesity and diabetes is noted to be significantly higher among girls taking home-made food. It has been reported that girls taking food prepared at home are more overweight/obese for BMI or at risk for higher waist line and waist height ratio as compared to those taking meals away from home. **Conclusion:** Universities can perform a crucial role in restraining the prevalence of obesity among young population by assessing college-going students for their weight status and eating practices and counseling them about healthy eating choices and habits.

Keywords

Adiposity, Delhi, Food, Risk, Students

1. Introduction

Etiology of obesity is multifactorial; however, it is certainly the existing equi-

*Both authors have contributed equally to the work and must be regarded as first authors and corresponding authors.

brium among intake of energy and its expenditure ascertaining obese/overweight status [1] [2]. Globally evident changes in eating habit inclusive of greater reliance on convenience foods and fast foods, lack of access to fruits and vegetables, growing portion sizes contribute in the development of obesity as an epidemic especially among children and adolescents [3] [4]. Also, exercise pattern and physical activity level have steeply diminished with growing demand and use of personal vehicles, which make children more sedentary [5] [6].

The population spends more time on watching television and using computers. As a result, greater exposure to television and videos may influence the choices and practices of young adults about consumption of unhealthy foods [7]. Based on studies carried out over such aspects, it has been witnessed that different social and lifestyle factors play a crucial role in the onset of obesity [2] [8].

Universities can perform a crucial role in restraining the prevalence of obesity among young population. This could be achieved by promoting healthy eating regime. Universities, in this regard, act as an ideal platform for reaching out to a larger proportion of young adults. Universities could also introduce several nutrition education programs that would positively influence students' dietary behavior by advocating for the adoption of healthy eating choices [9].

Aim of the present study is to examine dietary behavior among college-going students from Delhi University and to assess the prevalence of overweight and obesity status using various adiposity markers. It attempts to evaluate the association between dietary and behavioral factors triggering obesity.

2. Methodology

Sample size for the present cross-sectional study consisted of 201 females with age ranging from 18 to 22 years. All participants were under-graduate students from Daulat Ram College, affiliated with University of Delhi residing either with their families in Delhi or in hostels and as paying guests. Ethical clearance was obtained from the Principal of the college. Convenient, purposive sampling technique was used for data collection. Socio-demographic information and parameters related to lifestyle were gathered from the participants using a standardized proforma. However, before administering the proforma, informed written consent was taken from all the participants who volunteered for the study after gaining insights about its aim. Anthropometric and physiological measurements were taken according to standard techniques recommended by Weiner & Lourie (1969) [10] and Shavers (1982) [11] respectively.

Stature was noted using anthropometer with its crossbar raised up to the height of the subject touching the vertex, in mid sagittal plane while, weight was measured using Omron Karada Scan (Model HBF-362). Waist circumference was measured at the midpoint between the lower margin of the least palpable rib and the top of the iliac crest, using a stretch resistant tape. Hip circumference was measured around the widest portion of the buttocks, with the tape positioned parallel to the floor. For both measurements, the subject was asked to

stand with feet close together, arms raised by the sides and body weight evenly distributed, with least clothing. Obesity related conditions based on BMI [12], WHR [13], WHtR [14] and waist circumference [15] recommended over an international basis. All indices were further calculated using the previously recorded measurements. Analysis was done using SPSS 20.0.

3. Results

Of all the 201 participants, 51.7% girls take home-made food since they reside with their family in Delhi itself while the remaining 48.3% girls consume food either from hostels or where they stay temporarily as paying guest.

3.1. Dietary and Behavioral Characteristics of Students

Table 1 depicts the distribution of participants according to various dietary and behavioral characteristics. It has been found that in both categories of place of food consumption, service has emerged as the main occupation of fathers (64% and 50.5%, home-made and hostel/PG food respectively), followed by business (32% and 31.2%), agrarian living and some as retired. The differences were statistically significant at $p < 0.001$. In both the categories *i.e.* home-made and hostel/PG food, majority of the mothers are homemakers (74% and 75.3% respectively), followed by those in service sector (23.1% and 22.3% respectively) and few are those running a business (2.9% and 2% respectively) homemakers. However, these results were found to be statistically non significant.

Participants residing at Delhi preferred non vegetarian food (52.9%). On the other hand those who are living in PG/hostel preferred vegetarian food (51.5%). Majority of the participants (72.1%) residing at Delhi took three complete meals, when compared with those who are in PG/Hostel (56.7%). The difference was found to be statistically significant at $p < 0.05$. 58.7% of the participants reported not to skip any of their meals, who were getting home-made food. Among the girls with access to food majorly from hostel or PG places, 58.8% have tendency to skip any of their meals. Also, these results hold considerable statistical significance ($p < 0.05$). Most of the girls in both categories eat junk food once in a week (46.2%, 37.1%) while very few have it fortnightly (3.8% and 2%). 13.5% and 16.5% girls in both categories spend on junk food on daily basis. The difference was found to be statistically significant ($p < 0.05$).

Of 104 girls getting home-made food, 56.8% of them do physical activity on a daily/weekly basis, 24% fortnightly/occasionally and the remaining 19.2% are not doing any kind of physical activity. In contrast, 54.6% girls, among those having food from their hostels/PGs, are engaged on daily/weekly basis in physical activity, 31% on fortnightly/occasionally and 14.4% with no physical activity at all.

3.2. Family History for Different Disorders

Table 2 explicates the distribution of participants according to their response for history of various lifestyle disorders in family. 27% girls depending on home-made

Table 1. Distribution of participants according to dietary and behavioral characteristics.

	TYPE OF FOOD				Total	χ^2 value
	Home-made		Hostel/PG			
	N	%	N	%		
	N = 104 (51.7%)		N = 97 (48.3%)			
Father's occupation						
Farming	4	4.0	13	14.0	17	11.280**
Service	64	64.0	47	50.5	111	
Business	32	32.0	29	31.2	61	
Retired	0	0.0	4	4.3	4	
Mother's occupation						
Service	24	23.1	22	22.3	46	0.150
Business	3	2.9	2	2.0	5	
Homemaker	77	74.0	73	75.3	150	
Diet pattern						
Vegetarian	49	47.1	49	51.5	98	0.232
Non-vegetarian	55	52.9	48	49.5	103	
If take three meals						
Yes	75	72.1	55	56.7	130	5.220*
No	29	27.9	42	43.3	71	
Breakfast intake						
Regular	65	62.5	49	50.5	114	0.150
Irregular	39	37.5	48	49.5	87	
Skip any meal						
Yes	43	41.3	57	58.8	100	6.090*
No	61	58.7	40	41.2	101	
Frequency of eating junk food						
Daily	14	13.5	16	16.5	30	13.016*
Twice in a week	18	17.3	9	9.3	27	
Once in a week	48	46.2	36	37.1	84	
Fortnightly	4	3.8	2	2.0	6	
Monthly	11	10.5	9	9.3	20	
Occasionally	9	8.7	25	25.8	34	
Physical activity status						
Daily/weekly	59	56.8	53	54.6	112	1.593
Fortnightly/occasionally	25	24.0	30	31.0	55	
Not at all	20	19.2	14	14.4	34	

**p < 0.01; *p < 0.05.

Table 2. Distribution of participants according to history for various disorders.

	TYPE OF FOOD				Total	χ^2 value
	Home-made		Hostel/PG			
	N	%	N	%		
	N = 104 (51.7%)		N = 97 (48.3%)			
Family history for obesity						
Yes	28	27.0	15	15.5	43	
No	76	73.0	82	84.5	158	3.919*
Family history for CVDs						
Yes	25	24.0	24	24.7	49	
No	79	76.0	73	75.3	152	0.013
Family history for diabetes						
Yes	44	42.3	37	38.1	81	
No	60	57.7	60	61.9	120	0.362

*p < 0.05.

diet responded as having a history for obesity in their family whereas only 15.5% girls taking hostel/PG made food replied to have a history for obesity. These observations are statistically significant at $p < 0.05$. In both the groups about 24% families have history for cardiovascular diseases. Astoundingly, 42.3% and 38.1% girls in the two groups replied positively to have a history for diabetes in their family. However, results for both the cases are not found to be statistically significant ($p < 0.05$).

3.3. Obesity Status among Students Based on Adiposity Markers

For BMI, 67% females are under normal weight category in both groups (from **Table 3**), however the ratio for overweight/obese is more among those consuming home-made food (19.2%) than their counterparts (11.3%). For waist circumference, the ratio of participants under risk is again more among the former group (18.3%) than the later (14.4%). Similar trend has been noted for WHR (24.0% vs. 32.0%) and WHtR (23.0% vs. 15.5%).

Table 4 describes the regressive association between place of preparation of food and markers defining adiposity with food made at hostel/PG taken as reference category. The table shows that consuming food made at home could increase the chance of getting overweight by 1.2 times. It could also multiply the risk for increasing waist circumference by 0.6 times. Interestingly, the likelihood of falling into the risk category for higher waist height ratio could boost up to 4 times by relying on home-made meals.

Table 5 depicts the regression values for place of preparation of food and markers defining adiposity with food made at home taken as reference category. The table shows that consuming food made away from home could lead to an

Table 3. Distribution of participants according to adiposity markers.

	TYPE OF FOOD				Total	χ^2 value
	Home-made		Hostel/PG			
	N	%	N	%		
	N = 104 (51.7%)		N = 97 (48.3%)			
Body mass index						
Underweight	14	13.5	21	21.7	35	
Normal weight	70	67.3	65	67.0	135	3.959
Overweight/obese	20	19.2	11	11.3	31	
Waist circumference						
Normal	85	81.7	83	85.6	168	
Risk	19	18.3	14	14.4	33	0.538
Waist hip ratio						
Normal	79	76.0	66	68.0	145	
Risk	25	24.0	31	32.0	56	1.566
Waist height ratio						
Normal	80	77.0	82	84.5	162	
Risk	24	23.0	15	15.5	39	1.860

Table 4. Logistic regression for place of food prepared/consumed and various adiposity markers (a).

Variables	Categories	B	Exp (B)	CI (95%)
Body mass index	Underweight	-0.504	0.604	(0.28, 1.30)
	Overweight	0.245	1.278	(0.41, 3.93)
	Normal weight	0 ^a	-	-
Waist circumference	Risk	-0.549	0.577	(0.09, 3.44)
	Normal	0 ^a	-	-
Waist hip ratio	Risk	-0.960*	0.383	(0.16, 0.89)
	Normal	0 ^a	-	-
Waist height ratio	Risk	1.343	3.829	(0.62, 23.48)
	Normal	0 ^a	-	-

*p < 0.05; 0^a: Reference category (Normal); Food prepared at home: Dependent category; Food prepared at hostel/PG: Reference category.

underweight status by 1.7 times while an overweight grade by 0.8 times. Also, it could amplify the risk for increasing waist circumference by 1.7 times.

4. Discussion

Global economies heading toward industrialization have resulted in shift from traditional diets and labor intensive lifestyle to modern calorie-rich diets also

Table 5. Logistic regression for place of food prepared/consumed and various adiposity markers (b).

Variables	Categories	B	Exp (B)	CI (95%)
Body mass index	Underweight	0.504	1.655	(0.76, 3.58)
	Overweight	-0.245	0.782	(0.25, 2.40)
	Normal weight	0 ^a	-	-
Waist circumference	Risk	0.549	1.732	(0.29, 10.33)
	Normal	0 ^a	-	-
Waist hip ratio	Risk	0.960	2.611	(1.12, 6.11)
	Normal	0 ^a	-	-
Waist height ratio	Risk	-1.343	0.261	(0.04, 1.60)
	Normal	0 ^a	-	-

0^a: Reference category (Normal); Food prepared at hostel/ PG: Dependent category; Food prepared at home: Reference category.

rich in fats and sugar content and lack of sufficient activity regime. This increases the epidemiological burden of obesity and other non-infectious disorders among the predisposed. Predominance of diet-related non-communicable diseases has risen over years around the world, India being one of them witnessing this pandemic [16] [17]. Taking into consideration some of these aspects we have examined various lifestyle factors contributing to population health trends and assessed their association with adiposity markers in this study.

Rapidly growing fast-food market and the trend of instant food making and eating is becoming highly detrimental to the dietary habits of young adults. Resultantly overweight and obese statuses are being witnessed increasingly among the younger age groups. The amalgamation of obesity and unhealthy lifestyle, such as lack of sufficient physical activity or poor dietary habits, may increase the risk of chronic, non-communicable disorders such as diabetes, CVDs, etc. For this adequate nutritional knowledge and awareness about the escalating junk-food trend would help in curbing its consumption at alarming levels [9].

Fathers involved in different occupations are found interested in encouraging their daughters to continue studies after schooling. Servicemen and businessmen are found highly concerned about the same for which they have even allowed their girls to go to different cities and towns other than their native land also for pursuing academics. Furthermore, those from agricultural background as well as retired men are not hesitant to let their daughters stay away from home for study purpose. Mothers, be it homemakers, running a business or involved in any service are equally focused to provide education to their daughters either at their own place or far away from home.

Girls staying with family are slightly more inclined towards non-vegetarian food and those living away from family have comparatively more affinity for vegetarian meals. Trend of taking less than three meals and skipping meals is considerably more prevalent among the hostellers or those living as PGs. In line

with this, they are mostly irregular breakfast consumers than their counterparts. However, the frequency of eating junk food is consistently more among the girls with reliance on food made at home than the others. Also, they are physical more inactive than the girls staying away from family.

When compared with those who take food at hostels/PGs, family history for obesity is noted to be significantly higher among girls taking food prepared at home. Similar trend is seen for history of diabetes among family members. While almost 24% girls in both categories held a family history for cardiovascular disorders. For almost all adiposity markers (except for waist hip ratio) it has been reported that girls taking food prepared at home are more overweight/obese or at risk as compared to those taking meals away from home.

Present study suggests that away-from-home food intake could remarkably jeopardize for high risk of regional adiposity markers. It may also put a person at risk for turning underweight more than being overweight for BMI, as per the present study. Paradoxically, home cooking, that is primarily acclaimed to be holding adiposity deterrence qualities and offering an ideal way to get access to healthier diet [18], was also discovered posing supreme risk for developing a higher waist height ratio, from our work. Again from current study, it is considerably likely to acquire a BMI in overweight-risk category with dependence on home-made food. Different investigations have shown that foods eaten away from home are usually less nutritious and probably to be including larger portion size [19]. Also, food prepared and eaten away from home contains more calories per eating occasion with higher levels of total fat (inclusive of saturated fats) lower concentration of fiber, calcium and iron. Such food is also likely to be containing more sodium than that cooked at home [20]. However, ironically home prepared food, though being far away from all such constrains, has also shown to be an active cause for intensifying adiposity. Credible reason behind the same could be binge eating at home as well as with friends, accompanied with the “so-called” sedentary lifestyle that is being encountered more by the permanent inhabitants compared to ones living away from home.

5. Conclusion

Current study enforces the fact that source of food preparation does not have much role to play compared to the dietary patterns and behavioral activities in terms of frequency of food intake and subsequent metabolization of energy reserve. In this regard, assessment of college-going students’ weight status and eating practices could surely help the health educators in developing, running and managing proper programs imparting nutrition-related education which could then promote healthy eating choices and habits. Addressing problems originating earlier in life can potentially be corrected during adolescence. Adolescent health and development could reduce the burden of morbidity/mortality in later life as healthy behaviors and practices adopted during adolescence tend to last a lifetime. Better-prepared and healthy adolescents will result in productivity gains when they enter the workforce.

Acknowledgements

We would like to express our deep gratitude for our principal, Dr. Savita Roy for her unfaltering support in conducting the study and Dr. Satwanti Kapoor for her critical analysis and suggestions. We would also like to thank all the volunteers for giving their consent to participate in the study. We are grateful to Daulat Ram College for providing all the infrastructural aid.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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