

RESEARCH ARTICLE

COMPARISON OF PRACTICES RELATED TO MID-MORNING SNACKS AMONG
SCHOOL GIRLS OF DIFFERENT SOCIOECONOMIC STATUS

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ABSTRACT

Background: Adolescence is the second most critical period of physical growth and development; therefore, it is very important to fulfill their dietary needs in this period. **Objective:** To compare practices related to mid-morning snacks and observation of students for taking healthy foods as mid-morning snacks. **Methodology:** This is the survey based or conclusive research that was conducted on teenage girls of Beacon house School System Lahore and Govt. Model Girls High School Lahore. The sample size was calculated from the online calculator Raosoft (Raosoft 2020). The study sample size was 60. They were divided into two groups with 30 in each group; one of high and the second of low socio-economic status. This research was conducted with the ethical permission of Department of Food and Nutrition; College of Home Economics and this data were collected with the consent of School's authorities and students. Data collection tools were Anthropometrics, Interview schedule and Dietary record. **Results:** Mean age was 13.6 ± 15.9 . Results of taking mid-morning snacks in students was recorded 9.084 ± 0.05 . Awareness about nutritive mid-morning snacks was 2.639 ± 0.05 . Fruits preferences were 6.358 ± 0.05 . Food frequency of high carbohydrate food was 10.24 ± 0.221 . High fat food frequency was recorded as 13.9 ± 0.229 . Result of food frequency of beverages was 7.59 ± 0.219 . Frequency of mid-morning meals was 6.7 ± 0.309 . **Conclusion:** Results revealed that the snacking practices of both schools were unhealthy and intake of unhealthy snacks was more prevalent as compared to healthy snacks.

Keywords: Adolescent, Mid-morning snack, Nutritive value, School students

INTRODUCTION

The period of adolescence is a bridge between childhood and adulthood over which individuals must pass. Adolescence is the second most critical period of physical growth & development; therefore, it is very important to fulfill their dietary needs in this period (1). Mid-morning snacks are a terrific way to satisfy that hunger and get all the vitamins and nutrients that body needs but selection of healthy snacks is very important (2). According to research that was conducted to observed that snacking is a definite part of adolescent's dietary behavior and the intake of snacks effect the nutritional status of adolescents (3). Adolescents usually skip the breakfast and when they skip the main meals, they are most likely to grab mid-morning snacks from a restaurant or from a school canteen. In addition, eating too many unhealthy snacks can lead to weight gain (4). According to research conducted by to categorized snacks as either "unhealthy" or "healthy" in order to study the effects of snacks on health. They further defined unhealthy snacks as those eatables that carry little nutritional value and have a high content of refined sugars, saturated fat, and salt. The study specifically defined unhealthy snacks as: chocolate bars, chips, cakes, and pastries. According to them Healthy snacks are low in fat, sugar, sodium, and calories. Healthy snacks include whole-grain foods, fruits and vegetables, nuts and seeds, and low-fat dairy products (5). Another study that was conducted on adolescents concluded that snacking can have positive effect on the nutrient intakes of adolescents but selection of appropriate snack foods are important (6). According to the study; adolescence is a very important period of growth and development. Healthy dietary behaviors should be established in adolescence so that they can lead to balanced nutrient intakes. Balanced nutrient intake promotes appropriate physical growth and development. It also plays an important role in maintaining mental and emotional stability (7). A study concluded that wisely chosen snacks can improve the diet and weight control efforts. Snacking must not contribute to empty calories to diet. The prevalence of eating snacks at day (mid-morning snacks) is more common. Eating a mid-morning snack helps manage hunger and prevent over eating at

meals (8). Conclusion of a research conducted on the diets of 28 adolescents, ages 11-14, and found that snack foods significantly increase the total intake of vitamins and minerals such as iron, zinc, folate, and calcium, if wisely chosen. However, the study also found that snacking contributes to excessive levels of fat in the body (9). They further explained in their research that a healthy diet should include six to seven meals a day. Being a long time without eating can lead to reduced levels of blood sugar called hypoglycemia and whose symptoms usually involve loss of energy, tiredness, difficulty in concentrating, changes in mood, blurred vision, and difficulty in articulating speech and fainting in severe cases. Snacks if eaten wisely can provide a balanced diet and at the same time over eating at meal times can be avoided. Snacking plays a dual-role in the diet; it provides vital nutrients, yet it also increases calorie and fat intake. The prevalence of snacking is usually high in the period of adolescence (10). The study aimed to compare the practices related to mid-morning snacks which identified the intake of healthy and unhealthy snacks in both schools. It also assessed awareness of students about the importance and nutritive value of mid-morning snacks. It provided relative information on the reasons of different mid-morning snack preferences among school girls of high and low socio-economic status and their caloric contribution to diet. It also focused on the effect of these mid-morning snacks on weight using BMI (Body Mass Index). The findings of this study can also be used in future to develop nutrition education program.

Aim of the study

To compare practices related to mid-morning snacks and observation of students for taking healthy foods as mid-morning snacks.

METHODOLOGY

Study design

This is the observational survey based or conclusive research that was conducted on teenage girls of Beacon house School System (Liberty Branch, Lahore) and Govt. Model Girls High School (Model Town, Lahore).

Sample size

Girls of class 9th and 10th were selected. Survey research design was used. The sample size is 60. They were divided into two groups with 30 in each group; one of high and the second of low socio-economic status.

Sampling technique

By applying Stratified random sampling, two strata were made i.e. 9th and 10th and 15 students were taken from each strata from both schools. In Govt. Model Girls High School 5 students each were taken by employing systemic random sampling from the 3 sections of 9th and 10th class. In Private School System, 7-8 students each from the 2 sections of 9th and 10th were selected by employing systemic random sampling.

Data collection tools

- **Anthropometrics:** Anthropometrics including height, and weight were taken. A standard weighing scale was used for determination of weight while height was measured by height measuring scale. Body mass index (BMI) was calculated using the standard formula (11).

$$\text{BMI (kg/m}^2\text{)} = \text{weight (kg)} / \text{height (m}^2\text{)}$$

- Interview schedule
- Dietary record.

Statistical analysis

The data were analyzed with SPSS software version 22. The results were analyzed by applying Chi-square test. Data were presented as mean \pm SD and $p < 0.05$ was considered as level of significance.

RESULTS

Mid-morning snacks concept in students was recorded 9.084 ± 0.05 . Seventy seven percent of the students of Private School System and

seventy three percent of the students of Govt. Model Girls High school considered snacks to be eatables consumed between breakfasts. Awareness about nutritive mid-morning snacks was 2.639 ± 0.05 . Consumption of High fat is maximum according to food frequency record is 13.9 ± 0.229 (Table 1). Fruits preferences were 6.358 ± 0.05 . According to research consumption of high carbs snacks in both schools are in extreme quantity as Food frequency of high carbohydrate is recorded as 10.24 ± 0.221 (Table 2). The consumption of sandwiches in Beaconhouse is recorded as seventeen percent, three times a week and seventeen percent, one time a week in Govt. School; whereas the consumption of shawarma in Beaconhouse is twenty percent, one time a week and seventeen percent, one time a week in Govt. School. Result shows no significant difference between the intake of sandwiches and shawarma in both schools. Frequency of midmorning meals was 6.7 ± 0.309 (Table 3). Nineteen percent of the students of Private School and seven percent of the girls of Govt. model girls High School consumed chocolate milk. The consumption of packed juice in Beaconhouse is seventy nine percent and in Govt. School is seventy seven percent. Research shows no significant difference between the intakes of beverages in both the schools. Result of food frequency of beverages was 7.59 ± 0.219 (Table 4).

Table 1. Food frequency: high fat food

| | Food Frequency | Samosa | French fries | Other fried foods | patties | pizza | Packed chips | Nimko |
|-----------------------|----------------|--------|--------------|-------------------|---------|--------|--------------|--------|
| | | % | % | % | % | % | % | % |
| Private School | Six time | 0 | 0 | 0 | 0 | 3 | 10 | 0 |
| | Five time | 0 | 0 | 0 | 0 | 3 | 27 | 3 |
| | Four time | 13 | 7 | 10 | 0 | 3 | 7 | 0 |
| | Three time | 13 | 3 | 7 | 3 | 10 | 27 | 3 |
| | Two time | 23 | 7 | 17 | 3 | 23 | 17 | 0 |
| | One time | 13 | 17 | 7 | 7 | 30 | 10 | 0 |
| | No intake | 37 | 67 | 60 | 87 | 27 | 3 | 94 |
| | Six time | 33 | 3 | 3 | 0 | 0 | 0 | 3 |
| | Five time | 10 | 3 | 0 | 0 | 0 | 7 | 3 |
| | Four time | 7 | 3 | 0 | 0 | 0 | 13 | 10 |
| | Three time | 10 | 3 | 0 | 0 | 0 | 7 | 3 |
| | two time | 27 | 3 | 20 | 7 | 0 | 10 | 7 |
| | One time | 7 | 10 | 13 | 7 | 10 | 17 | 20 |
| | No intake | 7 | 77 | 63 | 86 | 90 | 47 | 54 |
| Chi square | | 20.774 | 4.376 | 6.785 | 1.333 | 26.314 | 23.133 | 15.273 |
| p-value | | 0.002 | 0.626 | 0.237 | 0.721 | 0.000 | 0.001 | 0.018 |

Table 2. Food Frequency: high carbohydrate food

| Food frequency | | Cake | Biscuits | Chocolate | Toffee | Nann and cutlet |
|-------------------|------------|-------|----------|-----------|--------|-----------------|
| | | % | % | % | % | % |
| Private School | Six time | 0 | 3 | 0 | 7 | 0 |
| | Five time | 0 | 3 | 3 | 10 | 0 |
| | Four time | 3 | 0 | 10 | 3 | 0 |
| | Three time | 0 | 0 | 24 | 13 | 0 |
| | Two time | 3 | 17 | 20 | 17 | 0 |
| | One time | 23 | 27 | 20 | 13 | 0 |
| | No intake | 71 | 50 | 23 | 37 | 100 |
| Govt. School | Six time | 0 | 7 | 10 | 20 | 0 |
| | Five time | 0 | 7 | 7 | 10 | 10 |
| | Four time | 3 | 7 | 0 | 0 | 0 |
| | Three time | 10 | 33 | 17 | 3 | 13 |
| | Two time | 7 | 17 | 17 | 17 | 7 |
| | One time | 17 | 23 | 10 | 7 | 3 |
| | No intake | 63 | 6 | 39 | 43 | 67 |
| Chi square | | 3.767 | 22.675 | 9.073 | 5.633 | 10.653 |
| p-value | | 0.439 | 0.001 | 0.169 | 0.465 | 0.031 |

Table 3. Food Frequency: Mid-morning meals

| Food frequency | | Sandwiches | Shawarma |
|-------------------|------------|------------|----------|
| | | % | % |
| Private School | Six time | 0 | 0 |
| | Five time | 7 | 0 |
| | Four time | 7 | 0 |
| | Three time | 17 | 3 |
| | Two time | 3 | 3 |
| | One time | 10 | 20 |
| | No intake | 57 | 74 |
| Govt. School | Six time | 10 | 0 |
| | Five time | 0 | 3 |
| | Four time | 7 | 3 |
| | Three time | 10 | 0 |
| | Two time | 13 | 13 |
| | One time | 17 | 17 |
| | No intake | 43 | 63 |
| Chi square | | 8.333 | 5.110 |
| p-value | | 0.215 | 0.403 |

Table 4. Food frequency: Beverages

| Food Frequency | Chocolate milk | Packed juices | Carbonated beverages | |
|-------------------|----------------|---------------|----------------------|----|
| | % | % | % | |
| Private School | Six time | 0 | 3 | 7 |
| | Five time | 0 | 13 | 10 |
| | Four time | 0 | 13 | 7 |
| | Three time | 3 | 20 | 20 |
| | Two time | 3 | 13 | 20 |
| | One time | 13 | 17 | 13 |
| | No intake | 81 | 21 | 23 |
| Govt. School | Six time | 0 | 27 | 0 |
| | Five time | 0 | 3 | 0 |
| | Four time | 0 | 17 | 3 |
| | Three time | 0 | 7 | 10 |
| | Two time | 0 | 17 | 20 |
| | One time | 7 | 6 | 17 |
| | No intake | 93 | 23 | 50 |
| Chi square | 2.974 | 10.442 | 9.354 | |
| p-value | 0.396 | 0.107 | 0.155 | |

DISCUSSION

In our study Mean age was 13.6 ± 15.9 . Mid-morning snacks concept in students was recorded 9.084 ± 0.05 . Awareness about nutritive mid-morning snacks was 2.639 ± 0.05 . Fruits preferences were 6.358 ± 0.05 . A study revealed that adolescents select snacks based on taste over nutrition; they more often choose salty, crunchy foods as snacks over healthier alternatives such as fruits (12). Food frequency of high carbohydrate food was 10.24 ± 0.221 . High fat food frequency was recorded as 13.9 ± 0.229 . A study concluded that that the consumption of high fat food is increasing in adolescents (13). Result of food frequency of beverages was 7.59 ± 0.219 . Frequency of midmorning meals was 6.7 ± 0.309 . A study revealed that mid-morning snack should include high energy food that keeps the blood sugar level stable until lunch time (14). According to our study valuable sources for nutritive snack were 6.358 ± 0.05 ; a study demonstrated consent of students to nutritive foods as snack much lower than junk food choices (15). Calories increases by using unhealthy snacks that readily effect the BMI of adolescents; a study concluded the correlation test was applied on 8203 adolescent girls to find out the snack foods had a weak inverse association with weight change among girls. The researcher concluded from the above

results that the consumption of high fat mid-morning snacks was high in both schools which indicated that the most frequently consumed snacks were unhealthy (16). According to study wisely chosen snacks can improve the diet and weight control efforts. Snacking must not contribute to empty calories to diet. The prevalence of eating snacks at day (mid-morning snacks) is more common. Eating a mid-morning snack helps manage hunger and prevent over eating at meals (8). Many studies showed that lunch is most consuming meal as compared to breakfast and mid-morning snacks. A study which exhibits the similar results to present study indicated that students rarely consumed mid-morning snacks (35%) as our study also indicated about roughly intake of healthy mid-morning snacks (17).

In current study estimated ratio of healthy eating and snacking was too poor in teenager girls as another parallel study give evidence to support these results which indicate that approximately half of the students were skipped morning snacks and majority of the students were chosen unhealthy food as mid-morning snacks (18). Another study conducted on nutrition assessment awareness ratio in teenager school girls, that research indicated high ratio of breakfast skipping and semi-skipping mid-morning snacks as same present study showed less awareness about

nutrition assessment and healthy eating among teenagers" girls (19). According to many surveys, adolescence period of school going girls mostly involved in unhealthy eating due to availability of such junk or ready to eat foods (20). According to a study that conducted to check the intake levels of high fat and high carbohydrates food during mid-morning snacks and lunch times, results showed that majority of students consumed high fat food similar to the results of current study (21). In our study, beverages intake of school going girls (packed juices and carbonated drinks) were estimate as 2.9±0.6 that maximum as compared to other drinks, this result is similar to a study conducted to evaluate the consumption of beverages and confectioner's products in government girls" school. This study showed clear results about high intake of cookies (eleven percent), sugar sweetened beverages (nine percent), sweets and other desserts (nine percent) as mid-morning snacks (22). Present study was conducted to evaluate the practices related to mid-morning snacks and observation of students for taking healthy foods as mid-morning snacks. Results showed that, it is casual to skip breakfast and consume unhealthy mid-morning snacks among school going adolescents' girls. Also, students are lacking of knowledge of healthy eating and well-nourished meals.

CONCLUSION

Results revealed that the snacking practices of both schools were unhealthy, and intake of unhealthy snacks was more prevalent as compared to healthy snacks. Therefore, the real need of hour is to educate students and make them aware about the health benefits of taking healthy snacks.

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None

DECLARATIONS

Authors' contributions

HA and NS designed study and prepared and reviewed the questionnaire. HS, NS and FK collected the data, analyzed the data and draft the manuscript. FK critically revised the manuscript. All the authors contributed equally and approved the final manuscript.

Ethical approval

This study was approved by the ethics committee of University of Veterinary and Animal Sciences, Lahore. Pakistan (Letter no 0905/IRC/BMR).

Conflict of interest

The authors declared no conflict of interest among them.

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REFERENCES

1. Kemon A, Piotrowska M. Polyurethane recycling and disposal: Methods and prospects. *Polymers*. 2020;12(8):1752. <https://doi.org/10.3390/polym12081752>
2. Hayyat FS. Health related Physical fitness. *JMS SKIMS*. 2021;24(3):51. <https://doi.org/10.33883/jms.v24i3.1151>
3. Kislowicz H. Judging religion and judges' religions. *Journal of Law and Religion*. 2018;33(1):42-60. <https://doi.org/10.1017/jlr.2018.10>
4. Simón D, Borreguero AM, De Lucas A, Rodríguez JF. Recycling of polyurethanes from laboratory to industry, a journey towards the sustainability. *Waste Management*. 2018;76:147-71. <https://doi.org/10.1016/j.wasman.2018.03.041>
5. Moreira PV, Baraldi LG, Moubarac JC, Monteiro CA, Newton A, Capewell S, O'Flaherty M. Comparing different policy scenarios to reduce the consumption of ultra-processed foods in UK: impact on cardiovascular disease mortality using a modelling approach. *PLoS One*. 2015;10(2):e0118353. <https://doi.org/10.1371/journal.pone.0118353>
6. Viano EC. Plea bargaining in the United States: A perversion of Justice. *Revue internationale de droit pénal*. 2012;83(1):109-45. <https://doi.org/10.3917/ridp.831.0109>
7. Garcia-Peterson LM, Li X. Trending topics of SIRT1 in tumorigenicity. *Biochimica et Biophysica Acta (BBA)-General Subjects*. 2021;1865(9):129952. <https://doi.org/10.1016/j.bbagen.2021.129952>
8. Rasborg K. „(World) risk society" or „new rationalities of risk"? A critical discussion of Ulrich Beck's theory of reflexive modernity. *Thesis Eleven*. 2012;108(1):3-25. <https://doi.org/10.1177/0725513611421479>
9. Nyberg L, Karalija N, Salami A, Andersson M, Wählin A, Kaboovand N, Köhncke Y, Axelsson J, Rieckmann A,

- Papenberg G, Garrett DD. Dopamine D2 receptor availability is linked to hippocampal–caudate functional connectivity and episodic memory. *Proceedings of the National Academy of Sciences*. 2016;113(28):7918-23. <https://doi.org/10.1073/pnas.1606309113>
10. Croce CM, Tripicchio GL, Coffman DL, Fisher JO. Association of Snacking Frequency, Size, and Energy Density with Weight Status among Preschool-Aged Children in the United States. *Journal of the Academy of Nutrition and Dietetics*. 2023;123(2):309-17. <https://doi.org/10.1016/j.jand.2022.07.001>
 11. Uddin Ismail B, Ali SF, Ayaz AA. Microcontroller based automated body mass index (BMI) calculator with LCD display. In 2nd International Conference on Electrical, Electronics and Civil Engineering (ICEECE'2012) Singapore April 2012 Apr 28 (pp. 28-29).
 12. Pawar SV, Choksey AS, Jain SS, Surude RG, Rathi PM. Prevalence of overweight and obesity in 4 schools of south Mumbai. *Journal of Clinical and Diagnostic Research: JCDR*. 2016;10(3):OC01. <https://doi.org/10.7860/JCDR/2016/17624.7383>
 13. Mythen G. The critical theory of world risk society: a retrospective analysis. *Risk Analysis*. 2021;41(3):533-43. <https://doi.org/10.1111/risa.13159>
 14. Stran KA, Knol LL, Turner LW, Severt K, McCallum DM, Lawrence JC. College students must overcome barriers to use calorie labels in fast-food restaurants. *Journal of nutrition education and behavior*. 2016 Feb 1;48(2):122-30. <https://doi.org/10.1016/j.jneb.2015.09.009>
 15. Magriplis E, Farajian P, Panagiotakos DB, Risvas G, Zampelas A. The relationship between behavioral factors, weight status and a dietary pattern in primary school aged children: the GRECO study. *Clinical nutrition*. 2019 ;38(1):310-6. <https://doi.org/10.1016/j.clnu.2018.01.015>
 16. Dallas SK, Liu PJ, Ubel PA. Don't count calorie labeling out: Calorie counts on the left side of menu items lead to lower calorie food choices. *Journal of Consumer Psychology*. 2019;29(1):60-9. <https://doi.org/10.1002/jcpy.1053>
 17. Cezimbra VG, de Assis MA, de Oliveira MT, Pereira LJ, Vieira FG, Di Pietro PF, Roberto DM, Geraldo AP, Soar C, Rockenbach G, Hansen F. Meal and snack patterns of 7–13-year-old schoolchildren in southern Brazil. *Public Health Nutrition*. 2021;24(9):2542-53. <https://doi.org/10.20944/preprints202306.1826.v1>
 18. Hassan BK, Cunha DB, da Veiga GV, Pereira RA, Sichieri R. Changes in breakfast frequency and composition during adolescence: the Adolescent Nutritional Assessment Longitudinal Study, a cohort from Brazil. *PLoS ONE*. 2018;13(7):e0200587. <https://doi.org/10.1371/journal.pone.0200587>
 19. Azemati B, Heshmat R, Qorbani M, Ahadi Z, Azemati A, Shafiee G, Ziaodini H, Motlagh ME, Kelishadi R. Association of meal skipping with subjective health complaints in children and adolescents: the CASPIAN-V study. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*. 2020 ;25:241-6. <https://doi.org/10.1007/s40519-018-0559-1>
 20. Mizia S, Felińczak A, Włodarek D, Syrkiewicz-Światała M. Evaluation of eating habits and their impact on health among adolescents and young adults: A cross-sectional study. *International journal of environmental research and public health*. 2021;18(8):3996. <https://doi.org/10.3390/ijerph18083996>
 21. Mama Chabi S, Fanou-Fogny N, Nago Koukoubou E, Deforche B, Van Lippevelde W. Factors Explaining Adolescent Girls' Eating Habits in Urban Benin: A Qualitative Study. *Adolescents*. 2022 ;2(2):205-19. <https://doi.org/10.3390/adolescents2020017>
 22. Lopes TD, Mello AV, Nogueira LR, Leme AC, Fisberg RM. Energy, nutrients and food sources in snacks for adolescents and young adults. *Revista Paulista de Pediatria*. 2021;40. <https://doi.org/10.1590/1984-0462/2022/40/2020148>



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