



International Journal of Home Science

ISSN: 2395-7476

IJHS 2021; 7(2): 116-120

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www.home-sciencejournal.com

Received: 22-04-2021

Accepted: 24-05-2021

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A study to assess the snacking pattern among adolescents and young adults and its effect on the meal pattern and overall nutritional status

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DOI: <https://doi.org/10.22271/23957476.2021.v7.i2b.1156>

Abstract

A very high proportion of adolescents and young adults have a habit of snacking in between meals. Snacking might influence the meal patterns of the youth and contribute to improper nutritional intake and skipping of meals.

Objective: To study the association of snacking pattern with skipping of meals and to observe the impact of snacking pattern on the nutritional status of the adolescents and young adults.

Methodology: A random sampling method was used for a co relational study with sample size of 150 from Mumbai City. Survey based research design was used, where the information was obtained with the help of Google forms from individuals of the age group 13 to 25 years. Out of the 150 participants, 48.7% were males and 51.3% were females. The analysis was done using Statistical Package of Social Software for Windows (SPSS, version 20). The analysis of data included t-tests, Chi-Square tests and ANOVA. p value < 0.05 was considered to be statistically significant.

Results: Approximately 50% of the participants who skipped breakfast were known to consume snacks on a regular basis with p value < 0.05. The most common reason found for snacking was cravings in 62% of the participants followed by boredom (57.7%), stress (44.4%), tiredness (36.6%), as a reward (33.8%) and sadness (30.3%) with p value < 0.05. The frequency of consumption of unhealthy snacks was higher in males as compared to females with p value < 0.05. The consumption of healthy snack foods was found to be higher in females as compared to males with p value < 0.05. It was also found that the frequency of skipping meals was lower in females as compared to males. The energy, carbohydrate and fat consumption was significantly higher in participants who consumed snacks due to stress than the ones who did not snack due to stress. (p<0.05)

Conclusion: There was a significant positive relationship between snacking and skipping of breakfast. The frequency of consumption of unhealthy snacks was higher in males as compared to females. It was also seen that the frequency of consumption of healthy snacks was higher in females and lower in males. The tendency to consume snacks when in stress, while having a craving or due to sleeplessness had caused an increase in the overall energy, carbohydrate and fat consumption.

Keywords: nutrient intake, snacks, skipping meals, diet, physical activity, reasons to snack

Introduction

Recent analyses of trends in dietary intake have shown that there was a significant increase in the contribution of energy-dense, nutrient-poor foods because of snacking over the past few decades among adolescents and young adults. Although snacks can contribute to intake of key nutrients, frequent snacking has been associated with increased total energy intake and energy from added and total sugars. (Mary S *et al*, 2013) [14]. Although snacking when hungry tends to be associated with the consumption of health-promoting foods, snacking in the absence of hunger leads to the consumption of fat, sugar, and sodium-rich food. Unnecessary snacking promotes weight gain and poor nutrition (Bellisle F 2014) [4]. Liking can be considered as the number one motivator for snacking choices in most of the situations. Physiological or functional motives can be additional main drivers for morning snacking. (Edgar C *et al* 2018) [5]. Some studies suggest that eating while distracted may contribute to reduced satiety and increase consumption at the next eating occasion.

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Distractions may increase snack intake even more. (Aveyard P *et al*, 2013) ^[2]. Snacking may also be driven by the rewarding properties of food known as hedonic eating. On an average, adolescents who are sensitive to reward are known to consume more energy-dense snacks and sugar-sweetened beverages than did individuals who were less sensitive to reward. (Carl L *et al*, 2015) ^[6]. Additionally, regular skipping of meals, particularly the breakfast meal, has been associated with a poor diet quality, lower intakes of total energy, vitamins and minerals, increased risk of central adiposity, insulin resistance and cardiovascular risk factors. Estimated prevalence rates of meal skipping in the young adult population vary between 24 and 87%, with young adults consistently reporting higher rates of meal skipping compared with other age groups. (Livingstone K 2016) ^[13]. Male peer interactions are more likely to promote unhealthy snacking behaviors. Male adolescents are also more likely to perceive and consume fast foods as a snack. On the other hand, girls are found to demonstrate a greater tendency to uptake healthier snacking practices to present a more desirable body image. (Amalia S *et al* 2014) ^[1]. There is a need to address the food purchasing behavior of the adolescents using different approaches such as limiting the availability of unhealthy foods and drinks from school canteens as adolescent's food purchasing behavior at school and in the neighborhood was associated with soft drink and snack consumption. (Mekdes K 2016) ^[15]. Frequent snacking poses a large threat to the health and well-being of the youngsters. Processed snack items are rich in sodium, Trans fat, cholesterol, fructose and sugar. This leads to a plethora of chronic medical complications that may cause diseases among youngsters ranging from diabetes to hypertension to cardiovascular disorders (Ganapathy D *et al*, 2019) ^[11]. Snacking guidance was published by 2 WHO regional offices in the Asia and Eastern Mediterranean Region. Qualitative recommendations included examples of snacks to choose, such as fruit and vegetables (fresh or dried),

whole-grain-based snacks and cereals, nutritious snacks, and nutrient-dense snacks. Most organizations gave broad examples of snacks to limit such as packaged snacks, sugary or salty snacks, or foods high in fat (Lehmann U *et al* 2018) ^[12]

Methodology

A co relational study with the sample size of 150 was conducted among the males and females between the age group of 13 to 25 years from Mumbai city. Random sampling technique was used for the study. The participants were selected for the study purely based on their consent to participate. The participants were informed about the study conducted, its design and the purpose of the study. Ethical clearance was obtained from the Institutional Ethical Committee (IEC) of Dr. BMN College of Home Science, Matunga, Mumbai. Questionnaire method was used to collect the data from the participants. The different aspects which included in questionnaire were General Information, Socio-Demographic data, Lifestyle pattern, Physical activity pattern, Eating Habits, Snacking habits, Medical history, Medications, Nutritional supplements, 3 days 24 hours diet recall.

Statistical Analysis

The analysis was done using Statistical Package of Social Software (SPSS, version 20). The analysis of data included t-tests, Chi-Square tests and ANOVA. p value < 0.05 was considered as statistically significant.

Results and Discussion

A total of 150 participants in the age group of 13 to 25 years were a part of the study. Out of the 150 participants, only 6% of them belonged to the age group of 13 to 17 years and 94% of the participants belong to the age group of 18 to 25 years.

Table 1: Baseline characteristics of the participants

Parameters	Options		Male (%)	Female (%)	Average (%)	p value
Gender	-		48.7	51.3	-	-
Yoga/Exercise	Yoga/Exercise		27.4	41.6	34.5	0.069
Physical Activity	Seated or standing position		30.1	33.8	32.0	0.502
	Few Activities	Physical	46.6	35.1	40.7	
	Moderate Activity	Physical	20.5	28.6	24.7	
	Vigorous Activity	Physical	2.7	2.6	2.7	

Out of the 150 participants, 48.7% were males and 51.3% were females as seen in table no. 1.

Out of the 150 participants, a total of 34.5% of the participants (27.4% males and 41.6% females) performed regular exercise or yoga on daily basis as seen in table no. 1.

Table no. 1 also shows that 30.1% of the males and 33.8% of the females were involved in seated or standing positions throughout their day, 46.6% of males and 35.1% of the females were involved in few physical activities throughout their day and less than 30% of the participants were involved in moderate and vigorous physical activities throughout their day.

David G *et al* (2018) ^[8] conducted a study to examine the lifestyle behaviors in Spanish children and adolescents based on screen time, non-screen sedentary time, moderate to vigorous physical activity, diet quality, and sleep time, and to investigate its association with health related physical fitness. Relationship between different lifestyle behaviors was identified and differences in health-related physical fitness were found among clusters. It suggested that special attention needed to be given to sedentary behaviors in girls and physical activity in boys when developing childhood health prevention strategies focusing on lifestyles patterns.

Table 2: Frequency of consumption of specific snack food

Category	Gender	Options							p value
		2-3 times a day	Once daily	2-3 times a week	Once a week	2-3 times a month	Once a month	Rare LY/Never	
Fruits	Male	8.2	21.9	20.5	37.0	5.5	2.7	4.1	0.001
	Female	20.8	42.9	11.7	10.4	5.2	3.9	5.2	
	Total	14.7	32.7	16.0	23.3	5.3	3.3	4.7	
Nuts	Male	8.2	15.1	17.8	35.6	2.7	6.8	13.7	0.000
	Female	7.8	53.2	7.8	10.4	7.8	6.5	6.5	
	Total%	8.0	34.7	12.7	22.7	5.3	6.7	10.0	
Vada pav/samosa	Male	2.7	4.1	16.4	31.5	23.3	15.1	6.8	0.026
	Female	2.6	10.4	5.2	18.2	23.4	20.8	19.5	
	Total%	2.7	7.3	10.7	24.7	23.3	18.0	13.3	
Dabeli/Kachori	Male	1.4	4.1	12.3	26.0	9.6	21.9	24.7	0.000
	Female	6.5	9.1	0.0	2.6	13.0	18.2	50.6	

There was a significant difference in the consumption of specific snack foods among the male and female participants. Majority of the females i.e 42.9% were found to eat fruits at least once in a day whereas majority of the males (37%) were found to eat fruits once a week with p value < 0.05. Majority of the females (53.2%) consumed nuts at least once daily whereas majority of the males (35.6%) consumed nuts once a week p value < 0.05. 31.5% of the males consumed vada pav/samosa once in a week. 23.4% of the females consumed the same 2 to 3 times in a month p value < 0.05. Majority of the males (26%) consumed dabeli/kachori once in a week whereas 50.6% of the female participants never or very rarely consumed it. Table no. 2

Majority of the males consumed bahjiya/pakode/Manchurian (32.9%) once in a week whereas majority of the females (28.6%) never or very rarely consumed it. 26% of the males consumed namkeen once a week but majority of the females (27.3%) never or very rarely consumed it. 30.1% males consumed pizza/burger/french fries 2 to 3 times a month whereas 39% females consumed it once in a month. 35.6% of the males consumed sandwich once a week whereas 33.8% of the females consumed sandwich once a month P value < 0.05. Table no. 2

28.8% of the males consumed noodles/fried rice/pasta once a week whereas 36.4% of the females consumed noodles/friedrice/pasta once a month. Majority of the males (30.1) and females (36.4%) never or very rarely consumed waffles/doughnuts. Majority of the males (27.4) consumed sweets such as jalebi, gulab jamun once in a week whereas majority of the females (32.5) consumed sweets once a month. P value < 0.05. On the other hand, there was no significant difference in the consumption of biscuits among the males and females. Table no. 2

27.4% males consumed franky/veg roll/chicken roll 2 to 3 times a month whereas majority of the females (32.5%) never or very rarely consumed these foods. 30.1% males consumed dhokla/patra/khandvi once a week and 31.2% females consumed these foods once a month. P value < 0.05. There was no significant difference in the consumption of idli/dosa and cake/pasteries among the male and female participants. Table no. 2

More than 50% of the males (56.2%) never or rarely consumed chana chaat whereas majority of the females (32.5%) consumed chana chaat once a month. 45.2% males rarely or did not consume sweet corn whereas 29.9% females consumed sweet corn once a month. P value < 0.05. Additionally, there was no significant difference in the consumption of moong salad, egg and pani puri/bhel/sevpuri among the male and female participants. Table no. 2

Thus, it was noted that the frequency of consumption of unhealthy snacks was higher in males as compared to females.

Apart from this, it was also seen the frequency of consumption of healthy snacks was higher in females and lower in males.

Table 3: Correlation between tendency to snack and reasons associated with it

Reasons to snack	Snacking in between the meals		p value
	Yes	No	
Hunger	90.1%	9.2%	0.466
Stress	44.4%	56.6%	0.000
tiredness	36.6%	63.4%	0.000
boredom	57.7%	42.3%	0.000
sadness	30.3%	69.7%	0.000
Having a craving	62.0%	38.0%	0.000
As a reward	33.8%	66.2%	0.000

According to table no. 3, the most common reason found for snacking was cravings in 62% of the participants followed by boredom (57.7%), stress (44.4%), tiredness (36.6%), as a reward (33.8%) and sadness (30.3%) with p value < 0.05.

A study conducted by Appleton K *et al* (2009) showed that the three most common snack foods consumed in the sample were savory snacks such as crispy snacks, breadsticks etc. in 22% of the participants, biscuits in 19.5% and confectionery such as sweets and chocolate in 17% of the participants. Pleasure was the most frequently given reason for snack choice in 14% of the participants, followed by hunger in 11% and availability and convenience in 10% of the participants. Among those who did not have fruit as their snack, pleasure was the most frequently given reason for snacking (22.4%), followed by availability (20.1%) and convenience (7.3%). Brizio D *et al* (2016) [5] established that in addition to liking, breakfast was encouraged by natural concerns, need and hunger including habit and health. Motivations for the mid-afternoon snack were primarily need and hunger, Liking, and Convenience. Apart from this, convenience, need and hunger, and visual appeal i.e the presentation, for example the packaging were found to be more associated with the mid afternoon snack than the other snack eating occasions.

Table 4: Correlation between snacking and skipping of meals

Skipping of meals	Snacking in between the meals		p value
	Yes	No	
Skipping of breakfast	44.4%	55.6%	0.000
Skipping of lunch	15.5%	84.5%	0.283
Skipping of dinner	16.2%	83.8%	0.190

Table no. 4 shows significant correlation between snacking and skipping of breakfast. 44% of the participants who skipped breakfast were found to consume snacks on a regular basis with p value < 0.05. On the other hand there was no

significant correlation between snacking and skipping of lunch and dinner.

Donna S *et al* (2012) ^[9] conducted a study to investigate the association of skipping breakfast with visceral fat and insulin indices in overweight Latino youth. The results showed that 21.5% of the participants were breakfast skippers, 41.9% were occasional breakfast eaters, and 36.6% were regular breakfast eaters.

According to a research conducted by Darshan B *et.al* (2018) ^[7], a high percentage of children and college students had reported skipping of meals and increased snacking behavior. A regular breakfast was considered as is the first nutritious meal of the day, needed to be consumed on a regular basis and was known to help in maintaining the positive health. Skipping breakfast was found to cause adverse health

outcomes and also increased the chances of poor snacking behavior. Similar behavior was observed among the children and adolescents of developing countries.

Anthony W *et al* (2007) ^[3] conducted a study to examine the situations in which adolescents tend to snack and whether those situations were associated with demographic characteristics of adolescents and with meal skipping. The results showed that the most common situations for snacking among adolescents were after school, while watching TV and while hanging out with friends. Apart from this adolescents were least likely to snack all day long or in the middle of the night. It was also reported that adolescents who reported more frequent snacking on the run, on the way to or from school, all day long, or in the middle of the night were more likely to skip meals.

Table 5: Correlation between snacking and nutrient intake of the participants

Categories	Options	Energy (Kcal)	Carbohydrates (gm)	Protein (gm)	Fat (gm)
Snacking due to stress	Yes	1239.0 ± 462.0	163.3 ± 58.8	33.9 ± 11.0	48.7 ± 23.3
	No	1060.6 ± 414.2	143.1 ± 56.1	30.7 ± 11.4	39.5 ± 20.6
p value		0.021	0.046	0.110	0.018
Snacking due to craving	Yes	1215.7 ± 446.1	161.0 ± 57.5	33.8 ± 11.3	47.3 ± 23.5
	No	1004.0 ± 409.0	136.2 ± 56.0	29.0 ± 10.7	36.9 ± 18.1
p value		0.008	0.018	0.020	0.009
Late night snacks due to sleeplessness	Yes	1266.83 ± 450.5	167.6 ± 60.4	35.0 ± 10.9	49.3 ± 23.0
	No	1028.3 ± 408.6	138.5 ± 52.5	29.5 ± 11.1	38.5 ± 20.3
p value		0.002	0.004	0.005	0.005
Tendency of having late night snacks	Never	1206.0 ± 464.5	162.1 ± 61.9	33.9 ± 12.1	45.6 ± 22.1
	Sometimes	1013.78 ± 440.3	135.6 ± 54.4	29.5 ± 10.4	38.2 ± 23.4
	Most of the times	1106.6 ± 308.8	139.8 ± 35.8	29.9 ± 8.9	46.0 ± 20.4
	Always	1323.1 ± 445.2	195.5 ± 71.5	34.2 ± 0.17	44.1 ± 17.9
F value		1.729	2.461	1.516	1.006
Significance		0.164	0.066	0.213	0.392

There was a significant relationship between the snacking due to stress and energy intake, carbohydrate intake, and fat intake of the participants. The energy, carbohydrate and fat consumption was significantly higher in participants who consumed snacks due to stress than the ones who did not snack due to stress. ($p < 0.05$) but there was no significant relationship between snacking due to stress and protein intake of the participants. Table no. 5

Additionally the energy, carbohydrate, protein and fat consumption was significantly higher in participants who consumed snacks due to sleeplessness or while having a craving as compared to the ones who did consume snacks due to sleeplessness or while having a craving. Table no. 5

Apart from this, it was also seen that there was no significant relationship between tendency of the participants to have late night snacks and the nutrient intake of the participants i.e energy, carbohydrate. Protein and fat intake. Table no. 5

Thus it was noted that the tendency to consume snacks when in stress, while having a craving or due to sleeplessness can cause an increase in the overall energy, carbohydrate and fat consumption.

According to a study conducted by France B (2014) ^[10] in normal-weight children and adults, snacking appeared to facilitate the adjustment of energy intake to needs, and to contribute carbohydrates, rather than fats, to the diet, in addition to valuable micronutrients. Additionally, snacking often appeared to contribute much energy but little nutrition in the diet of obese children and adults.

Conclusion

There was a significant positive relationship between snacking and skipping of breakfast. The frequency of

consumption of unhealthy snacks was higher in males as compared to females. Apart from this, it was also seen that the frequency of consumption of healthy snacks was higher in females and lower in males. The tendency to consume snacks when in stress, while having a craving or due to sleeplessness has caused an increase in the overall energy, carbohydrate and fat consumption. Most of the Indians, regardless of their snacking behaviors, do not appear to be eating healthy diets. Eating snacks out of boredom or for emotional reasons can lead to weight gain. Public health messages targeting both snacking and meal behavior are needed. Snacks can fit into a healthy eating plan and provide an energy boost between meals, if they are planned right. Choosing nutritious foods from the My Plate food groups can help increase variety and reduce sources of empty calories and added sugar.

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