Snack Consumption Pattern and Impact of Nutrition Education on Healthy Snacking Among Adolescents

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Abstract: The aim of the present study is to examine the meal pattern and snacking pattern of the adolescents and to impart changeability on snacking behaviour of adolescents. Children from grade 10 to grade 12 of three schools from Coimbatore were selected to study the meal and snacking pattern. Based on the data, students were imparted about healthy snacking habits. Totally 984 students participated in the study, of which 52 percent were boys and 48 percent were girls. Almost 72 percent of the students were from nuclear family remaining (28 percent) followed joint family system. Most of the school students (56 percent) had snacks 2 to 3 times a day. 42 percent of the selected students preferred their snacks in sweet taste. Almost 90 – 92 percent of the students who participated in the nutrition education gained appropriate knowledge on effect of healthy snacking, importance of food groups and RDA.

Index Terms **– adolescent, school students, snacking pattern, nutrition education, healthy snack**

I. INTRODUCTION

Adolescents are considered to be a nutritionally vulnerable segment of the population. Due to enhanced growth during adolescence, the requirement of some minerals is of paramount important. A rapid growth rate combined with a marginal nutrient intake increases the risk of nutritional deficiencies in this population. Poor nutritional status during adolescence is an important determinant of health outcomes at a later stage of life. Therefore attention should be given to adolescent health and nutrition (Kabir et al, 2010).

Snacking is commonly associated with undesirable health outcomes and dietary patterns. Since children and adolescents select snacks based on taste over nutrition, they more often choose salty, crunchy foods as snacks over healthier alternatives (Cross et al, 1994). Consequently, snacking is commonly regarded as a contributing factor in the development of childhood overweight and obesity, although studies that have examined the association between snacking and body mass index have yielded mixed results (Kubik et al 2005 and Howarth et al 2007). Although evidence is limited, snacking may also be associated with less frequent consumption of meals, which may be detrimental to health since regular meal patterns are associated with greater dietary diversity (Cusatis and Shannon, 1996), healthier food choices (Haapalahti et al 2003) and better nutrient intakes (Neumark-Sztainer, 2003 andSjöberg et al 2003). With this context, the study aimed to to examine the meal pattern and snacking pattern of the adolescents and also to impart changeability on snacking behaviour of adolescents.

II. METHODOLOGY

2.1 Selection of locale and sample

During the transitional period of young adulthood, following a healthy lifestyle behavior can have a long lasting effect on personal and family health. It is vital for young adults to be educated and reinforced with healthy eating behaviours for them to make healthy food choices in the future. These healthy eating food habits can be sustained into the future to combat life-style related diseases such as diabetes mellitus, hypertension and coronary heart disease. Irregular meal patterns and the consumption of high calorie snacks are becoming common which may contribute to being overweight and being obese in adolescent population (Moy et al 2009).

A community based cross-sectional study was conducted among the school children. Permission to conduct the study was obtained from the school authorities. Three schools from Coimbatore were selected randomly. Students in the grade 10, 11 and 12 from each school were selected to conduct survey. Eligibility criteria were those who were present, age 16 - 19 years and those willing to participate. The class teacher and students were briefed about the study and were interviewed only after obtaining verbal consent. All of them were given questionnaire for self-administration, however 3 students did not return the questionnaire and 8 students gave incomplete response. Thus, 150 students could be finally considered for analysis. Data was collected using a pre-designed, pretested semi-structured questionnaire on socio-demographic variables, meal pattern and snacking habits. Translation of questionnaire in Tamil language was done by language experts.

2.2 Drafting of questionnaire and collection of data

Considering the importance snacking pattern, self-administered questionnaire was framed to assess the snacking pattern among school students. The questionnaire handed out consisted of two sections. The first section covered basic demographic data such as age, sex, residence, family type, family size, parents' occupation, monthly income second section gathered the information on meal and snacking pattern (type, time and frequency).

Initially, a pilot study was carried out to test the reliability of the questionnaire among 50 participants. The pretested questionnaire was further reframed and used to collect necessary data. The details regarding each and every question was clarified and cleared before administering the questionnaire to the students. Data was collected by giving adequate time and instructions to gather reliable information.

2.3Nutrition Education and Statistical analysis

An awareness campaign on nutrition education was conducted among the selected school students. Questionnaire was framed which comprises the questions to assess the knowledge on healthy eating. It consisted of questions that measured the students' knowledge on food groups, nutrients, sources and RDA (15 questions). Students were explained about the questionnaire form before being answered (self-administered).

Power point slides were prepared and used for imparting nutrition education. Education about food groups, nutritional requirements of adolescents, health snacking were imparted to them. Before starting the nutrition education programme, questionnaire was administered to assess the initial nutritional knowledge and the same was used to test the final knowledge at end of the education period (immediately and after month). The difference between the initial and final scores was assessed to find the impact of the nutrition education.

2.4 Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 16 was used for data analysis. Paired t-test was used to find the significance difference between before and after supplementation. The level of significance was maintained at one percent level and five percent level.

III. Results and Discussion

3.1.1 Demographic profile of the selected students

Demographic profile of the selected participants were consolidated and tabulated in Table I.

Table I
Demographic profile of the selected participants

Demographic profile	Group	Percentage	Number
Sex	Male	52	513
	Female	48	471
Age (yrs)	15	3	29
	16	31	306
	17	33	324
	18	29	286
	19	4	38
Class	10	34	335
	11	33	328
	12	33	321
Type of family	Nuclear	72	708
	Joint	28	276
Fathers occupation	Government	23	227
	Private	61	600
	Business	12	118
	Any other	4	39
Mothers occupation	Government	18	177
	Private	45	443
	Self Help Group	24	236
	Homemaker	13	128
Monthly income	Low	26	256
	Medium	53	522
	High	21	206

About 1000 students were selected for the study from three schools at Coimbatore. Of which, only 984 students were willingly participated and provided consent to be participants for survey. Hence, 16 students were rejected from the study due to incomplete forms. Among 984 students, 52 percent (513) were boys and 48 percent (471) were girls. Higher percentage of the students (33 per cent) was in the age of 17 years, 31 percent was in 16 percent and 29 percent were in 18 yrs since they were in higher secondary schools. Equal percentage of the students was in all the 10, 11 and 12 grades. Almost 72 percent of the students were from nuclear family remaining (28 percent) followed joint family system. 61 and 45 percent of the students' fathers' and mothers' occupation was in private concerns respectively. 24 percent of the mothers were self-help group members. 53 percent of the school students' were from middle income group. 26 and 21 percent were in low and high income group respectively.

3.1.2 Meal consumption pattern of selected school children

Meal consumption pattern of the selected school children were collected using the drafted questionnaire, consolidated and presented in figure 1 and 2.

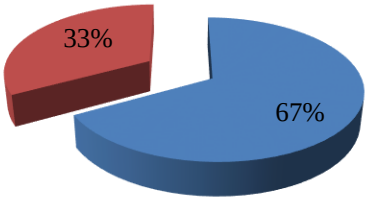


Figure 1
Meal skipping pattern

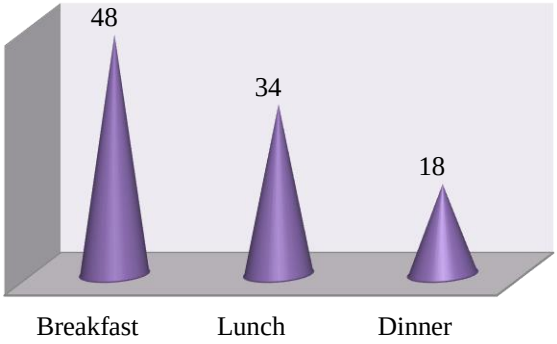


Figure 2
Type of meal skipped by selected school children

Among the participants, 67 per cent of the students skipped their meals regularly. Around 48 percent and 34 percent of students skipped their breakfast and lunch respectively. Only 18 percent of the students missed their dinner rarely. On a daily basis, more adolescents skipped breakfast than skipped lunch or dinner (Figure 3).

3.1.3 Snacking pattern among selected school children

The prevalence of snacking (defined as the consumption of foods and drinks between meals including milk drinks, regular soft drinks, sports drinks and energy drinks) among adolescents and children varies widely across the world. Snacking is also commonly associated with undesirable health outcomes and dietary patterns. Since children and adolescents select snacks based on taste over nutrition, they more often choose salty, crunchy foods as snacks over healthier alternatives. 46 percent of the school students had snacks outside home moderately (3 or 4 days per week) and 37 percent had very often (5 to 7 days per week). Most of the school students (56 percent) had snacks 2 to 3 times a day. Snacking after school was the most common context with 46 percent of school students indicating they snacked during this time on most days or every day. Adolescents also snacked frequently while watching TV and while hanging out with friends. Snacking while doing homework or working, on the run, or on the way to or from school were less common. Adolescents were least likely to snack in the middle of the night (7 percent) with less than 26 percent of students reporting that they often snacked in the morning break.

Findings show that most respondents obtained their snacks from grocery shops or supermarket and fast food restaurant. Remaining took snacks at home and school canteen. The present study also shows that spending power of majority of participants was (59 percent) only Rs. 25 or less for snacks, 21 percent spent Rs.25 – 50, 20 percent spent more than Rs. 50/-. The expenses for snacks among the adolescents were very little as they were depended on their parents to buy snacks. Snacking pattern of the selected school children were tabulated in Table II.

Foods that were most frequently consumed as snacks by respondents, which were consumed everyday on a week, included chat items, bakery items and fried items while beverages that were most frequently consumed between meals included carbonated drinks and fruit juices. Students rarely prefer sweets or savories compared to chat and bakery items. They also hesitate to include fresh fruits however they would like to include flavoured or preserved juices.

Table II
Snacking pattern among selected school children

Snacking pattern	Criteria	Number of participants	Percentage
Frequency of snacking outside	Rarely (1 or 2 days)	167	17
	Moderately (3 or 4 days)	453	46
	Very often (5 or 7 days)	364	37
Frequency of snacking in a day	Rarely (1 – 2 times)	207	21
	Moderately (2 – 3 times)	551	56
	Often (3 – 4 times)	147	15
	Very often (more than 5 time)	79	8
Time of snacking	Morning	256	26
	Afternoon	207	21
	Evening	453	46
	Night	68	7
Amount spent on snacks per day	Rs. 0 – 25	580	59
	Rs. 25 – 50	207	21
	Rs. 50 – 100	108	11
	Above Rs. 100	89	9

3.1.4 Awareness on millets

Information on millets as healthy foods were obtained from selected school students and given in figure 3 More than half of the participants (53 percent) strongly agree that millets are healthy kind of food. 12 percent and very few disagreed that millets are healthy foods and they were not aware of different kinds of millets available in market.

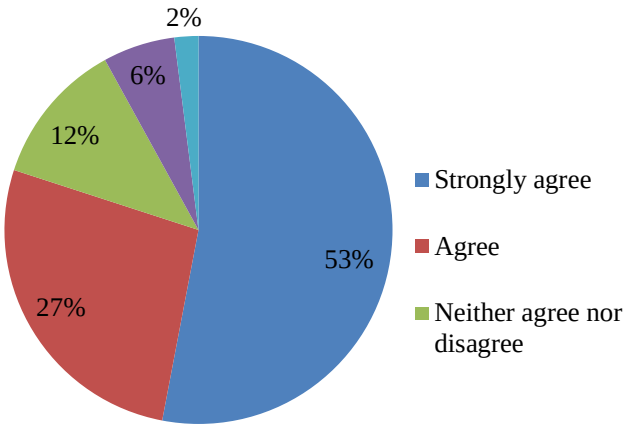
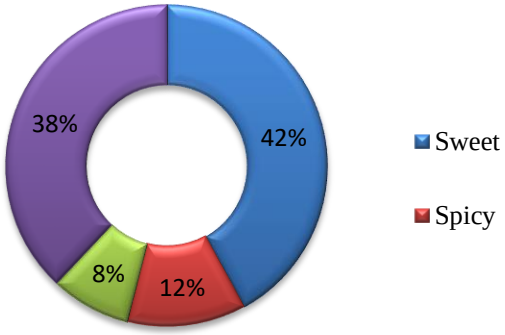


Figure 3
Millets are healthy

3.1.5 Taste preference for new snack

Students were interviewed to identify their taste preference for product development. Data of the respondents were consolidated and given in figure 4.

Fig 4
Taste preference for snacks



About 42 percent of the selected students preferred their snacks in sweet taste.38 percent of them were ready to accept salt and spicy snacks. However minimum percentage of 8 percent preferred the snacks in plain salt taste. Students were also enquired about any allergies on wheat, soya or milk. There was no such evidence for allergic reactions with common ingredients; it was also reconfirmed with the parents. Based on the preferences, a sweet cookie and RTE crispy snack was formulated using multigrain keeping millets as main ingredients.

3.2 Nutrition education

Nutritional knowledge of selected participants were assessed using the questionnaire before and after nutrition education and presented in Table III.

Table III
Nutritional knowledge of the selected participants

Knowledge on	Knowledge scores		
	Before education	After education	BE Vs AE
Balanced diet and nutrients	11 (22)	45 (90)	-12.15*
Healthy eating	17 (34)	46 (92)	-9.61*
Awareness on millets	13 (26)	48 (96)	-9.00*

BE –Before education, AE – After education *Significant at 1% level

From the table, it is clear that on an average 22 to 34 percent of the school students had knowledge on balanced diet, nutrients, importance of breakfast and millets initially. After nutrition education, majority of the respondents (90 to 96 per cent) gained

knowledge on nutrients and the impact of healthy eating. Almost 96 percent of the population understood that millets are good for health. Almost above 90 – 92 percent of them gained appropriate knowledge on effect of healthy snacking, importance of food groups and RDA.

Conclusion

The present study indicates that many adolescents are consuming more than adequate intakes of energy through snacks which might be a reason for rising incidence of lifestyle disorders among adolescents. Since snacks eaten between meals provide up to a quarter of the daily energy intake in some adolescent populations, imparting changeability on healthy snacking may be an effective way for adolescents to reduce their total energy intake. Hence, school-based interventions may have considerable advantages over community. Providing energy and nutrients that help optimize children's learning in the classroom and their later capabilities contributes to the national economy.

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