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Impact of Nutrition Education on Knowledge, Attitude, and Practices of School-Going Adolescents of Public and Private Schools Regarding Healthy Lifestyle

Rameen Bukhari[a], Rimal Asif [b], Iqra Ajmal Butt[c*], Arooj Baber[d], Sumbal Sabir[e], Sana Farooq[f], Arisha Yasin[g], Fatima Binte Ahsan[h], Ahsan Sattar Sheikh[i]

[a,b,c,d,e,f,g,h]*University Institute of Diet and Nutritional Sciences, Faculty of Allied Health Sciences, The University of Lahore, Lahore 54000, Pakistan*

[i]*Institute of Molecular Biology and Biotechnology Then University of Lahore, Lahore 54000, Pakistan*

[a]*Email: Rameenbukhari001@gmail.com,* [b]*Email: Rimalasif157@gmail.com*

[c]*Email: Iqrabutt658@gmail.com,* [d]*Email: Aroojbaber1997@gmail.com*

[e]*Email: Sumbalsabir007@gmail.com,* [f]*Email: Sana.farooq@dnsc.uol.edu.pk*

[g]*Email: arishayasin12@gmail.com,* [h]*Email: Fatima.ahsan9@gmail.com*

[i]*Email: Ahsansheikh@gmail.com*

Abstract

Background Nutrition plays an important role in the development of people and in the prevention of disease. Nutrition education is an essential element of health awareness.

Objective The study is aimed to assess the impact of nutrition education on the lifestyle of school-age adolescents and to compare the impact of nutrition education on the lifestyle of female adolescents among private and public schools.

Methodology A quasi-experimental study was conducted on 108 female adolescents by using a cluster sampling technique. 54 students of ages between 10-15 years old were selected from private school, and 54 students of ages between 10-15 years old were from government school. The study duration was 6 weeks. A self-constructed pre-test questionnaire was filled by the participants. Nutrition education was given to students in the time period of 4 weeks. Lectures and brochures were developed and delivered to the students. Quizzes were taken for the evaluation and a better understanding of the respective lecture. Visual display on different parameters of a healthy lifestyle was shown on a projector. Post-test questionnaires were filled 1 week after giving 11 lectures on a healthy lifestyle.

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* Corresponding author.

Results Results showed that there were significant associations between knowledge, attitude, and practices of government and private school (p=0.001), (p=0.005) and (p=0.001). There was a significant association (p=0.001) between pre and post knowledge, attitudes, and practices of school students. **Conclusions:** Lack of knowledge was the reason for inappropriate dietary habits and poor lifestyle among school-going female adolescents. Positive modifications regarding lifestyle activities had a significant association with nutrition education among school-going female adolescents.

Keywords: Adolescent; Nutrition; Lifestyle; Knowledge; Attitude; Practices; Education.

1. Introduction

Nutrition is very important for the health of adolescents. It is defined as a term linked to the daily requirements of healthy eating. It is used in strategies, preparation, and research by the public [1]. Nutrition plays an important role in the development of people and in the prevention of disease. It is important for good health and the proper functioning of human body [2]. Adolescence is a distinct phase of the developmental life cycle in humans and other animal species among humans; adolescence is a complex, multi-system transitional process involving progression from the immaturity and social dependency of childhood into adult life with the goal and expectation of fulfilled developmental potential, personal agency, and social accountability [3]. Nutrition education is any combination of academic strategies, which go along with environmental supports, planned to facilitate optional adoption of food choices and other food and nutrition-related behaviors favorable to health and well-being. Nutrition education is delivered through multiple different sites and involves activities and action at the individual, community, and policy levels [4]. Nutrition knowledge is an essential element of health awareness. Many factors are included in nutrition knowledge, out of which some are taste, convenience, cost, food security, and cultural beliefs [5]. To provide a baseline for the evaluation of intervention programs, the most effective surveys are the KAP (knowledge, attitudes, and practices) surveys [6]. Nutrient intake and diet quality are characterized by meal pattern and nutrient intake; meal patterns can affect body fat, bone density, and many other situations. Moreover, snacking, skipping of meals, adoption of specific diets, and fast-food eating are the key aspects of meal patterns. Different socioeconomic factors are responsible for different preferences and dietary habits of an individual. The total consumption of junk foods and fatty foods should be decreased while the intake of fruits and vegetables should be increased [7]. Parents can help their children by making their daily routine activities and refrain them from adapting sedentary behaviors in the early years of their lives [8]. A good and healthy nutrition plays an important role in optimal growth, lifestyle, and health. Good eating habits play an important role in the prevention of nutrition-related problems, malnourishment, and abnormal growth. According to previous researches, educational institutes like schools are a ground place for children to adopt good dietary practices. Nutrition education is crucial in improving the educational performance of children. Thus, if children have a balanced diet and incorporate physical activity (PA), they can enjoy having good health in the future [9]. Furthermore, different studies (2013-2019) had been conducted on the effectiveness of nutrition education programs, which concluded that nutrition education had a good effect on the behavior and attitude of students regarding nutrition [10-17]. As the modern and urbanized life is the main reason behind the faulty dietary practices of children and their nutrient-related deficiencies. In order to promote healthy lifestyle behaviors and eating habits among children, a physical activity-based nutrition education

program is recommended. In this situation, education is one of the most important persuading factors for enhancing the knowledge, attitude, and behavioral performances of an individual. Lack of knowledge about physical activity and dietary behaviors among children and their caregivers causes many nutritional problems among school-going children. Moreover, nutrition education and physical activity are crucial to overcome the malnutrition associated with nutrition among children.

2. Methodology

2.1. Subjects

The study included the group consisted of 108 female adolescents. Two schools were selected; one private school and one public school from Lahore, Pakistan. 54 girls were selected from the private school and the rest of the sample size was taken from a government school by cluster sampling technique. The study also included the difference and comparison between girls from both schools. Students from seventh, eighth, ninth and tenth grades were included in the study. The age of the students from these schools were 10-15 years of age. All the female students participated in pre-assessment, post-assessment and other activities, lectures, and quizzes conducted to promote nutrition education given by the nutrition educators.

2.2. Instruments

Questionnaire and Anthropometric measurements

Data collection was conducted by taking consent from the students by giving them consent forms along with permission from the school principals to conduct the research study. The questionnaire began with the basic socio-demographic data of the students, which consisted of 9 items including their names, grades, ages, genders, father's occupation, socio-economic status, their residential status, the geographical region of the schools, contact numbers of all students and anthropometric measurements including height weight, age and BMI of all students with proper instruments (weight machine, BMI calculator and measuring tape for height). Furthermore, the next section of the questionnaire was attitude-based close-ended the next part of the questionnaire was the knowledge-based questions. The purpose was to assess the nutritional knowledge of the students. It consisted of 10 items including their knowledge about personal hygiene, oral brushing routines, the importance of taking baths, the importance of drinking water, knowledge about nutritional labels, five basic food groups, macro- and micro-nutrients, calories, harmful effect of skipping meals and differences between healthy and junk foods. Questions were close-ended with two options (yes/no), from which students chose their answers based on the knowledge according to their lifestyles and changes they made after receiving nutrition education. Furthermore, the next section of the questionnaire was attitude-based close-ended questions with (yes/no) options to assess the behavior of the students regarding healthy eating in their daily life. This part consisted on 12 items including frequency of taking showers daily, brushing teeth before bedtime, reading nutrition labels, eating from 5 food groups, preferring junk over healthy food, eating from outside, homemade or cafeteria lunches, skipping meals, carbonated drinks over water or fresh fruit juice, drinking water daily, screen time and physical activity. Students were asked questions from different aspects of nutrition, from which they answered according to their

daily life practices and beliefs. It consisted of 9 items with questions about their daily practices including their personal hygiene, nutrition labeling, foods eaten from five food groups, lunchbox preferences, skipping meals, healthy and unhealthy eating, junk food consumption and carbonated beverages, sleep duration, physical activity and screen time. Teachers in all classrooms presented the questionnaires to their students. The details were given to them, then educators read aloud each question along with an example and meanings of difficult words used in the questionnaire to help the children answer in an honest way.

Activities, lectures, and brochures

After the questionnaire, to deliver nutrition education, lessons were formed. Lesson formation included the lessons that were made for the students and were delivered under the guidance of expert dietitians and with the suggestions of a supervisor. All the lectures were based on different parameters of nutrition including Food Guide Pyramid, healthy eating, physical activity, and sleep timing. The research was based on the KAP model and all the lectures were made according to this parameter. 3 lectures were planned to be delivered weekly for 4 weeks. The duration of each lecture was an estimated 45 minutes. Lectures were made on PowerPoint along with activities, evaluations in the form of quizzes, and students were given brochures at the end of every lecture. The tools used to deliver lectures were laptops, projector, board, and board markers. PowerPoint presentations were made on all topics under the supervision of the experts. Pictorial data was primarily used to seek the attention of students and for their better understanding. Brochures were made on all the topics and were given to students as home lessons. Different activities based on the lectures like activity related to food guide pyramid and my plate, activity regarding healthy and unhealthy eating habits, activity to teach children daily life exercises, the difference between healthy and junk food through cards and oral quiz at end of every lecture were done.

My Pyramid and My Plate Activity

This activity was designed to teach children about the knowledge and serving sizes but in a fun and interesting way. First, children were shown a poster of MyPyramid and MyPlate to help them memorize information about the food groups included and also the serving sizes of MyPyramid. Then, they were called to the whiteboard one by one and questioned to give answers and write the serving sizes with examples about what is healthy and what is unhealthy.

Junk foods vs. Healthy foods identification activity

Quiz Cards (15) were made for the students. Half of them included healthy foods and the other half included all the unhealthy foods. Two cards were chosen (one healthy, one unhealthy), and raised in front of the class for the students to identify the difference and explain why the unhealthy one was harmful for them. The students, who answered it correctly, were given brochures regarding information about junk foods and healthy foods. Also, students were asked to tell the ingredients of a proper healthy sandwich.

2.3. Interventional phase

In between pre-assessment and post-assessments, 2-3 weekly classes were conducted for 6 weeks on the concepts mentioned in their questionnaire; sleep time, weekly and weekend's television watching, food groups, physical activity, preferences on foods, and hourly gameplay. A proper curriculum was made along with activities necessary to bring a change in them. The 6 weeks of classes also focused on the KAP model, which was made to understand the knowledge, attitudes, and practices of these children and interventions made to help them bring a positive change in their knowledge, attitudes, and practices in all nutritional and other aspects of life which were previously harming them in some way.

2.4. Procedures

This study was conducted in accordance with the current policies and procedures regarding the research department from the University of Lahore, lasting within a time span of 6 weeks. Two schools were selected, one was in an urban area and the other one was in the peri-urban area. The objective of this study was to do a comparison between the nutrition education status of a private and a government school. A sample size of 108 female students was taken from both schools. Pre 8^{th}, 9^{th} and 10^{th} grades were chosen with the ages being between 10-14 years old, their weekly lesson schedules were made along with all equipment necessary to carry out the study. In pre-assessment, consent forms were given to the students. A questionnaire was made for the students regarding proper education about their lifestyles. After pre-assessment, the students were given nutrition education within every aspect that they were lacking. The weekly schedule of a 45-minute class was constructed for the students. Lectures on PowerPoint, brochures, and activities were planned on different topics for the students. The last step of data collection was post-assessment. A gap of 1 week was taken after delivering lectures in both schools regarding nutrition. After 1 week, evaluation was made based on the knowledge gained by the students, by filling the questionnaires used in pre-assessment again.

2.5. Statistical Analysis

SPSS version 21.0 was used to analyze the data. Data was based on knowledge, attitude and practice-based questions. A total of two tests were used for the analysis of data and to find out the associations and significance between knowledge, attitudes, and practices of government and private schools. The first test was paired sample T-test which was used to check the significant results through pre- and post-testing and the results shown were significant in knowledge, attitude, and practices among adolescents. The second one was an independent sample T-test, which was used to assess the comparison between the knowledge, attitudes, and practices of government and private schools, and the results were significant.

3. Results

Socio-Demographic Characterization

In the study, 108 female students were selected. Frequency distributions showed that 54(50%) students were from an urban area and 54(50%) were from a peri-urban area. 42(38.9) students were from low-class families, 57(52.8%) were from middle-class families and 9(10.2%) students were from upper-middle-class families, 84(77.8%) students were living in their own houses and 24(22.2%) students were living in rented houses.

26(24.1%) student's fathers were businessmen, 17(15.7%) student's fathers were office employees, 31(28.7%) student's fathers were laborers, 4(3.7%) students' fathers were professionals and 30(27.8%) student's fathers were doing other kinds of jobs. 3(2.8%) students were 11 years old; 4(3.7%) students were 12 years old; 20(18.5%) students were 13 years old; 33(30.6%) students were 14 years old and 48(44.4%) students were 15 years old. Moreover, 42(38.9%) students were underweight, 55(50.9%) students were normal and 11(10.2%) students were overweight. (Table 1)

Table 1: Frequency Distribution of Socio-Demographic Characterization.

Sr. No.	Demographics	Frequency	Percentage
1.	**Student's Gender**		
	Female	108	100
2.	**Geographical Area**		
	Urban	54	50
	Peri-Urban	54	50
3.	**Monthly Income**		
	Less than 10,000	42	38.9
	10,000-200000	57	52.8
	Above 200000	9	10.2
4.	**Residential Status**		
	Own house	84	77.8
	Rented house	24	22.2
5.	**Father's Occupation**		
	Businessman	26	24.1
	Office job	17	15.7
	Laborer	31	28.7
	Professionals	4	3.7
	Others	30	27.8
6.	**Age**		
	11 years	3	2.8
	12 years	4	3.7
	13 years	20	18.5
	14 years	33	30.6
	15 years	48	44.4
7.	**Body Mass Index**		
	Underweight	42	38.9
	Normal	55	50.9
	Overweight	11	10.2

Frequency Distribution of Pre and Post-Testing

According to the results, out of 108 students, 44.4% of students started going for a walk daily after eating while only 15.7% were observed in pre-testing, 71.3% of students initiated preferring sports (22.2% in pre-testing), 81.5% of students started consuming fruits and vegetables on daily basis (2.8% in pre-testing), and 93.5% and 74.1% of students started washing hands before and after eating respectively (1.9% and 6.5% in pre-testing, respectively) after nutrition education sessions. Furthermore, in post-evaluation, 69.4% of students started brushing their teeth before going to bed (12% in pre-testing). Additionally, 12% of students were not doing any physical activity, so their physical activity levels were little in pre-testing evaluation (24.1% after the education program). 19.4% of students were always consuming junk food late at night, but after basic nutrition education,

73.1% of students held back from consuming junk food late at night. 17.6% of students were always drinking carbonated beverages before the nutrition education program and later on, 73.1% of students refrained from drinking carbonated beverages when they were given basic education regarding the importance of water and fluids. 59.3% of students were drinking milk after nutrition education while before the program implementation 13.9% were drinking milk (Table 2).

Table 2: Frequency distribution of pre- and post-testing**.**

Sr. No.	Questions	Pre-Testing			Post-Testing		
		Always	**Sometimes**	**Never**	**Always**	**Sometimes**	**Never**
1.	Do you go for a walk after eating a meal?	17 (15.7%)	52 (48.1%)	39 (36.1%)	48 (44.4%)	53 (49.1%)	7 (6.5%)
2.	Do you like sports?	24 (22.2%)	52 (48.1%)	32 (29.6%)	77 (71.3%)	26 (24.1%)	5 (4.6%)
3.	Do you eat fruits and vegetables?	3 (2.8%)	43 (39.8%)	62 (57.4%)	88 (81.5%)	20 (18.5%)	0 (0%)
4.	Do you wash your hands before eating?	2 (1.9%)	26 (24.1%)	80 (74.0%)	101 (93.5%)	7 (6.5%)	0 (0%)
5.	Do you brush your teeth before going to bed?	13 (12%)	47 (43.5%)	48 (44.4%)	75 (69.4%)	32 (29.6%)	1 (0.9%)
6.	Do you engage in any physical activity?	13 (12.0%)	54 (50.0%)	41 (38.0%)	26 (24.1%)	76 (70.4%)	6 (5.6%)
7.	Do you eat junk food late at night?	21 (19.4%)	70 (64.8%)	17 (15.7%)	1 (0.9%)	28 (25.9%)	79 (73.1%)
8.	Do you drink carbonated beverages late at night?	19 (17.6%)	59 (54.6%)	30 (27.8%)	1 (0.9%)	38 (35.2%)	69 (6 3.9%)
9.	Do you drink milk?	15 (13.9%)	49 (45.3%)	44 (40.7%)	64 (59.3%)	39 (36.1%)	5 (4.6%)

Paired Sample t-Test

The results of the study showed that there was a significant association (p=0.001) between pre and post knowledge, attitudes and practices of school students (Table 3).

Table 3: Comparison of pre and post knowledge, attitudes and practices**.**

Paired Sample t-Test						
Sr. No.	**Variables**	**N**	**Mean**	**Standard Deviation**	**t**	**p-value**
1.	**Knowledge**					
	Pre-Knowledge	108	7.8148	1.88029	-34.185	0.001
	Post Knowledge	108	14.00	.00000		
2.	**Attitude**					
	Pre-Attitude	108	8.2130	2.21739	-6.303	0.001
	Post Attitude	108	9.7407	1.31398		
3.	**Practice**					
	Pre-Practice	108	55.8889	5.59929	-13.867	0.001
	Post Practice	108	47.8241	4.03450		

Independent Sample t-Test: According to the results, there was a significant association between the pre (p=0.024) and post (p=0.001) knowledge of government and private school students. There was a significant association between pre (p=0.001) and post (p=0.005) attitudes of government and private school students. Lastly, there was a significant association between pre (p=0.170) and post (p=0.001) practices of government and private school students (Table 4).

Table 4: Comparison between Government and Private Schools Through Independent Sample Test.

Independent Sample t-Test						
Sr. No.	**Variables**	**N**	**Mean**	**Standard Deviation**	**t**	**p-value**
1.	**Knowledge**					
	Pre-Knowledge Govt. School	54	8.2222	1.28367	2.296	0.024
	Pre-Knowledge Private School	54	7.4074	2.26972		
	Post Knowledge Govt. School	54	14.0000	.00000	2.047	0.001
	Post Knowledge Private School	54	14.0000	.00000		
2.	**Attitude**					
	Pre-Attitude Govt. School	54	9.0185	1.79613	4.036	0.001
	Pre-Attitude Private School	54	7.4074	2.31906		
	Post Attitude Govt. School	54	10.0926	1.52053	2.876	0.005
	Post Attitude Private School	54	9.3889	.95989		
3.	**Practice**					
	Pre-Practice Govt. School	54	55.1481	5.32848	-1.381	0.170
	Pre-Practice Private School	54	56.6296	5.81247		
	Post Practice Govt. School	54	46.2593	3.25742	-4.356	0.001
	Post Practice Private School	54	49.3889	4.15464		

4. Discussion

The study was directed to assess the impact of nutrition education on the lifestyle of school-going female adolescents. The study design was quasi-experimental study and the total sample size was 108. Students were selected through cluster sampling technique. The present study showed that nutrition education had a positive impact on the lifestyle of female adolescents. There was a significant association between knowledge, attitude and practices of government and private school (p=0.001), (p=0.005) and (p=0.001). A similar study was conducted by Sadhu AR and his colleagues and it was concluded that the attitude and level of knowledge were improved significantly but there was a lesser change in practices, as an individual needed time to convert knowledge into practices [18]. Other similar findings were observed by Hassan MR and his colleagues which stated that knowledge and attitudes were significantly improved while there were no significant changes seen in the practices regarding healthy eating, as it needs time to change [19]. The results of the current study reported that the dietary habits and eating behaviors of female adolescents were improved after receiving basic nutrition education according to the post-assessment findings. 44.4% of students started always going for a walk daily after eating, 71.3% of students initiated preferring sports, 81.5% of students started consuming fruits and vegetables on daily basis, and 93.5% and 74.1% of students started washing hands before and after eating

respectively after nutrition education sessions. Furthermore, in post-evaluation, 69.4% of students started brushing their teeth before going to bed. Salem GM and his colleagues conducted a similar study, it was concluded that nutrition education improved the dietary habits of secondary school girls. The lifestyle, eating behavior, physical activity and food hygiene practices were significantly improved after intervention [20]. Another study conducted by Kigaru DM and his colleagues concluded that children had inappropriate dietary practices, negative dietary attitude along with moderate nutrition knowledge. Attitude was related to a significant relationship with nutrition knowledge rather than dietary practices [21]. Results of the current study revealed that personal hygiene was improved in school going female adolescents after the nutrition education program. In post-evaluation, 69.4% of students started brushing their teeth before going to bed (12% in pre-testing). Jayita P and his colleagues conducted a similar study and explained that adolescent girls needed to be more conscious about their personal hygiene [22]. Additionally, according to the results of the current study, 12% of students were not doing any PA so their physical activity levels were little before, but nutrition education had a positive impact on them and 12% increased to 24.1% after the education program. Similar studies conducted by Mura G and his colleagues helped students change their lifestyle, with also showing positive results like a decrease in body mass index. Some outcomes were also related to good physical fitness [23]. The present study showed that positive outcomes of nutrition education on junk food consumption and dietary practices were observed as 19.4% of students were always consuming junk food late at night, but after basic nutrition education, 73.1% of students refrained from consuming junk food late at night. Similar findings were observed by Jan S and his colleagues in the study, the conclusion was dietary practices were not followed by adolescents. Nutrition education interventions were considered significantly important to increase the nutrition knowledge of adolescent girls [24]. Moreover, in the present study, 17.6% of students were always drinking carbonated beverages before the nutrition education program and 73.1% of students refrained from drinking carbonated beverages after they were given basic education regarding the importance of water and fluids. Similarly, 59.3% of students were drinking milk after nutrition education (13.9% before education program). Similar findings were observed by Ha EJ and his colleagues concluded that soft drink consumption was decreased through a class-based nutrition intervention. Students changed their milk choice and total milk consumption was increased [25].

5. Conclusion

Conclusively, the lack of knowledge was the main reason for inappropriate dietary habits and poor lifestyle in school-going adolescents. Skipping meals, physical activity, dietary habits, meal patterns and timings of meals were improved and had a positive impact on the lifestyle of school-going female adolescents after nutrition education sessions. Knowledge, attitudes, and practices regarding personal hygiene, physical activity, sleep timings, and screen timings had a significant association with nutrition education among school-going female adolescents of public and private school. Thus, these lifestyle modifications had a positive impact on the nutrition education of school-going female adolescents.

6. Recommendations

- Awareness campaigns, health education programs/sessions, and seminars should be organized in schools to

educate students regarding healthy eating habits, food preferences, and a healthy lifestyle.

- Electronic and print media should be used as a strong communication for awareness programs among students.
- The concept of healthy eating should be introduced so that malnourishment among children could be reduced along with morbidity.
- Different types of physical activity (outdoor activities) should be introduced in schools among girls for their growth and development.
- Sessions on personal and food hygiene should be given to female students to prevent them from infections and other diseases.
- Consumption of all three meals along with snacks should be promoted to prevent further meal skipping and to boost academic performance.
- Children should be taught about the harmful effects of junk food consumption on their health and body and the benefits of healthy eating.

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