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Original Research Article

Impact of Nutrition Education on the Knowledge, Attitudes and Practices (KAP) of School Age Female Adolescents Regarding Use of Media Gadgets and Excessive Screen Time and Its Effects on their Sleep and Health

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Abstract: Now-a-days, mass media is used worldwide among all age groups, from children to elders. Nutrition education is very important in decreasing the prevalence of increased screen time to enhance the lifestyle and health of children. To assess the impact of nutrition education on the knowledge, attitudes and practices (KAP) of school age female adolescents regarding use of media gadgets and excessive screen time and its effect on their sleep and health. Qausi-experimental study was conducted by using cluster sampling technique. A sample size of 108 female students aged between 10-15 years was selected from two schools in Lahore. Study duration was 6 weeks. A questionnaire was filled by all participants. Nutrition education was given to students in the time period of 4 weeks. Post-test questionnaires were filled after a gap of 1 week. Paired sample t-test was used to analyze data. Results showed that there was a significant association (p=0.001) between pre and post Knowledge, Attitude and Practice (KAP) among school age female adolescents. Results suggest that nutrition education programs that teach the importance of sleep and appropriate use of gadgets can improve the health and academic performance along with an increase in the nutritional knowledge of children as lack of awareness is the main concern.

Keywords: Adolescent, Nutrition, Knowledge, Attitude, Practices, Education, Screen time, Sleep.

INTRODUCTION

Mass media mainly consisted of newspapers, popular magazines, radio and TV until the 1980s and were considered to be a great way of communication that extended to a large number of people by influencing them. But more recently, the new media has been introduced to the public such as the Internet, podcasting, smartphones and media [1]. Adolescence is the distinct phase of life in which a child progresses from immaturity and social dependence to transform into a fully mature and developed person with potential and social skills. Over the past decades, the new media has offered both benefits and risks to the health of children and teenagers, simply because this type of media has grown effectively [2, 3]. Increased screen time can lead to obesity, increase in energy intake, decreased time available for physical activity or through a weakened metabolic rate. Also irritability, low mood and poor educational performance in schools are also the risks of increased screen time [4]. Social media is the basis of people connecting and creating ties with other people through different websites and to build communities, along with participation. It improves learning, improves critical thinking and increase the variety of knowledge and experiences [5, 6]. Children cannot differentiate real life from fantasy, that's why media use is potentially harmful. Using excessive smartphone can lead to pain in wrists and neck and can cause eyesight problems. Moreover, mental and behavioral problems like anxiety, depression, and interference with school work and relationship disorders are also some risks. Many health outcomes, especially obesity is related to increased screen time when children don't go out and play and have a sedentary lifestyle with poor sleep quality [7-9]. The use of electronic devices in the bedroom has a high prevalence of insufficient sleep quality in adolescents. Sleep is defined as the individual's behavior while asleep and the physiological changes to one's brain electrical rhythms while at rest. Poor mood swings and bad academic performance are related to the negative consequence of sleep disorders and inadequate amount

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of sleep. Moreover, keeping a television, computer or mobile phone in a bedroom can be harmful and can result in less sleep. The excessive use of internet and other technologies before going to bed and late night usage of gadgets can cause sleep disturbances in children [10-13]. As a result a morning-evening (ME) preference is explained which includes morning chronotypes (M) and evening chronotypes (E) and describes the variations in rhythmic expressions of biological and behavioral patterns. M-type individuals are defined as the type of people who have an early to bed and early to raise routine. They prefer early-morning activities, while E-type individuals are difficult to wake and go to sleep late at night and prefer sleeping late at night. As a result, they feel exhausted during the day [14]. Nutrition education is very important in decreasing the prevalence of increased screen time to enhance the lifestyle and health of children. As we know that teachers and parents are role models for children. A nutritionist should give proper guidance and education to parents and teachers as terms like "sedentary lifestyle and obesity" are relatively new to them. Teachers should be properly interviewed. Teachers should be guided to give effective playing techniques to children to reduce sedentary lifestyle and to improve their social skills apart from their curriculum. Also, for parents, the reduction of social media and use of electronic media, children will have more time to play and engage in different activities [15]. Moreover, parents should be advised to limit the use of gadgets outside of bedroom, along with proper supervision so children will know to use filtered information. Internet use should be limited. Use of proper ways to communicate with children about these things, instead of spying on them and using parental controls, will help create a friendly way of communication rather than barriers. Raising awareness and initiation of preventive programs, that will increase the cognitive skills of children can only be accomplished with the cooperation of parents, teachers, healthcare providers and the regulations in all fields [16]. Results showed that playing games for a long time can interfere with the sleep duration of adolescents even when children went to bed at a normal time after playing video games [17]. Television is an activity than has remained consistent oven a period of time. Cognitive and physical abilities have been negatively associated and affected by screen viewing that has resulted in depression, anxiety and sleep problems [18]. It has been reported that the use of smart phones, allowance of devices usage in the bedroom turning off TV and games has a negative effect on the sleep and routine of adolescents [19]. Excessive screen time is a trend that is affecting adolescents lately, so adolescents and parents should be given proper education regarding the use of technology and smartphones and its consequences on sleep and health [20].

Rationale

Now-a-days, mass media is used worldwide among all age groups, from children to elders. Excessive use of technology has so many negative mental and physiological outcomes that can contribute to the poor health of adolescents. To improve their health, the use of media should be limited to create positive outcomes (as a basis of learning and education). Health providers should provide nutrition education about the use of gadgets and to enhance the health, specially sleep quality and weight maintenance to the parents and to the organizations and institutions along with the staff and teachers involved. So, proper education programs regarding these issues should be introduced.

METHODS

Subjects: The study we conducted included a preassessment and post assessment control group design. The control group consisted of 108 girls. We chose two schools; one private school and one public school from Lahore, Pakistan. 54 girls were chosen from private school and the rest of the sample size was taken from a government school. Our study also includes the difference and comparison between girls from both schools. Students from seventh, eighth, ninth and tenth grades were included in the study. The mean age of the students from these schools were 10-15 years of age. And all of them were using some kind of technology daily (apart from television use). All the female students participated in preassessment, post assessment and other activities, lectures and quizzes made to promote nutrition education given by the nutrition educators.

Instruments

A questionnaire was made for the students to get proper information about their lifestyle, their current health status and their habits. The questionnaire had all kinds of questions ranging from bedtime and morning-time routines to all kinds of technology they used, along with their physical activity status. The questionnaire was based on KAP model (knowledge-attitude and practices model). First, their demographic data was taken to get better understanding regarding the backgrounds of the students and how to contact their parents if necessary. Then, their age, height and BMI (anthropometric measurements) were calculated properly with the help of a weight machine, measuring tapes and a BMI calculator. Nutrition knowledge was assessed using yes/no and multiple-choice questions. Also, their knowledge about Food Guide Pyramid food groups, servings, their personal hygiene and daily routine were added to assess the risks associated with the use of too much tech use. To facilitate questionnaire completion, educators received a prompt guide that includes procedures for beginning the assessment process; proper directions on how to explain the questions to the students were read along with real life examples given to the students so they can understand

the questions better. Teachers in all classrooms presented the questionnaires to their students. The details were given to them. Readability was assessed to ensure ease of completion, no mistakes, spellings corrections and validity of the questionnaire made for the students. 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, Activities, lectures and brochures were designed by the nutrition educators to promote health and knowledge regarding a healthy lifestyle to the students. Specific lectures related to our study were made on Microsoft PowerPoint along with pictures and added videos to increase interest about the topics in children. Also, a quiz was designed for the students at the end of lecture to help the nutrition educator understand the knowledge level of the students. A weekly lectures schedule was made along with activities and rewards in the forms of brochures given to the students on answering the quiz questions properly.

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 rose in front of the class for the students to identify the difference and explain why the unhealthy foods were harmful for them. The students, who answered it correctly, were given brochures containing information regarding junk foods and healthy foods. Also, students were asked to tell ingredients of a proper healthy sandwich.

Limiting technology use activity

This activity was both for the parents along with their children. Parents were asked to make technology free zones for children in their house, like no tech use in the dining room or bedrooms, playing board games before going to bed rather than surfing internet, playing outdoor games instead of computer games. The parents, along with their children were urged to discuss about the risks of using technology in a friendly way. Tips were given to them on how would they limit tech use. Also, giving time and their love to children will help them to promote healthy habits and a good routine in their children.

Sleep Cycle Activity

Students were given a weekly sleep activity sheet. Different bedtimes were mentioned on the sheets. The children were asked to choose the time that they went to bed on all days of the week. After 7 days, children noticed a remarkable change in their bedtime routines as well as their behavior and academic performance the following day.

Intervention

In between preassessment and post assessment, 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 games playing. A proper curriculum was made along with activities necessary to bring a change in them. The 6 weeks 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.

Procedure

The study was conducted in accordance with the current policies and procedures regarding research department from University Of Lahore. The students who conducted the research were given proper knowledge about all steps and aspects of research. The demographic information of the students from both schools was taken. The questionnaires were given to the students from both of these schools. Weekly classes were conducted for 6 weeks along with activities. Both schools students completed all the activities and took all the lectures given by nutrition educators. A comparison regarding the knowledge from students of these schools was made along with the difference between their nutrition education in pre and post assessment.

RESULTS

Statistical Analysis

SPSS version 21.0 was used to analyze the data. Data was based on knowledge, attitude and practice-based questions. One test was used for analysis of data and to find out the associations and significance between knowledge, attitudes and practices among school age female adolescents. The 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.

Table-1: Frequency distribution of Socio-Demographic Characterization

Sr. No.	Demographics	Frequency	Percentage
1.	**Geographical Area**		
	Urban	54	50
	Peri Urban	54	50
2.	**Residential Status**		
	Own house	84	77.8
	Rented house	24	22.2
3.	**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

Results showed that 54(50%) students were from an urban area and 54(50%) were from a peri urban area. 84(77.8%) students were living in their own houses and 24(22.2%) students were living in rented houses. 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.

Table-2: Knowledge

Sr. No.	Questions	Pre-Testing		Post-Testing	
		Yes	No	Yes	No
1.	Do you know that playing too much video game is unhealthy?	83 (76.9%)	25 (23.1%)	108 (100%)	0 (0%)
2.	Do you know that watching too much TV can affect your academic performance and health?	86 (79.6%)	22 (20.4%)	108 (100%)	0 (0%)
3.	Do you know how many hours you need to sleep in a day?	71 (65.7%)	37 (34.3%)	108 (100%)	0 (0%)

Results showed that 83(76.9%) students were having knowledge about unhealthy effect of playing video games before nutrition education and 108(100%) students were having knowledge about unhealthy effect of playing video games after nutrition education. 86(79.6%) students were having knowledge about effect of too much screen timing on health and academic performance before nutrition education and 108(100%) students were having knowledge about effect of too much screen timing on health and academic performance after nutrition education. 71(65.7%) students were having knowledge about duration of sleeping before nutrition education and 108(100%) students were having knowledge about duration of sleeping after nutrition education.

Table-3: Attitude

Sr. No.	Questions	Pre-Testing		Post-Testing	
		Yes	No	Yes	No
1.	Do you prefer junk foods late at night?	60 (55.6%)	48 (44.4%)	6 (5.6%)	102 (94.6%)
2.	Do you think that you should play video games and watch TV before going to bed?	53 (49.1%)	55 (50.9%)	14 (13.0%)	94 (87.0%)
3.	Do you prefer waking up early in the morning?	94 (87.0%)	14 (13.0%)	106 (98.1%)	2 (1.9%)
4.	Do you prefer sleeping early at night?	73 (67.6%)	35 (32.4%)	103 (95.4%)	5 (4.6%)

Results showed that 60(55.6%) students were preferring junk food late at night before nutrition education and 102(94.6%) students were not preferring junk food late at night after nutrition education. 53(49.1%) students were thinking of playing video games and watching TV before bedtime before nutrition education and 14(13%) students were thinking of playing video games and watching TV before bedtime after nutrition education. 94(87.0%) students were preferring to wake up early in the morning before nutrition education and 106(98.1%) were preferring to wake up early in the morning after nutrition education. 73(67.6%) students were preferring sleeping early at night before nutrition education and 103(95.4%) students were preferring sleeping early at night after nutrition education.

Table-4: Practice

Sr. No.	Questions	Pre-Testing			Post-Testing		
		Always	Sometimes	Never	Always	Sometimes	Never
1.	Do you eat junk food before bedtime?	21 (19.4%)	70 (64.8%)	17 (15.7%)	1 (0.9%)	28 (25.9%)	79 (73.1%)
2.	Do you drink carbonated beverages before bedtime?	19 (17.6%)	59 (54.6%)	30 (27.8%)	1 (0.9%)	38 (35.2%)	69 (63.9%)
3.	Do you play games after getting home from school?	14 (13%)	37 (34.3%)	57 (52.8%)	8 (7.4%)	69 (63.9%)	31 (28.7%)
4.	Do you watch any TV show or play a game before going to bed?	19 (17.6%)	52 (48.1%)	37 (34.3%)	15 (13.9%)	37 (34.3%)	56 (51.9%)
5.	Do you take nap in afternoon?	11 (10.2%)	70 (64.8%)	27 (25%)	31 (28.7%)	61 (56.5%)	16 (14.8%)

Results showed that 21(19.4%) students were always eating junk food before bedtime, 70(64.8%) students were sometimes eating junk food before bedtime and 17(15.7%) students never ate junk food before bedtime before nutrition education whereas, 1(0.9%) students were always eating junk food late at night, 28(25.9%) students were sometimes eating junk food before bedtime and 79(73.1%) students never ate junk food before bedtime after nutrition education. 19(17.6%) students were always drinking carbonated beverages before bedtime, 59(54.6%) students were sometimes drinking carbonated beverages before bedtime and 30(27.8%) students never drank carbonated beverages before bedtime before nutrition education whereas, 1(0.9%) students were always drinking carbonated beverages before bedtime, 38(35.2%) students were sometimes drinking carbonated beverages before bedtime and 69(63.9%) students never drink carbonated beverages before bedtime after nutrition education. 14(13%) students were always playing games after getting home from school, 37(34.9%) students were sometimes playing games and 57(52.8%) students never played games before nutrition education whereas, 8(7.4%) students were always playing games, 69(63.9%) students were sometimes playing games and 31(28.7%) students never played games after nutrition education. 19(17.6%)students were always watching TV before going to bed, 52(48.1%) students were sometimes watching TV and 37(34.3%) students never watched TV before nutrition education whereas, 15(13.9%) students were always watching TV, 37(34.3%) students were sometimes watching TV and 56(51.9%)Students never watched TV after nutrition education. 11(10.2%) students were always taking a nap in afternoon, 70(64.8%) students were sometimes taking a nap in afternoon and 27(25%) students never took a nap in afternoon before nutrition education whereas, 31(28.7%) students were always taking a nap in afternoon, 61(56.5%) students were sometimes taking a nap in afternoon and 16(14.8%) students never took a nap in afternoon after nutrition education.

Table-5: Results of comparison regarding pre and post knowledge, attitudes and practices

Sr. No.	Paired Sample Statistics					
	Variables	N	Mean	Standard Deviation	t	Sig. p-value
	Knowledge					
1.	Pre Knowledge	108	2.2222	0.87897	-9.196	0.001
	Post Knowledge	108	3.0000	0.00000		
	Attitude					
2.	Pre Attitude	108	2.5926	0.93766	-4.864	0.001
	Post Attitude	108	2.1204	0.42619		
	Practice					
3.	Pre Practice	108	10.7778	1.82062	-4.822	0.001
	Post Practice	108	11.8056	1.60291		

Results showed that there was a significant association (p=0.001) between pre and post knowledge among school age female adolescents. There was a significant association (p=0.001) between pre and post attitudes among school age female adolescents. There was a significant association (p=0.001) between pre and post practices among school age female adolescents.

Table-6: Paired Sample Statistics

Sr. No.	Variables	N	Mean	Standard Deviation	t	Sig. p-value
1.	Pre-Knowledge, Attitude and Practice (KAP)	108	15.5926	2.36025	-4.999	0.001
2.	Post Knowledge, Attitude and Practice (KAP)	108	16.9259	1.60434		

Results showed that there was a significant association (p=0.001) between pre and post Knowledge, Attitude and Practice (KAP) among school age female adolescents.

DISCUSSION

This study was done to evaluate the association between excessive screen time and use of gadgets and its effect on adolescents' sleep time and health. It was a quasi-experimental study conducted on 108 school aged female adolescents. Cluster sampling technique was used. This study showed that nutrition education is important for school age children to make a positive impact. The association between knowledge, attitude and practice (KAP) of both schools (p=0.001) was significant. (Afzal N *et al.,* 2017*),* conducted a similar study on private and government school going girls. A difference had been observed, junk food consumption was more common in private school girls. An overall significant result (p<0.005) showed these adolescent girls were not very active in their daily routine. Eating unhealthy and TV watching were more common habits found in them, which needs to be overcome through interventions [21]. Current study results showed that TV watching and video game time was decreased after students received nutrition education on less screen time, 76.9% students were having knowledge about unhealthy effect of playing video games but after nutrition intervention, 100% students had the knowledge regarding unhealthy effect of playing excessive video games. Moreover, same results were observed with screen time specially TV before nutrition intervention as 79.6% students was having knowledge and after nutrition education, it increased to 100%. Another similar study was conducted by (Delfino LD *et al.,* 2017*)* in which it was observed that high use of gadgets, TV and computers was common among adolescents which was associated with unhealthy eating habits snacks, sweets etc. Also, increased screen time caused physical inactivity in adolescents [22]. Results of the current study showed that before nutrition education, 65.7% students were aware of sufficient sleep duration and after nutrition education, 100% students were having sufficient sleep. Nutrition education made a positive impact on students. Another study on sleeping patterns and its effect on health was conducted by (Lee J *at al*., 2017) in which he observed the shorter sleep duration effect on health of school going adolescents. Less sleep in adolescents was related to affected physical and mental health and they were more stressed as compare to other students. Hence, it was concluded that sleep education is necessary in schools [23]. According to the results, junk food consumption was high in school going adolescents. 21.9% students were always consuming junk food before bedtime but after nutrition education, it decreased to 0.9%. A similar study was done by (Vardanjani A.E *et al.,* 2015*)* on school going girls regarding junk food consumption. Intervention showed a positive impact on their knowledge, attitude and practices. Before intervention result was insignificant ($P >$ 0.005) and after intervention, a significant difference ($P <$ 0.001) was observed. So, the study concluded that, in order to improve practices and habits, intervention is important [24]. Another study on junk food consumption was conducted by (Gupta A *et al.,* 2018) in which high junk food consumption was observed in school going children. High prevalence of about 36% was observed. There was a greater need to arrange education programs for students to create awareness regarding unhealthy habits. In the present study, it was observed that 19% adolescents were always consuming carbonated drinks before bedtime, and after nutrition education, it decreased to 0.9% [25]. Similar study was conducted by (Irwin BR *et al*., 2019) regarding the sugary and carbonated beverages consumed by school going children. Study concluded that students who had insufficient nutrition knowledge consumed more sugary and carbonated beverage and less water. Nutrition knowledge helped them to develop healthy habits of more water intake. Intervention was positively effective and improved their beverage consumption habits [26].

CONCLUSION

This study concluded that there is lack of knowledge in children as well as schools regarding appropriate technology use and sufficient sleep. Consumption of junk foods and carbonated beverages before bedtime, excessive screen time along with other types of technology use and insufficient sleep was affecting health status of children, specially causing them to become overweight. Knowledge, attitudes and practices regarding healthy eating, appropriate technology use, sufficient screen time and sleep had a significant association with nutrition education among school going female adolescents. There is a greater need to promote nutrition education regarding all parameters above to make children aware of their health in order to lead a healthy and active life.

RECOMMENDATIONS

- Awareness campaigns, health education programs/sessions and seminars should be organized in schools to educate students regarding less screen time, sufficient sleep and healthy eating.

- Children should be taught about the harmful effects of junk food consumption on their health and body and the benefits of healthy eating.
- The excessive use of technology among female adolescents should be reduced at home and outdoor activities should be promoted in schools.
- Children should be allowed limited time to watch television and play games and early bedtime routine should be promoted.

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