

## The Effects of Nutrition Education of Public and Private School-Going Children on their Behavior, Attitude and Dietary Habits

Ammar Ahmed<sup>1</sup>, Aqsa Khan<sup>2</sup>, Tooba Naz<sup>2</sup>, Aneeqa Saif<sup>2</sup>, Iqra Saleem<sup>2</sup>, Syeda Zia e Fatima<sup>2</sup> and Faran Khan<sup>3\*</sup>

<sup>1</sup>University of Southern Denmark, Denmark

<sup>2</sup>Department of Nutrition and Dietetics, School of Health Sciences, University of Management and Technology, Pakistan

<sup>3</sup>Department of Clinical Services, School of Health Sciences, University of Management and Technology, Pakistan

**\*Corresponding Author:** Faran Khan, Department of Clinical Services, School of Health Sciences, University of Management and Technology, Pakistan.

**Received:** January 24, 2024; **Published:** March 04, 2024

### Abstract

Nutrition education is a vital component of any school-based health promotion initiative. It can improve student attitudes and behaviors toward healthy eating, and positively influence their dietary choices. Studies have shown that nutrition education not only increases knowledge about healthy eating, but also encourages positive changes in behavior and eating habits. Nutrition education is also effective in changing dietary choices, such as decreasing the consumption of unhealthy foods and increasing the consumption of fruits and vegetables. Nutrition education is an important part of any school-based health promotion initiative, and should be incorporated into the curriculum to ensure that students have the knowledge and skills necessary to make informed and healthy dietary choices. FFQ and 24HR survey questions were used to collect the data for the study. A total of 23 questions on the sociodemographic characteristics of individuals and their nutritional habits make up the food intake and nutrition knowledge-based questions that were organized by researchers. The review of this form yielded the opinions of experts. Simple random sampling was employed. We found that almost all the kids lacked rudimentary knowledge of food types after gathering their responses. The second objective was to present a slide show to them that we had created with the topic in mind. We demonstrated to them “MY PLATE, MY PYRAMID”, and sources of dairy, meat, carbohydrates, and fats, as well as informed them of their significance. The study’s primary goals are to assess students in public and private schools’ dietary decisions before and after receiving nutrition education, as well as to gather information on children’s nutrition knowledge and the dietary preferences of students between the ages of 14 and 16. After analyzing the available data and conducting thorough research, it can be concluded that government school students receive a more adequate diet than private school students.

**Keywords:** Health Promotion; Nutrition Education; Eating Habits; Health Dietary Choices

### Background

The idea of nutrition entails making an ongoing effort to eat enough nutrients for the body at the right times to maintain and improve health as well as the quality of life. Every stage of growth (childhood, adolescence, and infancy) requires a sufficient and balanced diet. For maintaining regular pubertal maturation as well as for promoting healthy development (Köse and Yıldırım 2020). Healthy eating habits, lifelong behavioral patterns, and rapid growth and maturity all occur throughout the primary education period. The required nutrients

must be ingested as part of a balanced and adequate diet plan for youngsters to experience this rapid growth. The development and maintenance of children's health are affected by dietary and lifestyle decisions. A nutritious diet prevents disease, improves quality of life, promotes the physical and mental health of children, and boosts academic performance. Correcting poor nutrition and lifestyle choices made during this time would be difficult. Inadequate and unbalanced nutrition prevents children from maturing properly and can lead to sicknesses and multiple disorders. In both affluent and developing nations, obesity and malnutrition are increasingly seen as a global epidemic and a sickness. Childhood obesity and malnutrition are one of the most important worldwide public health problems of the 21<sup>st</sup> century [1].

Most of the students face issues like poor growth, malnutrition, low immunity, bone diseases, weakness, dizziness, and obesity because of a lack of nutrition knowledge about healthy diets and food groups. We need to evaluate their dietary habits and educate them about the right dietary choices and improve their lifestyle for a better future [2]. Nutrition education is an important component in promoting school-age children's health. Most students of growing age have no idea of food groups and daily food choices before research. The significance of this research is that after the nutrition education session, students can get knowledge about food groups and healthy food choices. Their habit of skipping meals was improved. They started to bring homemade lunches according to food groups instead of eating unhealthy items from the school cafeteria. They came to know about the adverse effects of skipping meals and wrong dietary choices at this age. They started to improve their lifestyle by adopting healthy choices so that they would not have to suffer from serious diseases like hypertension, cardiovascular, etc. in the future. They came to know that a healthy body has a healthy future as compared to a weak body. This research was worth doing as students do not become aware of nutrition knowledge but also show improvements after nutrition education. They spread the knowledge about food groups to their family members too. Students started to eat according to My Plate [3].

### Objectives of the Study

- To evaluate the dietary choices of government and private school students before and after nutrition education.
- Compare the dietary choices of government and private school children.

### Materials and Methods

A cross-sectional or comparative study design was used for the investigation. Researchers in a cross-sectional study evaluate both the exposures and the results of their individuals at the same time. In contrast to case-control studies, where participants are selected based on the outcome status, and cohort studies, where participants are selected based on the exposure status, cross-sectional studies simply select participants based on the inclusion and exclusion criteria established for the research. Once participants are selected, the study's evaluation of exposure and outcomes proceeds.

### Inclusion/exclusion criteria of the sample

We chose the inclusion criteria of the sample for our research. Typical inclusion parameters include factors related to geography, clinical settings, and demographics. The research questionnaire asked inquiries about demographics, knowledge, and behavior. The pupils inquired about them. The questionnaire had food-related queries.

**Sample/participants:** Students in grades 8 through 10 from public and private schools make up the group that was chosen. The sample has a rudimentary understanding of nutrition based on their dietary habits and the courses they are taking. Additionally, they voluntarily choose sustenance for themselves.

**Sample strategy:** The research is performed based on a simple random sampling of school-going children in the 8<sup>th</sup> to 10<sup>th</sup> class.

**Probability sampling:** Using a strategy grounded on probability theory, a researcher selects samples from a broader population using the probability sampling approach. A participant must be picked at random to be included in the probability sample.

In simple random sampling with this technique, a representative subset of the population is selected at random. It's the simplest and quickest way to sample from a population using probability.

### Sample characteristics

- School going children.
- All are of the same age group.
- No demographic barrier.
- Inform consent.

Simple random sampling was used in this study with 185 subjects including public and private schools. Students and their parents who agreed to take part in the survey was included in the study sample.

The survey form was used to collect research data. The food consumption frequency form, child nutrition knowledge form, and BMI values form are all available. The researchers created a structured questionnaire containing 23 questions about the sociodemographic characteristics of the participants' parents and children, as well as their children's dietary habits.

### Children's nutritional knowledge form

To assess children's nutritional knowledge, the children's nutritional information form "Eat Smart with My Pyramid for Kids" was used. 30 food photos of five different food types are included in this form. For judging purposes, each accurate answer gets one point for each incorrect answer 0. The scale ranges from 0 to 20, with 20 being the highest possible score. A high score indicates a better understanding of nutrition [1].

**Body mass index calculator:** The weight measurements were carried out using the polyclinic's Seka 767 computer-aided digital weighing device. Before the child's weight and height were measured, outer clothing and shoes were removed. The BMI was then determined from this data using the following formula:  $\text{body weight (kg)}/\text{height (m}^2\text{)}$ . The BMI cut-offs for children aged 2 to 18 years as published by Cole., *et al.* (2000) and accepted by the World Health Organization. The BMI was determined using the World Health Organization (WHO).

### Data collection

The principal was interviewed after getting consent from the school's research ethics board. Information on parents willing to take part in the study was collected. There were 182 participants. Due to scheduling conflicts, employment commitments, or school transfers, 9 of these parents were unable to take part in the research. In all, 173 families (parents and kids) participated in the study. Before data collection, the study's purpose was discussed with the children and parents who took part.

Voluntary informed consent forms were used to obtain written parental consent and oral consent from children. The survey form and the frequency of food consumption form were filled out by the parents, while the child nutrition knowledge form was filled out by the children. Both parents and children received nutrition education. These classes have been designed separately for parents and children. After a two-hour training program, parents were asked to observe their children's dietary habits and the foods they eat most often. Before

the training, the children's height and weight were measured. The children were trained four times in total. This training took place every six weeks. The monitoring period was six months.

### Data collection tools

Nutritional evaluation questionnaires, food consumption frequency forms, food diaries, and knowledge-based questions about nutrition were used to compile the data for this study.

### Data collection procedure

In February 2023, 200 students from the government girls' high school Sher Shah, which is associated with the Government of Punjab, and the private girls' high school Fast School and Academy participated in the study. The Head of the Department of Health Sciences at the University of Management and Technology signed a letter authorizing the study on 01-02-2023, indicating that the study was approved by the university's ethics committee. On February 2, 2023, researchers in one group administered a series of pre-and post-tests as part of an intervention study. Students in eighth, ninth, and tenth grades at a Punjab-affiliated private school constituted the first research population.

Participants in the study were selected from the pool of students who were on campus during the survey's administration and who provided informed consent. Use of a simple random sampling technique. An easy random selection was used to pick one of the departments. The sample consisted of eighth graders from the chosen school. Nutritional evaluation questionnaires, food consumption frequency forms, food diaries, and knowledge-based questions about nutrition were used to compile the data for this study.

**Survey form:** Twenty-three items on the participant's demographics and eating habits are included in the survey the researchers designed.

**Food consumption frequency form:** There are questions on the questionnaire about the types of meat, dairy, vegetables, cereals, fruits, oils and sugar, fats and beverages, and sweets that kids often consume. This form was reviewed by a public health specialist and nutritionist.

**Nutritional assessment questionnaire:** This form consists of their demographic profile, anthropometric measurements, 24-hr dietary intake questionnaire, and how often you eat the following meals in a week for the scoring never, 1 time, 2 times, 3 times, 4 times, 5 times, 6 times in a week or daily.

**Knowledge-based questions:** This survey form consists of knowledge-based questions for students whether they know food groups or not, whether they know about their sources, and which food is good or bad for their health.

### 2<sup>nd</sup> study population

The female students of the eighth, ninth, and tenth grades at a government-run Sher Shah High School in the Indian state of Punjab constituted the second study population. The study, which had a single set of participants with a pre-and post-test format, was conducted on March 2, 2023. They employed a straightforward random sampling method. An easy random selection was used to pick one of the departments. The sample consisted of eighth graders from the chosen school. Students all filled out the same survey.

### 2<sup>nd</sup>-time data collection

2<sup>nd</sup>-time data collection was conducted after 30 days, and the same survey forms were filled out by the same population.

**Statistical procedures/analysis techniques**

SPSS 25 (Statistical Package for Social Sciences) was used to analyze and visualize data. SPSS 25 (Statistical Package for Social Sciences) is a software package that has been used to analyze and visualize data. The effect of nutrition education was analyzed through the software. The experience of taste loss and recovery of taste sensation were visualized. The nutrition education session and data were arranged on an Excel sheet and then put on SPSS to run tests of the data.

**Results**

**Demographics**

|        | Public |         | Private |         |
|--------|--------|---------|---------|---------|
|        | F      | Percent | F       | Percent |
| Female | 130    | 100.0   | 21      | 28.4    |
| Male   | 0      | 0       | 53      | 71.6    |
| Before | 63     | 48.5    | 36      | 48.6    |
| After  | 67     | 51.5    | 38      | 51.4    |

**Table 1**

**Late night snacks**

| Before  |          | Treatment |    | Total |
|---------|----------|-----------|----|-------|
|         |          | After     |    |       |
| Public  | Not sure | 12        | 8  | 20    |
|         | Yes      | 4         | 6  | 10    |
|         | No       | 5         | 8  | 13    |
|         | 3        | 9         | 9  | 18    |
|         | 4        | 6         | 6  | 12    |
|         | 5        | 7         | 6  | 13    |
|         | 6        | 2         | 5  | 7     |
|         | 7        | 17        | 19 | 36    |
| Private | Not sure | 5         | 10 | 15    |
|         | Yes      | 3         | 2  | 5     |
|         | No       | 4         | 3  | 7     |
|         | 3        | 4         | 5  | 9     |
|         | 4        | 7         | 2  | 9     |
|         | 5        | 2         | 4  | 6     |
|         | 6        | 1         | 1  | 2     |
|         | 7        | 10        | 6  | 16    |

**Table 2**

Do you know about food group

| Before  |     | Treatment |    | Total |
|---------|-----|-----------|----|-------|
|         |     | After     |    |       |
| Public  | Yes | 0         | 65 | 65    |
|         | No  | 20        | 2  | 22    |
| Private | Yes | 16        | 37 | 53    |
|         | No  | 20        | 1  | 21    |

Table 3

Soft drink intake

| Before  |              | Treatment |    | Total |
|---------|--------------|-----------|----|-------|
|         |              | After     |    |       |
| Public  | 1-3 in a day | 21        | 20 | 41    |
|         | One in a day | 42        | 28 | 70    |
|         | No intake    | 0         | 19 | 19    |
| Private | 1-3 in a day | 18        | 14 | 32    |
|         | One in a day | 17        | 14 | 31    |
|         | No intake    | 1         | 10 | 11    |

Table 4

Late night meal

| Before  |     | Treatment |    | Total |
|---------|-----|-----------|----|-------|
|         |     | After     |    |       |
| Public  | Yes | 50        | 24 | 74    |
|         | No  | 13        | 43 | 56    |
| Private | Yes | 30        | 13 | 43    |
|         | No  | 6         | 25 | 31    |

Table 5

Awareness of junk food

| Before  |     | Treatment |    | Total |
|---------|-----|-----------|----|-------|
|         |     | After     |    |       |
| Public  | Yes | 53        | 66 | 119   |
|         | No  | 10        | 1  | 11    |
| Private | Yes | 30        | 35 | 65    |
|         | No  | 6         | 3  | 9     |

Table 6

**Awareness processed increases weight**

| Before  |     | Treatment |    | Total |
|---------|-----|-----------|----|-------|
|         |     | After     |    |       |
| Public  | Yes | 24        | 64 | 88    |
|         | No  | 39        | 1  | 40    |
| Private | Yes | 18        | 37 | 55    |
|         | No  | 17        | 1  | 18    |

**Table 7**

**Water intake**

| Before  |              | Treatment |    | Total |
|---------|--------------|-----------|----|-------|
|         |              | After     |    |       |
| Public  | 3-4 glasses  | 17        | 24 | 41    |
|         | 6-8 glasses  | 18        | 23 | 41    |
|         | 8-12 glasses | 4         | 13 | 17    |
|         | Not sure     | 24        | 7  | 31    |
| Private | 3-4 glasses  | 24        | 1  | 25    |
|         | 6-8 glasses  | 8         | 16 | 24    |
|         | 8-12 glasses | 3         | 17 | 20    |
|         | Not sure     | 1         | 4  | 5     |

**Table 8**

**Awareness of hydration**

| Before  |     | Treatment |    | Total |
|---------|-----|-----------|----|-------|
|         |     | After     |    |       |
| Public  | Yes | 55        | 62 | 117   |
|         | No  | 8         | 5  | 13    |
| Private | Yes | 26        | 38 | 64    |
|         | No  | 10        | 0  | 10    |

**Table 9**

**Comparison of groups before and after nutrition education sessions**

A t-test was applied to examine the difference in mean scores of participants related to the questionnaire about nutrition awareness. The results displayed that there were significant ( $p < .05$ ) and insignificant ( $p > .05$ ) mean scores differences between before treatment

|         |                      |        | M      | SD     | SE     | t      | p    |
|---------|----------------------|--------|--------|--------|--------|--------|------|
| Public  | Sources              | Before | 1.9791 | .30280 | .03815 | -.819  |      |
|         |                      | After  | 2.0385 | .49602 | .06060 | -.830  | .001 |
|         | Nutrition for Health | Before | 1.8849 | .38905 | .04902 | -7.542 |      |
|         |                      | After  | 2.4123 | .40710 | .04973 | -7.553 | .571 |
| Private | Sources              | Before | 2.0152 | .54531 | .09089 | -2.030 |      |
|         |                      | After  | 2.2460 | .42848 | .06951 | -2.017 | .088 |
|         | Nutrition for Health | Before | 1.8750 | .56852 | .09475 | -7.509 |      |
|         |                      | After  | 2.6447 | .26877 | .04360 | -7.380 | .001 |

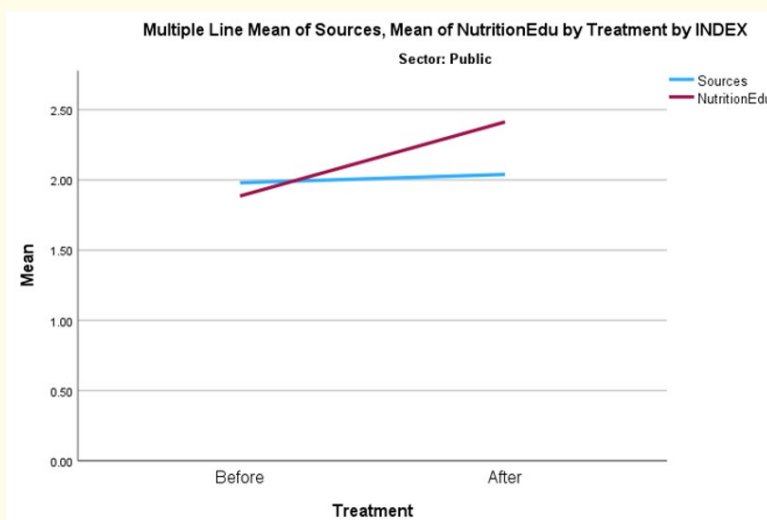
Table 10

and after treatment. In the public sector, there was a significant mean score difference between before (M = 1.98, SD = .302) and after (M = 2.04, SD = .496) regarding sources of nutrition such as fiber, vitamins, and their importance. Whereas an insignificant mean score difference was found regarding nutrition for health before (M = 1.88, SD = .389) and after (M = 2.412, SD = .407). The results related to the private sector revealed that there is a significant mean score difference before (M = 1.87, SD = .568) and after (M = 2.64, SD = .268) education sessions about nutrition for health. On the other hand, there was an insignificant mean score difference between conditions, before (M = 2.015, SD = .545) and after (M = 2.25, SD = .428). Therefore, the alternative hypothesis regarding educating sessions for sources of nutrition (public) and nutrition for health (private) was accepted (p < .001). On the contrary null hypothesis of nutrition for health (public) and nutrition sources (private) was accepted (p > .05).

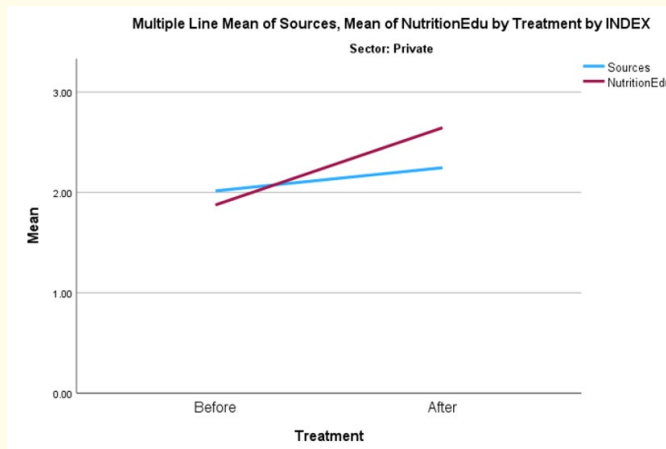
Hypothesis confirmation

| Sessions             | p    | Hypothesis 0 | Hypothesis 1 |
|----------------------|------|--------------|--------------|
| Nutrition Sources    | .001 | Rejected     | Accepted     |
| Nutrition for Health | .571 | Accepted     | Rejected     |
| Nutrition Sources    | .088 | Accepted     | Rejected     |
| Nutrition for Health | .001 | Rejected     | Accepted     |

Table 11







Figure

### Discussion

The study revealed that secondary school-going students give a positive response to nutrition education and the response rate was high related to the previous study which focused on BMI. It improved their nutritional knowledge and reduced their body mass index. The study results also demonstrated the importance of such educational practices in preventing overweight or obesity in childhood. Their studies took a long time to complete but the current study gave significant results in a month and improved dietary habits.

The recent studies focused on better choice and eating habits of secondary school-going children and healthy breakfast choices for better performance in academics as well as another daily tasks. Previous studies were only focused on observing the effects.

Health issues in children are less likely to arise from good eating habits.

Several of the most crucial components of a healthy diet. Habits include things like not skipping meals, eating breakfast frequently, drinking lots of water, consuming fewer or no fast foods, and participating in regular physical activity. Family and school are the two main social settings where children learn healthy eating habits. This study sought to examine how a nutrition education program delivered to secondary school-aged students in both public and private schools affected their dietary knowledge, attitudes, and behaviors. Private and public-school systems were the two we selected. The government-run Sher Shah Raiwind High School in Lahore was the other option. The quick high school in Lahore was in the private sector. The students’ ages ranged from twelve to sixteen. In the sample size, both genders were represented. Qualitative research was employed. Students answered a before-and-after survey. The first session focused on knowledge, while the second one educated participant about nutrition.

The response came after a month of waiting. After a month, we went back and completed the questionnaire once more. Both sectors found this session to be successful. The research was determined to be useful, and the reaction was significant. The students did not know food groups and had no understanding of nutrition. They are unable to control mealtime food intake or portion amounts. After the lesson, they learned about food groups, “my plate, my pyramid”, and how to make better nutritional decisions. They also try to control their eating habits and choose healthy diets based on their knowledge. In the past, students in the private sector didn’t consume any healthy food. They completely skip meals, and when they do eat, they like fast food, iced tea, and eating out. Students in the private sector strive to eat twice a day but skip breakfast and choose unhealthy foods like packaged food or fast food, which has an adverse effect. The findings from

the previous session showed that they had access to food, that skipping meals was a typical practice, that they frequently ate fast food and went out, and that their level of hydration was low. They didn't know the basic differences between the foods in each food group, which foods promote growth and family harmony, or how to alter one's diet to improve one's quality of life. They now have a fundamental understanding of dietary types, the significance of meals, hydration levels, salt consumption, and other topics because of the lesson. The same students filled in the questionnaire, and the findings were verified. They changed the way they ate. Keep adequate hydration levels and eat meals on time. Try to have 3 large meals and 2 or 3 mini meals as snacks. We got a good response after the session, which was successful.

Government school pupils were more physically active and made better food decisions when compared to their private school counterparts. Responses from before and after the session were significant, and nutrition information was presented using PowerPoint and a whiteboard. They learned about nutrition misconceptions and the fundamentals of nutrition while we tried to explain the pyramid and how I arranged my plate. The results of this study showed that the nutrition education programs offered to high school-aged kids to introduce them to wholesome foods were successful. Their nutritional behaviors, attitudes, and knowledge all improved because of receiving information on good eating practices. The results of the study also showed the value of these educational strategies in avoiding childhood overweight or obesity [4-15].

### Conclusion

After analyzing the available data and conducting thorough research, it can be concluded that government school students receive a more adequate diet than private school students. This is due to various reasons such as government schools having access to government-funded programs like mid-day meals, which provide nutritious food to students.

### Funding Support

Not applicable.

### Conflict of Interest

The authors declare that they have no competing interest.

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**Volume 19 Issue 3 March 2024**

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