BioScientific Review (BSR)
Volume 5 Issue 3, 2023
ISSN$_{(P)}$: 2663-4198 ISSN$_{(E)}$: 2663-4201
Homepage: https://journals.umt.edu.pk/index.php/bsr

Article QR

Title:	**Impact of My Plate-Based Education on Nutrition Knowledge of Elementary School Students in Lahore, Pakistan**
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DOI:	https://doi.org/10.32350/bsr.53.04
History:	Received: June 24, 2022, Revised: January 3, 2023, Accepted: February14, 2023, Published: September 15, 2023
Citation:	Abbas Z, Jamil A, Ayaz SL, Ikhlaq I, Noor M, Tanweer A. Impact of my plate-based education on nutrition knowledge of elementary school students in Lahore, Pakistan. *BioSci Rev.* 2023;5(3):33–41. https://doi.org/10.32350/bsr.53.04
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Conflict of Interest:	Author(s) declared no conflict of interest

A publication of
The Department of Life Sciences, School of Science
University of Management and Technology, Lahore, Pakistan

Impact of My Plate-Based Education on Nutrition Knowledge of Elementary School Students in Lahore, Pakistan

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ABSTRACT

An interventional study was conducted to enhance the knowledge of school going children of seventh grade. School age is the best age to provide nutrition knowledge because at this age eating habits are being developed. Nutrition education is an approachable and effective tool for healthy living. Nutrition knowledge helps students to become aware of healthy choices and also helps to prevent the onset of different diseases. 'My Plate' is a tool that is used to provide knowledge to students. Every food group on My Plate has equal importance and health benefits. In this research, a self-made questionnaire was used and the knowledge of students about food groups was assessed using SPSS. The results indicated a major difference between pre-test and post-test knowledge. In introduction, knowledge student's knowledge increased from 4% to 76.7%. Regarding grains, group knowledge increased from 25.3% to 72.6%. Regarding fruits and vegetables and proteins, student knowledge increased up to 97.3% and 90.4%, respectively. Regarding dairy products, group knowledge increased up to 84.9%.

Keywords: food groups, knowledge, My Plate, nutrition education

1. INTRODUCTION

Poor eating habits play a core role in childhood problems and may lead to chronic diseases in later life. Nutrition education in schools is very helpful in preventing nutritional problems as they provide nutrition knowledge and dietary guide to the children. According to a study, when teachers give educational sessions regarding nutrition, eating choices can be changed for both the short- and long-term [1]. Research explicates that less than 7.3% of students take five or more servings of fruits and vegetables. Fruits are rich in phytochemicals, fibre, and antioxidants and prevent many diseases. Vegetables also contain water which play role in satiety. There is a significant decrease in weight of obese when they eat vegetables on regular basis [2]. Every country needs some guidelines related to dietary knowledge also known as dietary guidelines. These guidelines are needed to be followed in the community for the promotion of health. One of the dietary tools is 'My Plate'. This tool provides guidance for the community to include all food groups in their daily dietary routine including fruits and vegetables, grains, proteins, and dairy products, as well as how many portions should be a part of their plate. This tool was introduced in 2011. My Plate should be followed and implemented through nutrition education sessions [3]. Nutrition education is an approachable and effective tool for healthy living. As the children start their school they begin to consider

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themselves independent in their food choice [4].

There is a lack of awareness regarding healthy eating habits among children. Nutrition education can fill this gap and bring productive results. This study focused on assessing the nutrition knowledge gaps and then filling these gaps with the help of interactive and informative sessions. The current study showed that although My Plate is not a part of school curriculum, it should be included in it since it is easy to understand as compared to its alternative My Pyramid.

This study focused on the assessment and improvement of the nutrition knowledge of school going children. Awareness regarding food groups was imparted by using the latest dietary tool namely My Plate. School age is the best age for bringing change in dietary habits and the provision of rational knowledge may help to change these habits. It may also help children to live a better and healthy life ahead.

2. METHODOLOGY

2.1. Development of Educational Material

This study was conducted to educate school going children of Grade 7 about My Plate, which is an internationally recognized dietary tool used to impart awareness about the food items that should be a part of our plates. The current study was interventional in nature.

Sessions were given to students about food groups that are part of My Plate. In the first session, the target was to introduce My Plate to the students. The logo was displayed in front of the whole class. Furthermore, basic dietary knowledge was delivered, such as the importance of breakfast and basic nutrients present in each food group. There were 4 questions that were asked before and after the session.

The major focus of the second session was the grains group, sources of grain, and why the grains group is important for our body and normal bowel function. Moreover, portion sizes were discussed so one can be able to take the appropriate portion of the grains. Food samples were shown. There were 9 questions regarding the grain group.

The third session was about the importance of the fruits and vegetables group. In this session, students came to know why fruits and vegetables are an important part of the daily routine. Portion sizes were discussed along with the health benefits of this group. There were 14 questions in the questionnaire regarding this group.

Similarly, protein group was discussed with its health benefits and portion sizes. How to add proteins in daily life was also surmised. There were 5 questions in the questionnaire for this group.

In fifth session, the major concern was to deliver the importance of dairy food group, as well as its servings for the seventh class girls and how to add them in daily life. My Plate logo was also displayed on the board. There were 4 questions in the questionnaire regarding this group. The data delivered in the sessions was taken from www.myplate.org.

2.2. Application of Educational Material

2.2.1. Study Participants. Sample size was 75 and all of them were girls selected from KIPS school, Johar Town, Lahore.

2.2.2. Pre- and Post-test

- Pre-test was conducted at the beginning of each session to assess the

existing knowledge of students regarding each food group.

- Post-test was conducted at the end of each session to see the increase in knowledge after the session on My Plate food groups.
- The result was a significant increase in the knowledge of students before and after the session.

2.2.3. Procedure. A healthy lifestyle program was developed in a private school after confirmation from the school head. The program consisted of pre- and post-test surveys. The program was based on 3 to 4 weeks of nutrition education to middle school children (girls). Nutrition education focused on My Plate and the five basic food groups included in it. The education was delivered through lectures which produced effective results at the end.

2.3. Study Design

The current study was designed as an experimental study. It was carried out on 70 to 75 students (girls) of class seven.

2.4. Participant Selection

The participants included in this study were the students of class seven at KIPS school. All the participants were selected based on their willingness. They shared the same demographic characteristics, parental support, socioeconomic status of family, and the same school environment.

2.5. Data Collection Tools

A questionnaire was used as the data collection tool. The questionnaire consisted of closed-ended questions (KAP). The questions were about basic eating habits as well as the five food groups included in My Plate. The KAP questionnaire was based on the items used in previous studies.

2.6. Pre-testing

The validity of the questionnaire was examined through pre-testing. Some questions were omitted and some were rephrased for better understanding and clarity.

2.7. Lectures of Nutrition Education

Audio-visual method was used to deliver lectures and interventional group demonstration. There were a total of five nutrition education lectures delivered to the interventional group. Each lecture lasted for 30 minutes. Two lectures were delivered in each week.

The first was based on basic eating habits. The basic and general concept of the first lecture was the introduction to nutrition and healthy food habits to students. The second lecture was the starting of My Plate. My Plate poster was shown to the students. It mentioned the definition of My Plate and the food groups included in it. Also, the knowledge of the first food group comprising carbohydrates was also delivered. It contained information about the basic nutrients present in them and their importance. The third lecture was about fruits and vegetables. The importance of fruits and vegetables, serving sizes, and why we should consume them daily was explained to the students. The fourth lecture initiated a discussion on protein group explicating which foods are categorized in this group. Moreover, different sources and forms of protein were explained to the students. In the last lecture, the importance of the dairy group was discussed. Post-test was performed after all the lectures to examine the knowledge of students after each lecture.

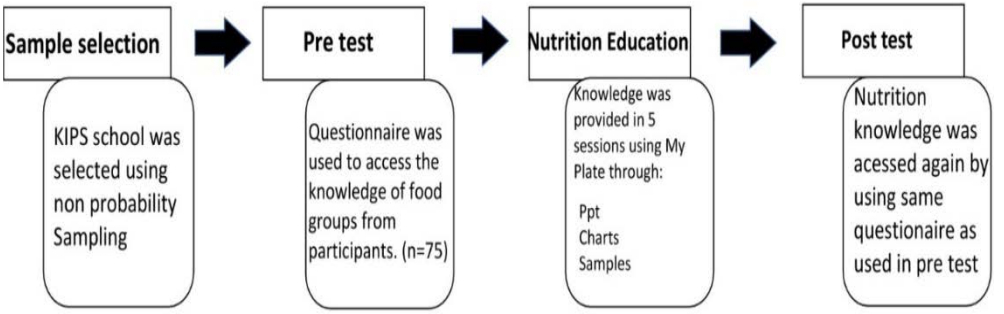

Figure 1. Methodology

3. RESULTS

The sample (n=75) consisted of seventh grade female students. There was a statistically significant ($p<0.05$) increase in the nutrition knowledge of students post intervention.

According to Table 1, the data from pre- and post-test assessment shows that there was an increase in knowledge due to labelling food groups from 4% to 76.70%. Furthermore, the general group knowledge significantly increased ($p<0.05$).

Table 2 shows that when asked about grains, group knowledge significantly increased from 14% to 61.60%. Furthermore, the knowledge about the serving of grains increased from 18% to 78.1% and the increased in knowledge was significant ($p<0.05$).

According to the post-test data shown in Table 3, the knowledge in students about drupes increased from 16% to 97.3%, while the knowledge about which nutrient is absent in fruit juice but present in the whole fruit increased from 24% to 65.8%. Furthermore, the knowledge about the servings of fruits and vegetables increased up to 84.9% and the increase in knowledge about fruits and vegetables was significant ($p<0.05$). Table 4 shows that the knowledge about protein group increased from 46% to 71.2%.

Table 5 shows that the knowledge about dairy group increased from 8% to 60.3%. Table 6 shows the significant results of introduction group (p=0.000), grains (p=0.000), fruits and vegetables (p=0.000), protein, and dairy (p=0.000).

Table 1. Pre- and Post-Test Comparison of General Questions

	n	Pre mean	Post mean	p-value
Eating a balanced diet give you all nutrients you need?	74	0.73	0.91	0.006
Label Plate with different food groups?	74	0.01	0.72	0.000
How many cups of water you should drink every day?	74	0.23	0.59	0.000
What is the most important meal of your day?	74	0.65	0.77	0.83

Table 2. Pre- and Post-Test Comparison of the Knowledge of Participants about Grains Group

	n	Pre mean	Post mean	*p*-value
How does fiber help our bodies?	75	0.07	0.55	0.000
Which is not in whole grain?	75	0.15	0.24	0.127
Which layer is absent in refined grain?	75	0.13	0.59	0.000
How many servings of grain are required for your age group?	75	0.19	0.76	0.000
In which layer of grain starch is present?	75	0.11	0.47	0.000
1 slice of bread is equal to how many servings?	75	0.17	0.84	0.000
Fiber can be digested by a human enzyme?	75	0.31	0.84	0.000
In which layer of grain fiber is present?	75	0.25	0.84	0.000
How much grain you eat should be from whole grain?	75	0.21	0.72	0.000

Table 3. Pre- and Post-Test Comparison of the Knowledge of Participants about Fruits and Vegetables Group

	N	Pre mean	Post mean	*p* value
Which food is in fruit group?	75	0.64	0.89	0.000
Do you know about drupes?	75	0.09	0.93	0.000
Which nutrient is present in whole fruit but not in juice?	74	0.26	0.64	0.000
Tropical fruit grow in which climate?	75	0.65	0.88	0.001
Eating different type of fruit and vegetable prevent from disease?	75	0.72	0.91	0.004
Why fruit is sweet in taste?	75	0.56	0.92	0.000
Which food is missing in his lunch?	75	0.19	0.77	0.000
Role of vitamin c?	75	0.48	0.92	0.000
How many cups of fruits required for 14 years old girls?	75	0.36	0.93	0.000
100% vegetable juice is consider in vegetable group?	75	0.53	0.88	0.000
Which food id in vegetable group?	75	0.79	0.93	0.004
Which color of fruits and vegetable should be eaten?	74	0.24	0.76	0.000
Carrots are rich source of?	75	0.53	0.94	0.000

	N	Pre mean	Post mean	*p* value
How many cups of vegetable required per day?	75	0.20	0.83	0.000

Table 4. Pre- and Post-Test Comparison of the Knowledge of Participants about Proteins Group

	N	Pre mean	Post mean	*p* value
Nuts and seed are good source of?	75	0.36	0.33	0.734
Which type of almond should be preferred?	75	0.68	0.89	0.001
Should you wash poultry before cooking?	75	0.83	0.83	1.000
Zinc is a nutrient that helps in?	75	0.17	0.47	0.000
Why are beans and pea are both in protein and vegetable group?	75	0.67	0.95	0.0000

Table 5. Pre- and Post-Test Comparison of the Knowledge of Participants about Dairy Group

	N	Pre mean	Post mean	*p* value
What type of sugar is present in milk?	74	0.09	0.85	0.000
Which nutrient is present in dairy group?	75	0.65	0.80	0.047
Milk is the only food that contain calcium?	75	0.80	0.83	0.708
How many cups of milk required for your age group?	75	0.16	0.64	0.000

Table 6. Pre- and Post-Test Comparison of the Knowledge of Participants about the Overall Score of Each Food Group

	Pre total mean	Post total mean	Follow up mean	Pre-post *p*-value	Pre-follow-up *p*-value
Introductory/general questions	1.61	3.01	2.97	0.000	0.000
Grains	1.5	5.8	4.653	0.000	0.000
Fruits and vegetables	5.25	9,5	8.18	0.000	0.000
Protein	2.7	3.4	3.96	0.000	0.000
Dairy	1.7	3.1	2.58	0.000	0.000

4. DISCUSSION

The purpose of the current research was to increase the nutrition knowledge of students regarding healthy eating and impart knowledge about food groups to check the effectiveness of school-based nutrition education sessions. The results showed that if proper nutrition education sessions are given to the students, they are able to implement that knowledge in their life. Hence, nutrition education is an important tool to bring changes in eating practices. The results also indicated an increase in the nutrition knowledge of students as they were able to sort out healthy eating choices.

Most of the nutrition education sessions that result in a positive change in schools are delivered through teaching mode. Teaching provides students with better and authentic knowledge that further helps them to live a better life with a lower risk of diseases in later life.

A program known as 'The Healthy Highway' was conducted in 2018 [5]. It aimed at improving the nutrition knowledge of students through nutrition education sessions. It included students from Grade 5. The sessions were based on healthy food, healthy eating, and physical education classes, while traffic lights were used symbolically to classify the foods according to their effects on health. Before the sessions, students were not able to differentiate healthy from unhealthy food. However, after these sessions, the result was a significant increase in the nutrition knowledge of students.

My Plate was introduced in 2011. This is an easy approach toward healthy eating choices. If proper education regarding this tool is provided, then there will be a positive change in the nutrition knowledge of students. The current study focused on giving education based on My Plate and showed that students were able to understand My Plate logo as well as the message that the plate is giving.

A program known as 'Discover My Plate' was conducted in 2017. It showed the same results as the current study. Its impact on kindergarten students showed that students were able to identify My Plate logo and food groups and they were also able to assign different foods to their relative food group [6].

This intervention had a positive effect on the nutrition knowledge of school going children of class seven [7]. According to the findings, knowledge about grain products was enhanced tremendously among students [8]. Gresser [9] explained the importance of dairy products and dairy alternatives. According to the results of this study, 69.7% of participants ate dairy products and 29.6% ate dairy alternatives.

4.1. Conclusion

This intervention focused on the knowledge of Grade 7 students regarding My Plate. Students came to know about the basic five food groups included in My Plate and their importance in their daily life. There was an increase in the knowledge of serving sizes, food sources, and the structure of grains. Students found out the macronutrients present in these food groups and how they play an important role in growth and development. The study showed the positive results of nutrition education on Grade 7 students. The results showed that if proper knowledge is provided to the students, it impacts positive results on dietary behavior patterns. The follow up session showed that there was significant improvement in eating patterns after nutrition education. Such programs improve the knowledge of students regarding food and subsequently improve their dietary food choices.

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