

# A Study on the Impact of Nutrition Educational Program on “My Plate”

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**Abstract:** - This study was designed to study the impact of a nutrition education program for the non-nutrition students in the University of Hail. The knowledge of nutrition plays a vital role in food choices; any step towards improving this paves way for better nutritional choices and a resultant better health. The study was carried out using the following tools for the purpose of imparting education and subsequently assessing the level of knowledge attained. (a) Pretested questionnaire (b) Handouts on selected instructional material. SPSS Statistic 17 for statistical processing. Non-parametric Mc Namer test of the paired t-test and Wilcoxon for dichotomous samples were applied for data analysis.

The statistical analysis of nonparametric type revealed a highly significant difference between the correct responses obtained from the pretest and posttest for 93% of the questions asked and a poor significance for 7% of the questions, indicating an overall high impact of the education imparted through this study program. This study highlighted the effectiveness of nutritional education program provided to the randomly selected students from non-nutrition back ground. Our findings showed a significant change in nutrition knowledge of the participants.

**Key Words:** nutrition education, My Plate, health promotion, healthy food habits.

## I. INTRODUCTION

Undesirable food habits and nutrition-related practices, which are often based on insufficient knowledge, traditions and taboos or poor understanding of the relationship between diet and health, can adversely affect nutritional status. However, people can adopt healthier diets and improve their nutritional well-being by changing their food and nutrition attitudes, knowledge and practices, if sufficient motivation is provided to do so [1].

Recent studies carried out on similar lines suggest an urgent need to educate the public especially the vulnerable groups like adolescents to equip with wisdom of healthier food choices and subsequent cultivation of healthy food habits.

Adequate and correct knowledge about healthy diet is a prerequisite for students to adopt a healthy dietary behavior with subsequent dissemination of the acquired knowledge to their parents, relatives and friends [2]. College students are highly exposed to unhealthy eating habits leading to body weight gain [3].

This can be done through lectures, training sessions, small group discussion, role-playing, pamphlets and booklet by the school health services in collaboration with other agencies.

There is at present a paucity of information in Saudi Arabia on adolescent nutritional status, eating habits and underlying influences, and the impact of nutrition intervention in adolescence. It is thus imperative that both educational authorities and researchers attend to this area, and that health education and information about healthy eating habits and lifestyle be included in the school curriculum [2].

This requires a basic knowledge of what constitutes a nutritious diet and how people can best meet their nutritional needs from available resources. Hence nutrition education is utilized to reinforce specific nutrition-related practices or behaviors to change habits that contribute to poor health; this is done by creating a motivation for change among people, to establish desirable food and nutrition behavior for promotion and protection of good health.

Nutrition education has been defined as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being. Nutrition education is delivered through multiple venues and involves activities at the individual, community, and policy levels”[4]. Such school-based nutritional education and

learning behavior was found to improve the students' eating habits. Eating behavior is learned and if we are to prevent dietary problems, correct health messages and behavior should be adopted at an early age [5].

Skipping meals and eating snacks are more pronounced in adolescents than in other people [6]; therefore, education and intervention programs directed to this age group should address these phenomena.

According to Farghaly et al, In Saudi Arabia, underweight is still common; although severe malnutrition secondary to poverty has almost disappeared with the oil boom during the last 3 decades; this may be explained by inadequate parental knowledge regarding proper nutrition and healthy dietary attitude [7].

The rapid cultural and social changes that have occurred in the Arabian Gulf region, since the discovery of oil and the economic boom during the 1970's and 1980's, were associated with an alarming increase in obesity [8-12].

One of the major causes of obesity in Saudi Arabia is the changes in the diet, in terms of quantity and quality, which has become more "Westernized" [13]. In the Kingdom of Saudi Arabia (KSA), recent studies revealed increasing consumption of animal products and refined foods in the diet at the expense of vegetables and fruits [14,15].

For those richer sectors of society where diseases of affluence are taking an increasing toll, nutrition education should be directed to proper food selection, consumption and lifestyle. Nutrition education is needed now more than ever; programs that link research, theory, and practice are more likely to be effective. . The rapid economic growth and westernized diet have triggered energy overconsumption [16], whereas the convenient modern lifestyle has led to the lack of exercise to increase metabolic syndromes, such as hypertension, diabetes and dyslipidemia [17,18].

Numerous unhealthy dietary changes were accused for increasing the prevalence of both overweight and obesity observed among Saudi children, adolescences and adults in the last few decades [19-22].

Restrained eating behavior or inadequate nutrient intake is a common and widespread practice among adolescents girls. The types of diets during this period may affect day-to-day well-being growth , dental health , physical development and academic achievement [23]. Young people have to start now to make the right food choices for lifelong health [24].

Some illnesses are known to be lifestyle related like coronary diseases , obesity, high blood pressure , diabetes , and to a certain extent , osteoporosis [25,26]. The risk- reducing lifestyle modifications , have their greatest impact if they are started in adolescence or even in childhood [27].

Much of nutrition education is based on the relationship between nutrition and the prevention of conditions such as coronary heart disease which develop in middle age while adolescents' main interest in nutrition is based upon how it can improve their lives now and what are their immediate reward [28]. therefore these education programs has been thought to be of little relevance to themselves [29].

## **II. OBJECTIVES**

1. To generate awareness regarding healthy food choices among non-nutrition students.
2. To compare the difference in the percentage of the correct responses obtained from a pretest and a posttest questionnaire.

## **III. DESIGN**

For the purpose of this review, nutrition education is defined as 'any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviors conducive to health and well being'. Our goal was to detect a difference in pre/post scores with at least 5% level of significance.

A systematic literature search was conducted by: a) searching internet databases, b) conducting backward searches from reference lists of articles of interest, c) searching the Journal of Nutrition Education and Behavior. We reviewed 30 articles derived from experimental or quasi-experimental studies.

## **IV. SETTING and PARTICIPANTS**

A total of 49 young adult females from non-nutrition back ground studying in the University of Hail, between the age group of 18-24 years were randomly selected. The samples were selected randomly from different colleges of the female campus, excluding Clinical Nutrition, specifically from clinical laboratory and physiotherapy department. This was a cross-sectional study.

## **V. METHODOLOGY**

The tools used for the study:

- a) Pre-test and Post-test using a pretested questionnaire
- b) A power-point presentation of instructional material
- c) Hand-outs of selected instructional information.

For the present study we used two variations involving the method of instruction. Firstly using a power-point presentation format as a tool for imparting the desired nutrition education, and the second one making use of printed material of the same information. A power point presentation comprising of selected nutrition information was used. The first method using a power-point class room presentation failed to generate a significant result upon statistical evaluation of the data obtained. Hence the instruction process was re-instigated using pamphlets comprising of the selected information about My Plate to facilitate a better understanding of the selected concepts, followed by subsequent questionnaire filling by the participants.

Being an educational program format, this study involved 3 specific steps, viz ;

1. Assessing pre-existing knowledge of the participants regarding food groups and My Plate by a pre-test.
2. Imparting the desired education( using (a) classroom presentation and (b)printed material)
3. Assessing the impact of the instructional method conducting a post-test.

The pretest and posttest were conducted using the same pretested questionnaire.

A total of 18 questions were required to be answered by the subjects. Most of the questions were closed-ended in a multiple choice format. The questionnaire was formatted according to the information provided in the teaching material used. The initial set of questions were targeted to gather background information regarding USDA and programs available for educating public about healthy food choices.

The next questions that followed were pertaining to the knowledge about My plate and its different components. Questions regarding the components of “My Plate” were covered in the questionnaire to assess the level of awareness among the subjects.

The nutritional knowledge of the subjects was tested before as well as after imparting the nutrition education by means of the same pretested questionnaire to assess the impact of the lesson. To facilitate students’ better comprehension, the questionnaire was translated into Arabic language and given to the subjects. After the education was imparted the participants were given a posttest with the same questionnaire, to compare the results obtained from the pretest as well as posttest.

Both the pretest and posttest questionnaires were checked for correct responses. The difference between the correct pretest and posttest responses was calculated to check the significance of correlation in the responses before and after the education. The responses from the first administration were used to assess construct validity and internal consistency. The two sets of responses were used to measure test-retest reliability.

## **VI. STATISTICAL ANALYSIS**

This study used SPSS Statistic 17 for statistical processing. Since this was a non-parametric data, descriptive statistics of frequencies and means and for comparison of the two related samples Mc Namer test of the paired t-test was used. For non-dichotomous data, Wilcoxon matched pairs test was used. Frequencies of the percent correct and percent incorrect responses were calculated for each of the question asked. Statistical results were considered to be significant at  $p = 0.05$ .

## **VII. RESULTS AND DISCUSSION**

The responses were first checked for frequencies of correct and incorrect pretest and posttest scores using descriptive statistics. For dichotomous variables McNamer test was performed to check for significance and for non-dichotomous variables Wilcoxon test was used.

To facilitate writing of results and deriving conclusions, we categorized the questions and the respective responses into 4 categories.

- A. Questions pertaining to the subject’s awareness about the existence of dietary guidelines.
- B. Questions about the recommended allowances for different food groups.
- C. Questions pertaining to Protein-rich foods.
- D. Questions about the components of My Plate.

Table 1 – RESPONSES ON AWARENESS OF DIETARY GUIDELINES

QUESTIONS ASKED	PRETEST RESPONSES	POST-TEST RESPONSES	MC NEMAR TEST
1. The Dietary Guidelines for Americans were developed to make people aware of the food groups that make up a healthy diet. Which of these organizations developed the guidelines?	% Correct 19.6 % Incorrect 80.4	% Correct 91.3 % Incorrect 8.7	0.000***
2. The guidelines were designed to focus attention on which of these?	% Correct 17.4 % Incorrect 82.6	% Correct 84.8 % wrong 15.2	0.000***

The analysis of responses on awareness of dietary guidelines revealed a significant difference between the responses of pretest and posttest questions. These two questions were asked at the beginning of the questionnaire to ascertain the knowledge regarding the existence of the dietary guidelines given by ADA and the purpose of these guidelines. Responses to these two questions showed a highly significant (0.000) difference between the pretest and the posttest responses indicating the high impact of the learning of this specific topic by the subjects.

Table 2- RESPONSES ON KNOWLEDGE OF FOOD ALLOWANCES

QUESTIONS ASKED	PRETEST RESPONSES	POST-TEST RESPONSES	WILCOXON TEST
1. Most of your daily food calories should come from which of these groups?	% Correct 19.6 % Incorrect 80.4	% Correct 82.6 % Incorrect 17.4	0.004**
2. How many glasses of milk should you drink during a day to get the recommended amount of dairy?	% Correct 23.9 % Incorrect 66.1	% Correct 87 % Incorrect 13	0.010*
3. The amount of milk and other dairy products recommended is listed in cups in the dietary guidelines. Which of these equals one cup in the milk group?	% Correct 30.4 % Incorrect 69.6	% Correct 67.4 % Incorrect 32.6	0.000***
4. What is the minimum and maximum amount of servings of vegetables you should have every day?	% Correct 19.6 % Incorrect 79.4	% Correct 78.3 % Incorrect 21.7	0.000***
5. Which of these represents one cup from the vegetable group?	% Correct 21.7 % Incorrect 78.3	% Correct 84.8 % Incorrect 15.2	0.007**

The responses to the next category of questions regarding the knowledge of food allowances revealed a significance for all the five questions asked. For questions 1 and 5, the difference between the number of correct responses obtained in the pretest and posttest were found to be significant at ( $p < 0.00$ ). For questions 3 and 4, apparently there was a high increase in the number of correct posttest responses; statistical analysis also revealed a highly significant difference ( $p < 0.000$ ) Responses to the 2<sup>nd</sup> question were lesser significant ( $p < 0.0$ )

Table 3 – RESPONSES ON AWARENESS ABOUT PROTEIN AND FATS

QUESTIONS ASKED	PRETEST RESPONSES	POST-TEST RESPONSES	WILCOXON/McNemar TEST
1.What would be a great vegetarian source of protein?	% Correct 47.8 % Incorrect 52.2	% Correct 87 % Incorrect 13	0.154
2.What food will give you a large amount of protein with the least amount of fat?	% Correct 39.1 % Incorrect 60.9	% Correct 91.3 % Incorrect 8.7	0.001**
3.Dry beans, eggs, and nuts are in which food group?	% Correct 50 % Incorrect 50	% Correct 91.3 % Incorrect 8.7	0.001**
4. Trans fats raise the risk of heart disease.	% Correct 65.2 % Incorrect 34.8	% Correct 95.7 % Incorrect 4.3	0.001**
5.Trans fats are found in fruits.	% Correct 73.9 % Incorrect 26.1	% Correct 93.5 % Incorrect 6.5	0.012*

This table represents the results obtained for the third category of questions- awareness about proteins and fats in foods. The analysis of the first question failed to establish significance between the correct pretest and posttest responses. The analysis of question 2,3,4 and 5 revealed a significant ( $p < 0.00$ ) difference between the pretest and posttest correct responses.

Table 4 – RESPONSES ON MY PLATE

QUESTIONS ASKED	PRETEST RESPONSES	POST-TEST RESPONSES	MC NEMAR TEST
1.What two food groups are balanced on My Plate?	% Correct 23.9 % Incorrect 76.1	% Correct 84.8 % Incorrect 15.2	0.001**
2.My Plate is divided into sections of approximately how many food groups ?	% Correct 37 % Incorrect 43	% Correct 89.1 % Incorrect 10.9	0.000***
3.The smaller circle in the plate represents	% Correct 35.9 % Incorrect 64.1	% Correct 64.1 % Incorrect 35.9	0.001**
4.Your plate should look like My Plate at every meal.	% Correct 35.9 % Incorrect 64.1	% Correct 89.7 % Incorrect 10.3	0.000***

This table depicts the responses obtained from the questions based on “My Plate”. From a total of 5 questions asked in this category, questions 1,3 and 4 displayed a significant difference ( $p < 0.00$ ) between the pretest and posttest responses. The responses to 2<sup>nd</sup> and 5<sup>th</sup> questions revealed a highly significant difference ( $p < 0.000$ ) respectively for the responses obtained.

## DISCUSSION

There are three essential components to nutrition education:

- a) A motivational component, where the goal is to increase awareness and enhance motivation by addressing beliefs, attitudes through effective communication strategies.
- b) An action component, where the goal is to facilitate

people's ability to take action through goal setting and cognitive self-regulation skills. c) An environmental component, where nutrition educators work with policymakers and others to promote environmental supports for action. Each component needs to be based on appropriate theory and research [4].

An analysis of the results suggests a good response of the subjects. 93% of the questions generated a higher percentage of correct posttest responses while there was poor response for 7% of the questions, with a smaller percentage of correct posttest responses compared to pretest responses.

The statistical analysis of the first category of questions, pertaining to a knowledge of the Dietary guidelines showed a highly significant difference ( $p < 0.000$ ) for the responses obtained in the pretest and posttest of both the question. This suggests that the initial queries were perhaps understood properly by the subjects and also indicate a high level of interest in the topic at the onset of the education program.

The analysis of the next category of questions pertaining to knowledge of food allowances indicated a highly significant difference between the correct responses obtained from the pretest and posttest. A total of five questions were asked to estimate the knowledge of food allowances prior known to the students. This suggests a lack of awareness of the subjects about the food allowances and dietary recommendations or perhaps a lack of interest for the same prior to the teaching-learning process. As anticipated, this percentage dramatically increased after dissemination of the educational material.

The third category of questions framed to check the knowledge of protein and fat in foods. The correct responses for the first two questions failed to establish any significance between the pretest and posttest. The analysis of question 3 pertaining to awareness about foods belonging to fat-group and protein-rich group, revealed a highly significant ( $0.000$ ) difference between the pretest and posttest correct responses. This suggested that the students' idea of a different nutrients in food was sound enough and the concept was properly comprehended.

The last category of questions was based on the actual teaching material about the "My plate". It comprised of four questions pertaining to the various concepts taught in the "My plate". The responses obtained to these queries revealed a high significance between the pretest and posttest knowledge levels. The result of the last two questions based on the knowledge of milk allowance given in the "My plate" and the inclusion of "My plate" at every meal; revealed a strongly significant difference between the correct of the pretest and posttest responses ( $0.001$  and  $0.000$ ). Overall, the findings show that there was program effect on the treatment group. The significant improvement for nutrition knowledge and nutrition behavior scores indicated that the education program had a high impact on improving the awareness regarding "My Plate". The nutrition knowledge of the females participating in nutrition education lessons significantly increased from pretest to posttest.

## CONCLUSION

The results of this study reiterate the critical role of nutrition education and promotion in improving the healthfulness good food choices. Despite the intuitive appeal of education as a means of improving diet, many studies in this area have strived to find significant associations between nutritional knowledge and dietary behavior. This could be taken as an indication towards a poor impact of such educational programs.

In the present study, with an improvement in methodology of instruction, we could generate desirable results. These factors should be improved upon to generate significant results from the present study. If these conclusions are correct and knowledge really has some impact on dietary behavior, then the implications for campaigns to improve people's diet are important. It could be that resources used for public education programs, if not used judiciously, are being wasted if knowledge does not, in fact, have a major influence on behavior [30].

The results obtained within constraints of a university campus, hint towards creation of a larger and a better awareness towards nutrition concepts if nutrition education is imparted at a mass level, with a stronger concern for overcoming the short-comings and challenges faced by us in the present nutrition program.

No one solution can solve the problems of poor diet and obesity among the populations, which is why a range of strategies that improve access to healthy dietary behaviors can be recommended, with highest priority to creating awareness about healthful eating behaviors through education.

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