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Impact of nutrition education interventions on milk consumption among students (age 20-22 years)

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Abstract

The purpose of this study is to determine changes in nutrition knowledge, attitude, and practices of 20-22 years students after the nutrition education intervention. It was a pre-post-test study and we selected 153 students from three institutions of Lahore city. Eight nutrition education lectures were delivered to the students and the effectiveness of these lectures was evaluated by pre and post testing of students. The data collection instruments were KAP (knowledge, attitude and practices) questionnaire and FFQ (food frequency questionnaire). First post-testing was done after the nutrition education lectures. Second post-testing was done after two months to evaluate the retention span of nutrition education lectures on student's knowledge, attitude and practices. Data was analyzed by SPSS version 20.0. The mean score of correct answers of KAP (knowledge, attitude and practices) questionnaire was (6.75± 2.26) at pre-test and mean score of correct answers of first post testing was (23.81±2.49) and the mean score after second post testing was (23.79±2.58). Results indicated that there was significant increase (P>0.05) in KAP (knowledge, attitude and practices) of students after nutrition intervention. While the results of two post testing showed that there was no significant difference (p=0.732) in overall KAP score of participants. Results of food frequency tables showed that consumption of fresh milk and milkshake was increased after nutrition education intervention. In conclusion, the study showed that nutrition education interventions were effective in improving the KAP of students regarding milk consumption patterns. It is hoped that improvements would be sustained throughout their lives.

Keywords: milk consumption, pre-post test, nutrition education interventions, knowledge attitude and practices (KAP)

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Introduction

Nutrition interventions are those activities that are planned and implemented for the purpose of solving the nutrition problems prevailing in a society. They are aimed at improving the nutrition knowledge, food intake and eating habits of a specific population (1). Nutrition intervention involves activities that utilize economic, political and institutional resources of a community for the purpose of changing the food habits of a target population. (2).

In nutrition intervention, basic foods are selected. Milk is a basic food in human diet. Nutritionists consider dairy products as a focus group and milk is called as a 'complete food' that should be a part of balanced diet (3). It has different place among other foods as it is full of high-quality proteins, vitamins and minerals. Milk contains sufficient amount of calcium that is required for building strong bones and teeth. Protein of milk is regarded as quality protein that is required for body growth and body building purposes (3). Phosphorous, zinc and potassium of milk help in regulating fluid

balance and keep the skin, bones and hair healthy. Vitamin A of milk is good for vision and vitamin D is required for absorbing calcium. Other B vitamins such as niacin, riboflavin and B12 are also found in milk (4).

Since the body growth is at its peak during adolescent years, so there is a great demand of body building foods and high-quality nutrients. Studies on assessing the eating habits of adolescents suggested that poor nutrition at this time can lead to the delayed sexual maturation and increase the risk of chronic diseases such as cardiovascular disease, osteoporosis and cancer (5).

Marias and Glasauer, 2014 conducted a research study to assess the dietary habits of college and university students and concluded that poor dietary habits and wrong food choices acquired in youth may have lifelong health consequences. Increased availability of carbonated beverages, experiences of life, beliefs, preferences, changes in life style as well as influence of peer group are the factors that lead to the formation of turning point of food habits in college and university students (4).

Holloman *et al*, 2009 conducted a research study to evaluate the effectiveness of nutrition education interventions on changes in soft drink consumption among students. The study used a pre-post test design and concluded that class-based nutrition interventions were effective in decreasing soft drink consumption in students. Total soft drink consumption of students was 8.53 (fl.oz) at pretest which was reduced to 3.62 (fl.oz) at post testing after the nutrition intervention. Whereas calcium intake contributed by milk consumption was 156.75 mg at the pretest and 233.0 mg after the intervention (6).

A survey conducted at Agha Khan University to assess the knowledge and practices of medical and non-medical students of Karachi and the results of the survey concluded that 'lack of time' was the major contributor to the bad eating habits of 49.7% of medical and 58.4% of non-medical students (7).

In Pakistan there is a need to provide nutrition education on milk consumption among college and university students. Focus should be on promoting healthy eating behaviors in college and university students because it is the most crucial period of life. Behaviors and practices acquired at this time may have lifelong implications.

Materials and Methods

Participants for Study

The study was conducted in three different institutions of Lahore city. The sample size calculation

(n =153) was included in this study. Participants in the study were selected from institutions and were not older than 20 years, irrespective to their color, class and social status.

Data Collection:

A KAP (knowledge, attitude and practices) questionnaire was designed. The questionnaire consisted of 3 parts

1. Anthropometrics:

Age, weight, height and BMI of the participants were included.

2. KAP questions:

- a. Questions about nutrition knowledge
- b. Questions assessing attitude
- c. Questions about dietary practices

3. Food frequency questionnaire was also filled by the students to assess the daily consumption of milk and milk products.

Study Design

It was a pre-post test study.

Sample size

A sample of 160 participants was calculated by formula given below. The sample size from each institution was calculated by using Solvin's formula [$n = N/1 + Ne^2$] and 7 students were dropped out, so our sample size remained to 153.

Duration of study

The duration of the study was 6 months. Pre testing was done at baseline to investigate the current KAP of students. Post testing was done two times. First post-testing was done after the nutrition education lectures and second post testing was done after the two months using the same questionnaire to evaluate the retention span of nutrition education lectures on student's knowledge, attitude and practices.

Nutrition education lectures

Eight nutrition education lectures were delivered to the students. The duration of each lecture was 30 minutes with the interval of one week.

Statistical analysis

Non-Parametric Wilcoxon Ranked Test was used to compare the mean scores of pre and post testing of knowledge, attitude and practices Percentages of food frequency questionnaires were calculated and comparisons were made between pre and post testing. Statistical significance was

determined at a level of $p=0.05$. The statistic software SPSS version 20 was used for data analysis. Data was represented in the form of tables and graphs.

Results

Demographic

153 participants (60 from college A 60 from college B and 40 from university) was included in this study, all females were 20-22 years of age. The baseline parameters of the study participants were weight, height and Body Mass Index (BMI). Baseline characteristics of participants were shown in table no1. The mean age of the study participants was 20.7 ± 0.78 , weight 51.0 ± 10.96 and height 157.98 ± 5.6 . The mean Body Mass Index (BMI) of the study participants was 20.0 ± 4.0 kg/m² indicating that majority of the study participants had normal weight at the time of study and only a slight difference was appeared in height, weight and BMI of the participants during the pre and post testing.

In Table 2, nutritional status of students was evaluated by using BMI (body mass index). The results of the table 4.1 showed that most of the study participants fall in the normal weight category and there is only a slight difference between the BMI of pre-test and post-test.

The table 2 showed that according to the BMI most of the study participants fall in the normal weight category and there was a slight increase in the participants of normal weights between pre and post test. On the other hand, there was also a slight decrease in the participants having over weight and underweight after pre and post testing. While the number of obese although it was very less but remained same.

Overall Knowledge, Attitude and Practice (KAP) questionnaire score

The overall KAP (knowledge, attitude and practices) questionnaire consisted of 30 questions. The mean score of correct answers prior to nutrition education intervention was (6.75 ± 2.26) and the mean score of correct answers of first post testing was (23.81 ± 2.49) and the mean score of correct answers after the second post testing was (23.79 ± 2.58).

Non parametric Wilcoxon ranked test was applied and the results showed that there was a significant difference ($p=0.000$) in the mean score of KAP of students after the nutrition education intervention. While the results of the two-post testing

showed that there was no significant difference ($p=0.732$) in the overall KAP score of the participants.

Dietary habits of the study participants

Pre and post analysis of food frequency of study sample regarding the amount of food consumed from each group revealed the following results. Analysis of food frequency revealed that there was an increase in the consumption of certain milk products after the delivery of nutrition education lectures.

Table No.1: Baseline characteristics of study participants. (N=153)

| Parameter | MEAN±S.D | | |
|--------------------------|------------|-------------|-------------|
| | Pre-test | Post-test | Post-test1 |
| Age (years) | 20.7±0.78 | 20.7±0.78 | 20.7±0.78 |
| Weight (kg) | 51.0±10.96 | 51.1±10.91 | 51.22±10.82 |
| Height (cm) | 157.98±5.6 | 158.10±5.46 | 158.10±5.46 |
| BMI (kg/m ²) | 20.0±4.0 | 20.43±4.09 | 20.45±4.06 |

Table No.2: Nutritional status of sample according to BMI (N=153)

| Status | Pre-test | Post-test | Post test 1 |
|---------------------------|----------|-----------|-------------|
| Underweight (<18.5) | 34.6% | 34.6% | 34.6% |
| Normal weight (18.5-24.9) | 52.3% | 53.3% | 53.3% |
| Overweight (25.9-30.9) | 11.1% | 10.1% | 10.1% |
| Obese (>31) | 2% | 2% | 2% |

Table No.3: Overall knowledge, attitude and practices (KAP) questionnaire score

| Parameter | Pre-test-Post-test 1 | Pre-test Post-test 1 | Post-test 1-Post-test 2 |
|-----------|----------------------|----------------------|-------------------------|
| KAP | 6.75±2.26 | 23.81±2.49 | 23.79±2.58 |

*Significant, ***highly significant, ns not significant

Table No.4: p-value comparison of KAP score

| KAP | Pre-test-Post-test1 | Pre-test post-test 2 | Post-test1 post-test 2 |
|---------|---------------------|----------------------|------------------------|
| p-value | 0.000*** | 0.000*** | 0.732 |

*Significant, ***highly significant, ns not significant

Table No.5: Frequency distribution of milk consumption (pre-post comparison)

| Milk products | Daily | | | 2-3 per week | | | 2-3 per month | | | Never | | |
|---------------------|-------|--------|--------|--------------|--------|--------|---------------|--------|--------|-------|--------|--------|
| | Pre | Post 1 | Post 2 | Pre | Post 1 | Post 2 | Pre | Post 1 | Post 2 | Pre | Post 1 | Post 2 |
| Fresh milk | 7.2 | 79.7 | 63.4 | 32.6 | 17 | 32.7 | 32.7 | 3.3 | 3.9 | 27.4 | 0 | 0 |
| Low fat milk | 4.6 | 21.5 | 20.9 | 21.6 | 34.6 | 34 | 31.4 | 14.3 | 13.7 | 42.5 | 29.4 | 31.4 |
| Butter milk | 7.9 | 35.3 | 24.2 | 28.7 | 28.8 | 37.9 | 31.4 | 18.3 | 19.6 | 32 | 17.7 | 18.3 |
| Yogurt | 12.5 | 7.3 | 54.9 | 28.7 | 28.1 | 33.4 | 32.1 | 2.6 | 9.8 | 26.8 | 2 | 2 |
| Cheese | 11.8 | 16.4 | 9.2 | 33.3 | 51.6 | 51 | 22.3 | 20.9 | 24.2 | 32.6 | 11.1 | 15.7 |
| Milkshakes | 22.8 | 78.5 | 71.9 | 27.4 | 20.9 | 24.2 | 22.9 | 7 | 2.6 | 26.8 | 0 | 1.3 |

Discussion:

To compare the effectiveness of nutrition education intervention pre and post tests were designed. Initially a pre testing was done to assess the milk consumption patterns in young adults and then changes in mean scores were analyzed and compared with post test. The changes in the knowledge, attitude and practices regarding milk consumption patterns were shown in table 3. The results of the P value were $p < 0.05$, showing the statistically significant results.

According to the present study most of the students did not consume milk. The results of our study were consistent with Jafari *et al*, 2014 who concluded that 78.1% of the participants did not consume enough dairy products (8). Tarakc *et al*. also reported that the average milk consumption of students was only 100 g, which was only one third of their recommended daily amount. According to Rizzoli, 2014 2-3 servings of dairy were required to meet the recommended calcium intake for bone health and fitness (9). A study was conducted at Kafkas University to assess the milk consumption patterns of students and the results concluded that only 33% of them consume milk while 67% of them did not consume milk throughout the study (10) Similar findings have been done by the reports of National Health and Nutrition of America that 39% of men and 43% of women did not consume even a single serving of milk and dairy products on the daily basis (10).

College and university life were said to be the time during which the eating habits often change. Lack of knowledge about healthy diet, personal likes and dislikes, lack of time, increased availability of carbonated beverages, as well as the study burden were said to be the factors that contribute to the wrong food choices towards milk in college and university students.

Milk is regarded as a 'complete food' and the results of the present study showed that most of our young adolescents did not know about the importance of milk for our health. Hence the intake was poor or limited. So, the 'lack of knowledge' was said to be the most powerful factor that affects the consumption of milk.

The results of our study suggested that personal likes and dislikes were the behavioral factors towards the lower consumption of milk. (11) also suggested that the consumption of low-fat milk products in adolescents was directly linked with behavioral intention. Several other studies also reported the significant relationship between behavioral intention and the consumption of fruits, vegetables and dairy products.

The unpleasant taste of milk was another factor effecting milk consumption. According to our study bone health was the positive belief and unpleasant taste of milk is the negative belief affecting consumption of milk. (12) had also reported that most of the people did not consume milk due to its taste.

According to Forshee *et al*, 2003 decreased milk consumption was associated with obesity and it was indirectly linked to wrong food choices and negative dietary patterns (13). A second positive finding of this study was that, participants mostly choose fat free milk choices. But the total milk consumption was even less than the recommended levels. Students often perceive that milk was fattening and they avoid milk and milk related products instead of choosing low fat or fat free milk.

College and university life have been regarded as the 'busiest' due to the study burden and tough schedule. (14) reported that many factors such as food preferences, expectations as well as changes in lifestyles and increased availability of fast foods were responsible towards the selection of foods in young adolescents. College life is a period where students gain independence from their parents and this period is said to be the turning point of food habits that have their implications through the adulthood. Sakamaki *et al*, 2005 worked on university students in China and reported that only 7% of the university students follow the concept of healthy eating while selecting food (15).

Nutrition education for Pakistani students is essential to change their dietary behavior because only few of them know about the healthy eating. Findings of our study suggested that nutrition education interventions were effective tool to change the nutrition knowledge, attitude and practices among students. Similar findings had been done by Power *et al*, 2005 that through proper nutrition education food preferences and eating habits of the students could be significantly changed (16).

This study suggested that nutrition interventions were important in improving the diet quality by changing the nutrition knowledge as well as food habits of the target population. Class based nutrition interventions help students to improve their nutrition knowledge and dietary practices.

According to Hoelscher a sufficient gap between the pre and post testing is required to bring changes in nutrition knowledge, attitude and practices of the participants (17). Contento also suggested that adequate implementation period is required to produce the large effect (18). Blom-hoffman recommended that 5-13 weeks was sufficient time to improve nutrition knowledge of the participants (19). However, another study has consistently reported that a longer

implementation period is required to achieve better behavioral outcomes. In our study gap of two months between pre and post testing produced significant difference in the KAP. (20)

Food frequency questionnaire was filled by the students to evaluate their dietary practices. It consisted of list of milk and milk products to indicate usual frequency of consumption over the time period. Results of our study showed that there was a significant increase in consumption of fresh milk and milk products especially in milkshakes after the nutrition education intervention. A survey was conducted among school pupils in Belgium to check the frequency of limited number of food items. Results showed that frequency of intake of milk and milk products were higher. They also reported that food frequency questionnaire was an effective tool that can be used to check the frequency of food items over a certain time period. The possible reason for increase in the consumption of milk and milk products was might be that the nutrition education lectures improved nutrition knowledge of the participants which ultimately changed their attitude and practices towards healthy eating. (21)

Effective teaching strategies are important for successful implementation of nutrition interventions. We used traditional lecture method, video presentations and demonstrations to enhance students' learning.

So, the present study concluded that well planned nutrition education program is an excellent medium to enhance students' knowledge and help them to translate into healthy food choices. There are some limitations of the study. This study was conducted on selected colleges and only female students were included and the duration of study was only 4 months.

Conclusion:

The present study concluded that nutrition education interventions have significant impact on improving nutrition knowledge, attitude and practices of the students. Nutrition knowledge and skills are important in establishing healthy eating behaviors that extend throughout the adulthood. Nutrition education is an effective method to promote dietary changes. Family, school, colleges, media, food industry and govt should work together to incorporate healthy eating behaviors into their lifestyles.

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Disclaimer

The interpretations and views stated in this article are those of the authors and do not inevitably imitate the official policy or position of any agency of the Pakistan government. Analysis done within this article are only examples. Assumptions made within the study are not reflective of the position of any Pakistan government entity.

Conflict of interest

No conflicts of interest.

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