



**IMPACT OF NUTRITION EDUCATION ON KNOWLEDGE, ATTITUDES
AMONG ADOLESCENT GIRLS IN HOLY MAKKAH**

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ABSTRACT

Adolescents are exposed to undernutrition, micronutrient malnutrition as well as obesity. Their lifestyle and eating behaviours, along with underlying psychosocial factors, are particularly important threats to adequate nutrition. The aim of the study was to investigate the impact of nutrition education program on knowledge, attitudes and dietary intake of adolescent students.

A descriptive approach, cross-sectional design was used to assess the nutritional knowledge, attitudes changed behavior and dietary intake of adolescent girls with respect to healthy diets before and after a nutrition education program. 100 female students with age range of 16-19 years were included in the study. The study questionnaires was used to collect data about Socio-demographic factor, nutritional knowledge and medical history of female students. Data analysis was carried out using the Statistical Package of the Social Science (SPSS) version 20 .

Our findings showed that overall student's knowledge has been improved significantly after an educational intervention as the mean percentage of right answers was 57.09% before educational intervention and became 68.27% after it, $p < 0.001$. overall student's knowledge has been improved significantly after an educational intervention. Most of them don't practicing physical activity. So replication of such a program among adolescent population which introduce healthy dietary concepts to improve nutritional knowledge, attitudes and dietary pattern is recommended.

INTRODUCTION

Adolescence, the second decade of life, undergoes major physical and is a period in which an individual psychological changes. Alongside this,

there are enormous changes in the person's social interactions and relationships. At the same time, it is a period of risk: a period when health problems that have serious immediate consequences can occur or when problem behaviours that could have serious adverse effects on health in the future are initiated (WHO 2009).

They are often not aware of the potential health risks associated with poor eating habits and have not thought about making dietary changes (Stang 2005).

Adolescents are exposed to under nutrition, micro-nutrient malnutrition as well as obesity. Their lifestyle and eating behaviours, along with underlying psychosocial factors, are particularly important threats to adequate nutrition (WHO 2005).

Total nutrient needs are higher during adolescence than any other time in the lifecycle. Nutrition is also important during this time to help prevent adult diet-related chronic diseases, such as cardiovascular disease, cancer, and osteoporosis (Stang *et al.*, 2005). Nutrition knowledge was significantly associated with 'healthy eating (Anthony, 2002). The relationship between area deprivation, food environment and dietary intake at individual level is inconsistent and is

influenced by multiple interrelated social, economic and cultural factors (Thompson *et al.*, 2013)

AIM OF THE STUDY

The aim of the study was to investigate the impact of nutrition education program on knowledge, attitudes and dietary intake of adolescent students.

SUBJECTS AND METHOD

A descriptive approach, cross-sectional design was used to assess the nutritional knowledge, attitudes and dietary intake of adolescent girls with respect to healthy diets before and after a nutrition education program in a systemic sample of high school at Holy Makkah.

questionnaire was considered to gather information from student's sample which includes demographic, social and anthropometric information's as well as information on dietary habits and their food & beverage intake every day.

Education program methods were include: Interview, Social media presentation (power point), Brochures, Samples of the dietary meals, Poster and The food pyramid model.

Statistical analysis:

Descriptive statistics were used to present the data on demographic characters, nutritional habits and medical history. Categorical Variables were expressed as percentages and

frequencies. Data analysis was carried out using the Statistical Package of the Social Science (SPSS) version 20. McNemar's test was applied to compare between pre and post groups. Paired t-test was utilized to compare overall knowledge percentage before and after an educational intervention.

RESULTS AND DISCUSSION

Common indicators of nutritional risk that should be considered during nutrition screening include overweight, under weight, hyper-lipidemia, hypertension, iron deficiency anemia, food insecurity, eating disorders, substance use, and excessive intake of foods and beverages that have high fat or sugar contents. Elements of a Nutrition Screening and Assessment for Adolescents include Medical, Psychosocial, and Socioeconomic status and history, Body Mass Index, Diet and Physical Activity and Routine Laboratory Tests (Stang, 2005)

Socio-demographic characteristics of the participants

The study included 100 female secondary school students. Their demographic characteristics are summarized in Table 1. Most of them are either aged 16 (42%) or 17 (46.0%) years. Vast majority of them (96%) were singles. Family size was more than 5

persons among most of them (84%). Mothers of more than a third of the students (39%) were university graduated and those of 7% were post graduated whereas fathers of almost a third of them (33%) were university graduated and those of 16% were post graduated. Maternal working was reported among 29% of the participants. The family income was 5000 SR/month or more among 71% of the students (Table 1).

Medical history of the participants

Our study indicated that Food allergy was among almost a quarter of them (24%). Family history of obesity was among 35% of the students, mostly among mothers (12%) and brothers/sisters (14%) whereas family history of diabetes was mentioned by 58% of them, mostly among grandmothers (26%) and fathers (17%). Family history of hypertension was reported by 63% of the participants, mostly among fathers (21%), grandmothers (24%) and mothers (17%). Family history of hypercholesterolemia was reported among 27% of students, for fathers (10%). About 6% of fathers and 8% Grandmother of 18% of the students had history of heart diseases. Family history of anemia was reported by 43% of the

students, among brothers/sisters (25%) and mothers (19%). Familial thyroid problems were reported by 10% of the students, among their mothers (5%). Also Familial history of cancer was observed among 4% of the students mostly among mothers (5%) (**Table 2**).

Evaluation of educational intervention:

As shown in **Table 3**, Our results indicate that, there was a significant improvement in the knowledge of students regarding the effect of food on physical and mental activities, The effect of breakfast in improving concentration, Food group that constitute the highest daily need, Sources of fibers, function of protein, non-saturated oil, best sources of iron, Effect of boiling vegetables in loss of their vitamins and Bad concepts regarding food loss or gain.

Adolescent girls were assessed to have a 80% level of awareness about the effect of food on physical and mental activities at the time of pre intervention. After intervention awareness increased to good level 93%, and was assessed to have a level of awareness about effect of breakfast in improving concentration at the time of pre intervention 74%. After intervention, awareness increased to good level 88%. This is consistent with

Wong.et al (1999) which found that 81% of subjects agree or completely agree with the necessity of eating breakfast. Also Ramrao GS (2013) reported that About 67% adolescent girls awareness about physical changes during puberty was fair, followed by poor levels 30.30%. After completion of training majority of adolescent girls awareness was improved to good level 87%.

Our study results revealed that there is a statistical significance in the nutritional knowledge about food groups. It was found that level of awareness about The food group that constitutes the highest daily need, The food group that constitutes the lowest daily need and The function of proteins is repairing of muscular tissues and formation of hormones was increased from (29%) , (51%) and (64%) at the time of before intervention to (58%), (65%) and (83%) respectively after intervention. The results are in favor with the findings of Tarvinder JK et al (2007) which revealed that nutrition education was effective in increasing the level of nutrition knowledge as well as nutrient intake

Also level of awareness about The fats are essential in all meals and the oils contains saturated and unsaturated fats was increased from (20%) and (54%) at

the time of pre intervention to (28%) and (75%) respectively after intervention. Another study result indicated that most adolescents (92.4%) were aware of the Food Guide Pyramid and even less (29.3%) were aware of the Dietary Guidelines for Americans (Wojcick & Heyman, 2012). Results of the present study indicate that the impact of educating regarding vitamins and minerals awareness of adolescent girls were increased as follows, The level of awareness about the best sources of calcium was increased after educating from 83% to 85%. It was reported that the majority knew that dairy products are the main source of calcium, but only 10% knew about the calcium content of the various dairy products. Only half (45%) knew about vegetables such as spinach and broccoli as a major nondairy sources of calcium and only 11% knew that sardines with bones could be a source of calcium (Harel Z *et al*, 1998).

Also The level of awareness of adolescent girls about **the best sources of iron** at increased after having education program from 52% to good level 75%. Another study on adolescent girls found that majority of the participants (73.8%) had no knowledge about iron rich foods. The remaining

26.2% of the participants, who said they knew, gave multiple answers. Among them about 76.4%, mentioned dark green leafy vegetables, liver and egg as rich sources of iron; while 58.8% said fish and fruits (Yearul Kabir *et al*, 2010). In regarding to loss of vitamin in the boiling water by boiling of vegetables the level of right responses after having education program increased from 49%. to 68%. The study of Tarvinder JK *et al.*, (2007) also supported the above findings which found that before imparting nutrition education the average daily intake for beta carotene, thiamine, folic acid, vitamin B 12, vitamin c, iron and calcium was 31.59, 70, 85.6, 85, 201.25, 33.96 and 74.60 per cent of the Recommended Dietary Intake (RDA) by the subjects respectively However, after imparting nutrition education intake of respective nutrients increased to 65.65, 106, 104.6, 90, 225.15, 47.25 and 84.22 per cent of corresponding RDA

Overweight during adolescence has been shown to have deleterious effects on high school performance, educational attainment, psychosocial functioning, and socio-economic attainment (Gortmaker SL *et al.*, 2007). Regarding the nutritional knowledge about obesity.

The adolescent girls were assessed to have a level of awareness about obesity as a risk factor of chronic diseases including cardiac diseases 89% at the time of before education program. It is increased to 94% after education program. Another study showed more than half of the respondents (63.6%) had poor knowledge of obesity less than a third of the respondents had fair knowledge while a few (9.3%) had good knowledge of the disease. (Christina A. *et al.*, 2012). So Interventions in schools to reduce overweight and obesity, as well as to increase fruits and vegetable consumption, have demonstrated effectiveness in the best-conducted studies. (Jonas AC *et al.*, 2011)

Results of this study clearly indicate that there were improvement in nutritional knowledge about food Intake and body weight. It was found that level of awareness about the intake of one meal/day is an effective method to lose weight , The intake of one kind of food over day is a healthy way to lose weight and The intake of one kind of food over day is a healthy way to lose weight was increased from (74%) , (77%) and (43%) at the time of pre intervention to (92%) , (87%) and (71%) respectively after having educating program. Selection of health-risk behaviours,

including abnormal eating attitudes and behaviours may cluster together in vulnerable adolescents (**Fisher *et al*, 1991**).

This increase in knowledge score adds support to other studies, which showed improvement in dietary knowledge and attitude among adolescent after imparting nutrition education. The results of the present study are in agreement with the study of Tarvinder JK *et al* (2007) who found that nutrition education was effective in increasing the level of nutrition knowledge as well as nutrient intake. A highly significant improvement was noticed in adolescent girls awareness and behavior in respect to the components dealt in nutrition education training (Ramrao GS). Also a Significant improvements in knowledge and attitude were evidenced in the nutritional education in the study conducted by Hafzan *et al.*, (2012)

CONCLUSION AND RECOMMENDATION

This study shows that the dietary habits of the adolescent females moving toward unhealthy dietary habits and lifestyles, But overall student`s knowledge has been improved significantly after an educational intervention. So replication of such a program among adolescent population

which introduce healthy dietary concepts to improve nutritional knowledge, attitudes and dietary pattern is recommended.

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Table 1: Socio-demographic characteristics of the participants (n=100)

Variables	Categories	Frequency	Percentage
Age (years)	16	42	42.0
	17	46	46.0
	18	9	6.0
	≥19	3	3.0
Marital status	Single	96	96.0
	Married	3	3.0
	Divorced	1	1.0
Family size	4-5	16	16.0
	>5	84	84.0

Maternal education	Illiterate	2	2.0
	Primary school	9	9.0
	Intermediate school	19	19.0
	Secondary school	24	24.0
	University	39	39.0
	University	7	7.0
Paternal education	Illiterate	3	3.0
	Primary school	8	8.0
	Intermediate school	8	8.0
	Secondary school	33	33.0
	Secondary school	32	32.0
	University	16	16.0
Maternal work	Yes	29	29.0
	No	71	71.0
Family income (SR/month)	<2000	3	3.0
	2000-<5000	26	26.0
	≥5000	71	71.0

Table 2: Medical history of the participants (n=100)

Variables	Categories	Frequency	Percentage
Food allergy	Yes	24	24.0
	No	76	76.0
Family history of obesity	Father	4	4.0
	Mother	12	12.0
	Both	8	8.0
	Grandfather	1	1.0
	Grandmother	5	5.0
	Brothers/sisters	14	14.0
	No	65	65.0
Family history of diabetes mellitus	Father	17	17.0
	Mother	5	5.0
	Both	3	3.0
	Grandfather	15	15.0
	Grandmother	26	26.0
	Brothers/sisters	3	3.0
	No	42	42.0
Family history of hypertension	Father	21	21.0
	Mother	17	17.0
	Both	6	6.0
	Grandfather	8	8.0
	Grandmother	24	24.0
	Brothers/sisters	2	2.0
	No	37	37.0
Family history of hypertension	Father	21	21.0
	Mother	17	17.0
	Both	6	6.0
	Grandfather	8	8.0
	Grandmother	24	24.0
	Brothers/sisters	2	2.0
	No	37	37.0
Family history of hypercholesterolemia	Father	10	10.0
	Mother	6	6.0
	Both	0	0.0
	Grandfather	3	3.0

	Grandmother	8	8.0
	Brothers/sisters	0	0.0
	No	73	73.0
Family history of heart diseases	Father	6	6.0
	Mother	1	1.0
	Both	1	1.0
	Grandfather	2	2.0
	Grandmother	8	8.0
	Brothers/sisters	2	2.0
	No	82	82.0
	Family history of anemia	Father	1
Mother		19	19.0
Both		0	0.0
Grandfather		0	0.0
Grandmother		2	2.0
Brothers/sisters		25	25.0
No		57	57.0
Family history of thyroid diseases	Father	0	0.0
	Mother	5	5.0
	Both	0	0.0
	Grandfather	0	0.0
	Grandmother	2	2.0
	Brothers/sisters	3	3.0
	No	90	90.0
Family history of cancer	Father	1	1.0
	Mother	1	1.0
	Both	0	0.0
	Grandfather	1	1.0
	Grandmother	1	1.0
	Brothers/sisters	0	0.0
	No	96	96.0

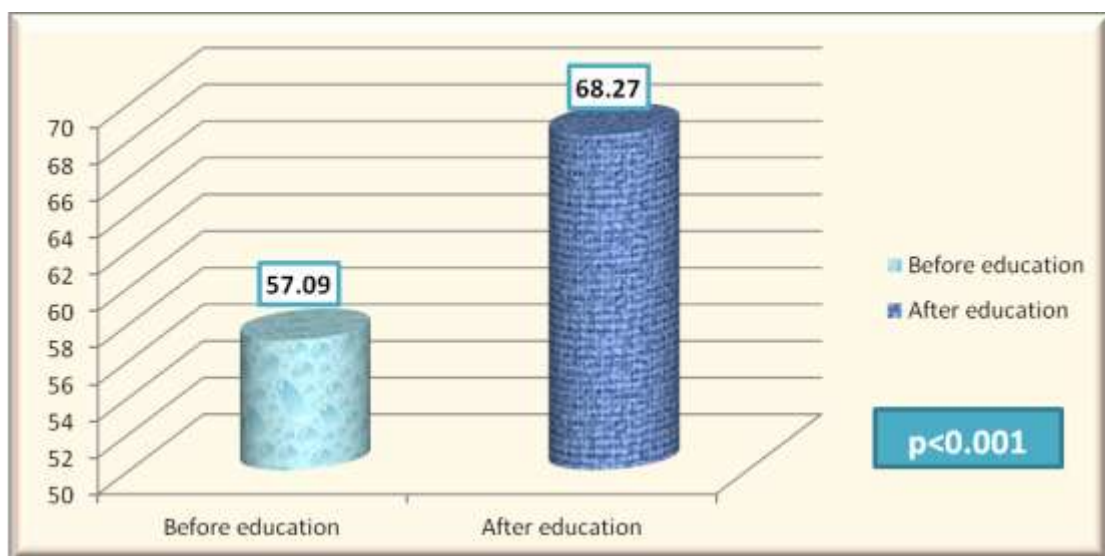


Figure 1: Comparison of student's knowledge before and after an educational intervention.

Table 3: Comparison of nutritional knowledge before and after an nutrition educational intervention.

	Questions	Before nutrition education (N=100)		After nutrition education (N=100)		P - value
		No	%	No	%	
1	30-Does Food affect t physical and mental activities?	80	80.0	93	93.0	0.019
2	31-Does breakfast improve concentration?	74	74.0	88	88.0	0.024
3	Nutritional knowledge about food groups					
4	What is the food group that constitutes the highest daily need?	29	29.0	58	58.0	0.000
5	What is the food group that constitutes the lowest daily need?	51	51.0	65	65.0	0.054
6	The function of proteins is repairing of muscular tissues and formation of hormones?	64	64.0	83	83.0	0.007
7	Are fats essential in all meals?	20	20.0	28	28.0	0.256
8	What is the oil that contains not-saturated fats?	54	54.0	75	75.0	0.001
9	Nutritional knowledge about source of food group					
10	Cereals, bread and pasta source of what?	72	72.0	78	97.0	0.441
11	Egg, nuts and beans are sources of what?	59	59.0	67	67.0	0.280
12	soft cheese, mayonnaise, nuts and cream are source of what?	50	50.0	53	53.0	0.788
13	Oats, cereals and fruits are sources of what?	28	28.0	43	43.0)	0.049
14	Nutritional knowledge about source of food group					
15	Cereals, bread and pasta source of what?	72	72.0	78	78.0	0.441
16	Egg, nuts and beans are sources of what?	59	59.0	67	67.0	0.280
17	soft cheese, mayonnaise, nuts and cream are source of what?	50	50.0	53	53.0	0.788
18	Oats, cereals and fruits are sources of what?	28	28.0	43	43.0	0.049
19	Nutritional knowledge about vitamins and minerals					
20	What are the best sources of calcium?	85	85.0	83	83.0	0.824
21	What are the best sources of iron?	52	52.0	75	75.0	0.001
22	Is iron deficiency can lead to anemia?	91	91.0	88	88.0	0.648
23	Is over use of vitamins can lead to toxicity?	29	29.0	26	26.0	0.749
24	Is boiling of vegetables lead to loss of vitamin in the boiling water?	49	49.0	68	68.0	0.004
25	What is amongst reasons of hair loss?	11	11.0	16	16.0	0.359
26	Nutritional knowledge about obesity					
27	Is obesity a risk factor of chronic diseases including cardiac diseases?	89	89.0	94	94.0	0.332
28	Nutritional knowledge about food Intake and body weight					
29	Is intake of one meal/day is an effective method to lose weight?	74	74.0	92	92.0	0.001
30	Is the intake of one kind of food over day is a healthy way to loss weight?	77	77.0	87	87.0	0.087
31	Is the intake of a heavy fatty meal is an effective way to gain weight?	43	43.0	71	71.0	0.000