

## Nutritional Knowledge among High School Male Students in Kuwait

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### Abstract

**Objectives:** High school male students in Kuwait enjoy, as others, fast and junk food for which perhaps reflect a possible deficiency in their nutritional knowledge. This study was conducted to explore the nutritional expertise among male high school students.

**Methods:** One high school from each of the six governorates of Kuwait was randomly selected, and the upper three classes of each were given the questionnaire containing two sections. The first section assessed different socio-demographic and health-related characteristics. The second section included 39 exact/false type questions on nutritional knowledge. An overall dietary knowledge score was calculated based on the number of correct answers to questions regarding the nutritional expertise. Overall nutritional understanding and specific dietary domains knowledge scores were described using mean and 95% CI. Spearman correlation was used to find the association between different nutritional domain scores.

**Results:** The highest score was related to a question concerning fibers. A significant medium correlation was observed between calories/food intake and carbohydrates domains. Nutritional knowledge of fibers domain was significantly associated with sodium, fats, and calories/food intake domains and a significant weak correlation of cholesterol with sodium domains.

**Conclusions:** The nutritional knowledge of male high school students was low.

**Keywords:** Kuwait; High school; Nutritional knowledge; Fast food; Calories; Eating habits and Healthy diet

### Introduction

During high school, adolescents seem to gradually take over, from their parent, their dietary choices and behaviors. They are not, however, completely ready to do so. In one study, about 30% of high school students showed adequate nutritional knowledge. Those high school students from rural areas showed lower scores. Breakfast and meal skipping were frequent, and meat and its derivatives were high among boys while fruits and vegetables among girls. Uncommon (fad) dieting was higher among girls than boys. Soft drinks consumption was high among boys while girls tended for sweets. Television was the primary source of nutritional information for adolescents. These rather unhealthy eating habits have been found in Europe and the U.S., which confirms the globalization of these unhealthy dietary habits. To counteract their trends, to increase nutritional knowledge and to improve dietary behavior is warranted [1].

Nutritional Knowledge during adolescent years plays a vital role in contributing to the health and well-being of young people and, in this case, high school students. Excessive food intake, even a healthy one may lead to unhealthy conditions, among which is cardiovascular disease. The quality of food consumed by adolescents has been a significant concern for researchers. Adolescents often do not to follow the recommended dietary intake. Their poor food habits may continue into adulthood [2-6].

Several interventions have been undertaken to change the eating habits of adolescents but with limited, if any, success, due, perhaps too limited understanding of the eating habits of children. It has been suggested that dieting interventions must take into consideration the age of the children or adolescents. Appropriate nutritional knowledge among adolescent may help them not becoming victims of poor health and obesity. An intervention study found significant improvements in the eating habits of adolescents and nutritional expertise. After the intervention, the adolescents started drinking milk and eat breakfast, which suggests that dietary interventions improve the nutritional knowledge of the adolescents [7].

The body, of course, needs fruits and vegetables for they are an essential source of vitamins, minerals, and fibers. The latter is a necessary nutrient for the functioning of the gastrointestinal tract; it promotes the movement of food through the track. In recent years, changes in lifestyle and eating habits have been noticeable worldwide, especially among adolescents. Their need is to eat more, as they are growing up, tend to be noticeable. They are more susceptible in their eating behaviors to environmental influences. Eating habits among adolescents tend to be poor, as reflected by their low intake of fruits, vegetables, and milk. This may lead to the possibility of becoming a victim of chronic diseases as their strength of retarding them is low.

Engaging in healthy eating habits during adolescence may be retained until adulthood. Therefore, it is necessary to continually avail adolescents of good eating habits and nutritional knowledge [8]. A study attempted to give high school students a program that provides them with nutritional education, as the latter may promote life-long

healthy eating habits. It must be said that few published studies attempted this method, at least in Asian countries [9]. The purpose of the study was to record the nutritional knowledge of Kuwaiti high school male students.

## Methods

Kuwait is divided into six governorates. Each has its own school Director, who looks over the running of various levels of schools. This study randomly selected one high school from the several available high schools. From each school, the study randomly picked four classes from the school in each of the six governorates. Each school has a nurse who is also responsible for the looking after the students. Each student was given a questionnaire containing two sections. The first section assessed different socio-demographic and health-related characteristics as shown in Table 1.

The second section included 39 right/false type questions on nutritional knowledge. The items evaluated NK on different dietary domains, including vitamins/minerals, fibers, fat, weight loss diet, protein, cholesterol, sodium, carbohydrates, and caloric/food intake. A few modifications were made including omitting a question that assessed knowledge of alcoholic beverages and omitting the word pork from another problem. These modifications were necessary since Kuwait has an Islamic population in which consumption of alcohol and pork meat is prohibited. After completing the questionnaire, height and weight were measured for the participants.

An overall nutritional knowledge score was calculated based on the number of correct answers to questions regarding the nutritional knowledge. All items were equally weighted (0=incorrect or missing answer, 1=correct answer). The highest possible score was 39. Those with a percentage of accurate knowledge more senior than the median, overall nutritional knowledge score of the sample were labeled as having a high overall nutritional understanding. Dietary knowledge scores on the different nutritional domains were calculated. The scores were expressed in percentages.

Categorical variables were described using numbers and percentages. Overall nutritional knowledge and specific nutritional domains knowledge scores were described using mean and 95% CI. Spearman correlation was used to find the association between different nutritional domain scores.

However, before assessing the relationship between domain scores, shared questions were excluded, to avoid creating inaccurate associations. Stepwise binary logistic regression was used to identify associated factors of high overall nutritional knowledge score (more significant than median).

The level of significance was set at  $\alpha < 0.05$  (two-tailed). A p-value of  $< 0.05$  was considered statistically significant. Data analyses were done using the Statistical Package for Social Sciences, (IBM SPSS Statistics 24, IBM Corporation, Armonk, NY, USA 2015).

## Results

Table 1 shows the frequency distribution of the socio-demographic data of nutritional knowledge among high school male Kuwaiti students. The total sample size is 537. The usual age range among high school students is from 14-18 years. We have divided the age into four groups ( $\leq 15$ -17 and  $\geq 18$  years).

Factors	Frequency n (%)
<b>Age</b>	
$\leq 15$	199 (37.0)
16	127 (23.6)
17	121 (22.5)
$\geq 18$	90 (16.7)
<b>Governorate</b>	
Capital	105 (19.5)
Hawally	102 (19.0)
Farwaniya	96 (17.8)
Ahmadi	85 (15.9)
Jahra	79 (14.7)
Mubarak Alkabir	70 (13.1)
<b>High school subjects</b>	
Science	288 (53.6)
Non-science	249 (46.4)
<b>GPA (Current)</b>	
Low	189 (35.2)
Medium	201 (37.4)
Top	147 (27.4)
<b>BMI (body mass index, kg/m<sup>2</sup>)</b>	
Normal	302 (56.2)
Overweight	140 (26.1)
Obese	95 (17.7)
<b>Dental status</b>	
Healthy	367 (68.3)
Unhealthy	48 (8.9)
Treated	122 (22.7)
<b>Parents obese</b>	
None	339 (63.1)
Father	74 (13.8)
Mother	86 (16.0)
Both	38 (7.1)
<b>Meals</b>	
1	15 (2.8)
2	149 (27.7)
3	373 (69.4)
<b>Eats between meals</b>	

Yes	224 (41.7)
Sometimes	233 (43.4)
No	80 (14.9)
<b>Dieting</b>	
Yes	74 (13.8)
I Was	61 (11.3)
No	402 (74.9)
<b>Father's education</b>	
Illiterate/Primary	37 (6.9)
Inter/Secondary	154 (28.7)
College/University	346 (64.4)
<b>Mother's education</b>	
Illiterate/Primary	74 (13.8)
Inter/Secondary	171 (31.8)
College/University	292 (54.4)
<b>Physical activity</b>	
Yes	420 (78.2)
No	117 (21.8)
<b>Nutritional knowledge (Self-reported)</b>	
Poor	95 (17.7)
Good	344 (64.0)
Excellent	98 (18.2)

**Table 1:** Socio-demographic and health-related factors among high school male Kuwaiti students (n=537).

As there are six governorates in Kuwait. The frequency distribution is shown in the table with a maximum number of cases from Capital and Hawally governorates respectively. The other factors like BMI, dental status, parent's obesity, high school GPA, subjects, dietary habits, and some other factors are also listed.

Table 2 shows the association of high overall nutritional knowledge score with significantly associated factors using stepwise binary logistic regression. Adjusted OR with 95% confidence interval are shown in the table.

Factors	Adjusted OR		p-value
	OR	(95% CI)	
<b>Current GPA</b>			
Low	Reference		
Med/High	1.6	(1.1-1.2)	0.016
<b>Dieting</b>			
No	Reference		
I was	1	(0.6-0.7)	0.853
Yes	2.2	(1.2-3.9)	0.008
OR= Odds ratio, CI= Confidence interval			

**Table 2:** Significantly associated factors with high overall nutritional knowledge score among high school male Kuwaiti students, using stepwise logistic regression (n=537).

Table 3 shows the mean scores of overall nutritional knowledge as well as nutritional knowledge on different nutritional domains (Sodium, Carbohydrates, Vitamins/minerals, Calories/food intake, weight loss diet, fat, fibers, protein, and cholesterol). The mean overall nutritional knowledge score was 53.2. The highest mean nutritional domain score was for fibers (58.2), followed by protein (56.7) and fat (55.4) respectively. The least mean nutritional domain score was for sodium (39.3).

Question on	The number of questions used in the score calculation	Knowledge score (%) Mean (95% CI)
Overall knowledge	All questions	53.2 (52.5-53.9)
Sodium	16, 32	39.3 (36.2-42.4)
Carbohydrates	18, 21, 37	48.6 (46.3-50.9)
Vitamins/minerals	2, 3, 11, 24, 25, 27, 31	54.6 (53.1-56.0)
Calories/food intake	9, 19, 21, 29, 36, 37, 38	51.5 (49.9-53.1)
Weight loss diet	4, 12, 18, 26, 34	48.6 (46.7-50.4)
Fat	8, 12, 13, 15, 21, 29, 35	55.4 (53.7-57.0)
Fibers	6, 17, 30	58.2 (55.9-60.5)
Protein	7, 14, 24, 33	56.7 (54.5-58.9)

Cholesterol	10, 13, 20, 22, 28, 39	50.8 (49.1-52.5)
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**Table 3:** Percentages of the correct response on the overall nutritional knowledge and specific nutritional domains among high school male; Kuwaiti students (n=537).

Table 4 summarizes the correlation between nutritional knowledge scores of different nutritional domains. A significant medium correlation was observed between calories/food intake and carbohydrates domains ( $r_s=0.428$ ,  $p<0.001$ ). Nutritional knowledge of

fibers domain was significantly associated with sodium, fats, and calories/food intake domains, but the correlation coefficient was low only. Also, there was a significant weak correlation of cholesterol with sodium domains.

Nutrient score	Carbohydrates	Vitamins/minerals	Calories/food intake	Weight Loss diet	Fats	Fibers	Proteins	Cholesterol
Sodium	-0.035	-0.042	-0.023	0.026	-0.026	-0.142**	0.017	-0.134**
Carbohydrates	-	-0.043	0.428**	0.05	-0.049	-0.018	0.033	-0.014
Vitamins/minerals	-	-	-0.075	0.02	0.027	0.026	0.102*	0.055
Calories/food intake	-	-	-	0.053	0.067	0.108*	0.110*	0.034
Weight loss diet	-	-	-	-	0.005	-0.039	0.036	-0.058
Fats	-	-	-	-	-	0.124**	0.028	0.203**
Fibers	-	-	-	-	-	-	0.048	0.094*
Proteins	-	-	-	-	-	-	-	0.04

\*Spearman Correlation Coefficient, \*\*Correlation Coefficient, and p-value were calculated after excluding overlapping questions.

**Table 4:** Correlations between knowledge on different nutritional domains among high school male Kuwaiti students (n=537).

## Discussion

There is almost an agreement between numerous studies that the fruit and vegetable consumption among males is low but females fair better than males. The consumption of fat among males is rather high, and their healthy intake of nutrients is low. In general, their nutrient density is low. As adolescents grow older, their nutrient density gets low, their freedom of choosing the food they want goes up. For them, convenient sources of foods, like fast food, are easier to consume than rather structured home-cooked food. They tend to shy away from the parental supervision of the foods they should consume. However, consistent supervision and advice from parents may produce some positive results for the consumption of healthy food [10,11].

There is no doubt about it that adolescents need nutritional education. There are limited pre and post-intervention studies. In one study, researchers found positive results after the intervention. Despite the study's short duration, fruits and vegetables increased, and sweet intake decreased among females. Among males, there was a noticeable decrease in the consumption of soft drink and an increase in the absorption of fruits and vegetables. Moreover, the study positively sensitized the students to healthy eating [11].

Several publications concluded that female high school students were better than males in the areas of educated identification of food groups, and which foods contained vitamins and mineral. Their nutritional knowledge is better than men. As, perhaps, right, with previous studies, rural students fair less in their nutritional expertise than urban ones. This may not mean that rural student's eating habits are less nutritious than urban ones. The settings for each group are different. It is likely that rural students may have more tendency to eat

home-cooked meals than urban students. City life of nearby areas fast food outlets may entice students to partake of junk food sold by fast food outlets. Sugars and sweets were higher among males than females, but the intake of fruits and vegetables was more among women than boys [12].

Nutritional Knowledge may improve the quality of food intake among adolescents. In most cases, if not all, interventions to promote the food intake of adolescents is necessary. It should improve the consumption of fruits and vegetables, especially among males. Nutritional interventions may change the eating behaviors of adolescents, especially since they are in a period of growth. Learning about better eating habits early on may extend to adulthood. If adolescent girls showed less favorable attitude toward foods, especially healthy ones, it might be because of the preoccupation of remaining slim and fighting the chance of being overweight or obese. Some students, especially females, tend to eat correctly not because of increased nutritional knowledge but because they are emulating the eating habits of their parents. There is also a tendency among the older adolescents to be independent in choosing his/her own foods, while younger adolescents are more likely to follow the pattern of eating off their parents [13].

## Conclusion

Nutritional Knowledge of Kuwaiti high school students was not only low but also may lead to unhealthy futuristic prospects.

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