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Effect of Food Habits on the Nutritional Status of Children in Cairo

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Abstract: In this study, 190 students (100 females and 90 males) aged 10-12 years of a selected sample from elementary school students in Cairo were chosen to investigate the effect of food habits and nutritional behaviors on their nutritional status. Our study revealed that 82.2% of children reported having breakfast, 57.5% of those had breakfast at home. Mother education had strong correlation with eating breakfast at home. It is found that the daily macronutrients intake were significantly higher in males than females. The mean daily intake of both macro- and micronutrients were higher for breakfast consumers than for breakfast skippers. With respect to BMI, the results indicate that the underweight were 10.5% and the overweight were 13.7% of the total sample, upon studying some dietary habits of the students and their associations with BMI, it can noticed that 8.4% of overweight students do not eat breakfast at home, 9.5% eat fast foods, 12.6% have snacks, their fruit and vegetable frequency intake/week are much lower than that of normal weight students and their regular physical activity are also lower than normal weight students. Females consumed milk or dairy products more frequently than males. It is found that there is positive correlation between dairy, fruit and vegetable intake and mother education. Also, there is a positive correlation between dairy, fruits and vegetables consumption and having the daily requirements of minerals and vitamins.

Keywords: Food Habits, Nutritional Status, Mother Education, Daily Intake, BMI, Dairy Intake, Fruit and Vegetable Intake

1. Introduction

Malnutrition and bad nutritional habits among children in Egypt continues to impair health and development. Unhealthy diet is related to increased susceptibility to diabetes and cardiovascular diseases, reduced immunity and increased likelihood of developing obesity. In fact, although the causal mechanisms of obesity remain unclear, it is well established that dietary factors, together with physical activity, play an important role in regulating overall energy balance, thereby influencing body weight. Dietary habits may also contribute to the incidence and severity of overweight/obesity in children and adolescents. In WHO [34] report, skipping breakfast, low intake of fruit and vegetables, high consumption of both sugar-sweetened beverages (SSBs) and energy dense snacks may be dietary determinants of obesity.

Lauria *et al.* [20] reviewed that skipping breakfast in childhood or adolescence may persist into adulthood and has been associated with overweight and obesity in both cross-sectional and longitudinal studies. The findings of Van Lippevelde *et al* [29] revealed that three factors (permissiveness, negotiating about breakfast, and family breakfast frequency) are associated with children's BMI. Despite the importance of breakfast consumption, the prevalence of breakfast skipping among children and adolescents has increased in the past few decades [20], and about 47% of children and adolescents skip breakfast in Egypt [18].

The association between television viewing and food intake has been linked to the effect that food advertisements have on subsequent food choices [10]. However, it may be that eating while watching television, a behavior not uncommon among children, also influences dietary patterns. In the study by Borghese *et al.* [6] on 9- to 11-year-old Canadian children, television viewing was negatively associated with the frequency of consumption of a number of healthy food items and positively associated with the frequency of consumption of a number of unhealthy food items. Current data on obesity-related morbidity in Egypt showed that overweight and obesity affected 1.6% of 2–6 year olds, 4.9% of 6–10 year olds, 14.7% of 10–14 year olds, and 13.4% of 14–18-year-old children [17].

The aim of this study to investigate the overall nutritional status and to describe dietary habits (breakfast, snack, fruit,

vegetables and sugar sweetened beverage consumption) and related socio-demographic characteristics of children aged 8-9 years in Cairo.

2. Methods

2.1. Sample

A random sample of 190 students from 3 elementary schools in Cairo. Data were collected between October 2015 and April 2016 in Cairo. The sample was limited to these schools due to the difficulty of collection of a big sample from several schools at different areas in Egypt.

2.2. Anthropometrical Measures

Height and weight were measured by a trained staff member following procedures described by Lohman *et al.* [21]. Children were dressed in light clothing and measured without shoes. Height was measured in triplicate to the nearest 10th of a centimeter using a stadio-meter. Weight was measured in triplicate to the nearest 10th of a kilogram.

2.3. Dietary Intake

Well-trained interviewers who visited each participating household and solicited three day 24-hour recall form mothers in the study. Food intake data were converted to nutrient intake variables using Food Intake Analysis System [14] is a food analysis program developed by the University of Texas and has been used for the developing of an Egyptian food data base since 1992. The program produces nutritional analysis of the recipes through entering the ingredients and cooking methods.

2.4. Statistical Analysis

Statistical analyses were conducted using SPSS program (ver. 16).

3. Results and Discussion

3.1. Sample Characteristics

The sample consists of 190 students, 90 males and 100 females. Breakfast makes an important nutritional contribution to overall dietary quality for children and young people, yet breakfast is more commonly missed more than any other meal [12]. It is estimated that children consume approximately 20% of their daily energy intake at breakfast [24].

Table 1. *Frequency of Breakfast Consumption vs. Sex and Mother's Education Level.*

Characteristics	Having Breakfast	Skipping Breakfast	Total
		Sex	
Male	43.10%	6.30%	49.40%
Female	41.10%	9.50%	50.60%
		Mother Education	
Less than Intermediate	7.90%	0.00%	7.90%
Intermediate	15.80%	10.50%	26.30%
Graduate	28.90%	0.00%	28.90%
Post-Graduate	31.60%	5.30%	36.80%
Total	84.20%	15.80%	100.00%

3.2. Breakfast Intake

The frequency of breakfast consumption in the study sample by sex and school level is reported in Table 1. From table 1, 84.2% of the sample reported having breakfast, 43.1% of them were males and 41.1% were females. Our data are consistent with Lytle *et al*, [22] work that reported that skipping breakfast ranges from about 15% to 19% among children and adolescents and reached up to 50%, based on 24-hour dietary intake methodology. Results regarding female breakfast consumption were relatively consistent with previous studies with girls reporting less frequent breakfast consumption than boys [31, 11]. Lytle *et al*. [22] explained this by the increasing independence in making food choices and greater accessibility to food as children grow older. While Affenito *et al.* [2] reported other factors may include because of lack of time, not being hungry upon waking up But Vanelli *et al*. [30] related this to the habit of Italian children of going to bed late and having a snack at bed time.

As for the mother's education, children of post graduate mother's had breakfast more frequently than other mothers. Our data revealed that the mother's education play a role in eating breakfast, higher the mother's education, the more frequent the children eat breakfast.

From table 2, 57.5% of the students reported having breakfast at home, 29.4% of them were males and 28.1% were females. Our data revealed that mother's education play a role in eating breakfast at home, children of post graduate mother's had breakfast at home more frequently than other mothers. Zabinski *et al* [36], reported that parents may contribute to a home environment which encourages healthful choices for children as they begin to regulate their own food choices.

Table 2. *Frequency of Having Breakfast at Home vs. Sex and Mother's Education Level.*

Characteristics	At Home	At School	Total
	Sex		
Male	29.40%	19.40%	48.80%
Female	28.10%	23.10%	51.20%
Mother Education			
Less than Intermediate	0.00%	9.40%	9.40%
Intermediate	6.20%	12.50%	18.80%
Graduate	17.50%	16.90%	34.40%
Post-Graduate	33.80%	3.80%	37.50%
Total	57.50%	42.50%	100.00%

It can be observed, from table 3, that the mean daily energy, protein, carbohydrate and total fat intake was higher for breakfast consumers than for breakfast skippers.

Table 3. *Total Macronutrient Intake in Relation to Breakfast Consumption.*

Breakfast	Energy (kcal/d)	Protein (gm/d)	Carbohydrate (gm/d)	Total Fat (gm/d)
Yes	2232.32*±59.07	84.23*±2.35	305.57*±9.35	77.16±2.06
No	1948.87±126.08	68.52±5.45	262.04±17.34	71.64±5.75
Total	2187.56±53.98	81.75±2.20	298.70±8.40	76.29±1.96

*Mean± SE

As shown in table 4, the most micronutrients intake are significantly higher in students reported having breakfast than those reported skipping breakfast. This finding confirmed by Wilson *et al.* [32] who stated that children and adolescents who miss breakfast consume significantly less of many important nutrients and minerals than those who eat breakfast. Our findings thus suggest that children who skip breakfast are missing the opportunity to consume a nutrient-rich and healthful meal. Utter *et al.* [28] reported that New Zealand children who skip breakfast are more likely to be frequent consumers of unhealthful snack foods (e.g., chocolate, sweets, potato chips, candies and soft drinks), or higher intakes of high-fat snacks [25].

Table 4. *Total Micronutrient Intake in Relation to Breakfast Consumption.*

Breakfast	Vitamins*							
	Vit A* IU/d	Thiamin* mg/d	Riboflavin* mg/d	Niacin* mg/d	Vit B_6* mg/d	Folate* µg /d	Vit B_{12} * µg /d	Vit C* mg/d
Yes	8160.66 ±909.48	0.97 ±0.031	1.76 ±0.10	16.57 ±0.52	1.63 ±0.05	376.80 ±14.31	13.45 ±2.60	97.74 ±6.03
No	3718.28 ±368.66	0.79 ±0.06	1.20 ±0.10	13.34 ±1.26	1.29 ±0.12	300.33 ±21.10	2.30 ±0.32	81.23 ±12.15
Total	7459.23 ±776.63	0.94 ±0.03	1.67 ±0.09	16.06 ±0.48	1.58 ±0.05	364.72 ±12.65	11.69 ±2.21	95.13 ±5.44

Table 4. *Continue.*

Breakfast	Minerals*				
	Calcium* mg/d	Phosphorous* mg/d	Magnesium* mg/d	Iron* mg/d	Zinc* mg/d
Yes	603.49 ±25.21	1350.65 ±42.90	320.71 ±10.53	12.23 ±0.34	10.39 ±0.28
No	546.99 ±109.29	1068.57 ±99.41	264.76 ±25.37	10.32 ±0.83	8.69 ±0.72
Total	594.57 ±27.23	1306.11 ±39.99	311.87 ±9.81	11.93 ±.32	10.13 ±0.26

*Mean± SE

3.3. Body Mass Index (BMI)

Among the sample, the underweight were 10.5%, 2.1% were males and 8.4% were females. As for the overweight in the sample, they were 13.7%, 8.4% were males and 5.3% were females; table 5 presents these results. These results confirmed the data obtained by El-Zanaty and Way [13]. From table 5, it can noticed that 8.4% of overweight students do not eat breakfast at home, 9.5% eat fast foods, 12.6% have snacks, their fruit frequency intake/week are much lower than that of normal weight students and their regular physical activity are also lower than normal weight students.

The prevalence of overweight among children may be attributed to a group of different factors. Janssen *et al.* [19] observed some significant associations among dietary habits, overweight, and obesity. The differences in physical activity and inactivity behaviors was one of the main reasons, in this sample, overweight were associated with decreased physical activity and they observed high prevalence rates of inactive behaviors and there was a strong trend for increased overweight and obesity with increased television viewing time in boys and girls. These observations highlight the importance that physical activities play in the childhood obesity epidemic. Many cross-sectional studies have documented a relationship between skipping breakfast and higher body mass index (BMI) [12, 2]. Affenito *et al.* [2] suggests that routinely eating breakfast may lead to more regular eating habits and exercise patterns, healthful choices, and consistent energy intake, which when taken together contribute to a reduced BMI. Ahadia *et al.* [3] reported that the prevalence of overweight and obesity among breakfast skippers were higher than non-skippers counterparts.

Also our results are consistent with previous study by Woodruff and Hanning [33] that found family meals and parental presence to be associated with improved dietary profiles and more healthful food-related practices. While Affenito [1] has found that consuming breakfast is more important for overall

healthy weight than the specific contents of the breakfast. While Albertson *et al*. [4] reported that the types of foods consumed and the energy and nutrient content of the breakfast meal is likely to influence individuals' health-related outcomes, including weight and nutritional status.

Table 5. *Associations between BMI and Some Dietary Habits of Students.*

Characteristics		BMI			
		Under-weight	Normal	Over-weight	Total
Sex	Male	2.1%	36.8%	8.4%	47.4%
	Female	8.4%	38.9%	5.3%	52.6%
Breakfast	Yes	8.9%	63.2%	12.1%	84.2%
	No	1.6%	12.6%	1.6%	15.8%
Breakfast at Home	Yes	4.7%	43.8%	5.7%	48.4%
	No	6.3%	35.3%	8.4%	55.8%
Fast Food	Yes	8.4%	53.2%	9.5%	71.1%
	No	2.1%	22.6%	4.1%	28.9%
Snacks	Yes	10.5%	68.9%	12.6%	92.1%
	No	0.0%	6.8%	1.1%	7.9%
Dinner	Yes	10.0%	57.4%	11.1%	78.4%
	No	0.5%	18.4%	2.6%	21.6%
Fruit Frequency (times/week)	0	3.2%	3.7%	0.5%	7.4%
	2-4	2.1%	30.0%	5.3%	37.4%
	5-7	4.2%	35.8%	7.4%	47.4%
	>7	1.1%	6.3%	0.5%	7.9%
TV Time (hours/day)	Low	5.3%	34.2%	5.8%	45.3%
	Medium	4.2%	33.2%	6.8%	44.2%
	High	1.1%	8.4%	1.1%	10.5%
Snack with TV	Yes	7.9%	72.1%	13.1%	87.4%
	No	2.6%	3.7%	0.5%	6.8%
Computer Time (hours/day)	Low	8.9%	63.2%	10.0%	82.1%
	Medium	1.6%	8.4%	1.1%	11.1%
	High	0.0%	4.2%	2.6%	6.8%
Snack with Computer	Yes	4.7%	32.1%	3.7%	40.5%
	No	5.8%	43.7%	10.0%	43.2%
Regular Physical Activity	Yes	4.2%	47.4%	10.5%	62.1%
	No	6.3%	28.4%	3.2%	37.9%
Total		10.5%	75.8%	13.7%	100%

Other reasons for obesity include a variety of unhealthful behaviors such as more snacking and fast food eating [27]; our finding revealed that the percentage of overweight students who reported eating snacks and fast food are higher than those did not eat. This result may be attributed to fast food and snacks are strongly correlated with consumption of total fat, saturated fat, carbohydrates and added sugars [5]. This is true because snacks, as chips, candy … etc are mainly associated with salt, fat, carbohydrate contents rather than vitamins and minerals as in fruits, dairy.

Also, elements of the home environment linking community disadvantage with obesity include low levels of physical activity (at home), strained financial resources, and lack of health and nutrition knowledge [16]. Chaput *et al.* [8] reported evidence to suggest that the type of sedentary behaviour, such as screen-based sedentary behaviour (e.g., television, video games), may be more important than overall sedentary time in predicting obesity in children. Incorrect dietary habits were more common among children with lower socio-economic conditions and who spent more time watching TV.

3.4. Milk and Minerals

Dairy foods are key sources of calcium and other bone building nutrients such as protein, vitamin D, and magnesium. National guidelines recommend that children and adolescent's ages 9 to 18 years consume at least three servings of dairy foods and 1.300 mg calcium per day.

The frequency of milk and dairy products intake was presented in table 6, it can be noticed that females consume milk more frequently than males. This finding is similar to other studies that stated that the low calcium intake was reflected by the low percentage of persons meeting the pyramid recommendation for dairy product; although the average number of servings of dairy products was almost close the minimum recommendation. Low milk and other dairy products consumption may increase the risk of developing osteoporosis in later life, especially for girls. Optimal calcium intake during the child growth is critical for children to obtain their full genetic potential for peak bone mass [35].

Table 6 presents the relation between milk consumption and mineral intake. The mean calcium intake for the sample was 594.57 mg/d; 694.94 mg/d (53.46% RDA) for males in the sample and 504.23 mg/d (38.79% RDA) for females. It can be observed that children reported not having milk or milk products (yogurt or fermented milk) was 16.8% of the sample, their mean calcium intake was 609.49 mg/d; for males the mean was 623.28 mg/d (47.94% of RDA) while for females the mean was 475.03 mg/d (38.04% of RDA). Males consuming milk 5-7 times weekly had calcium intake of

784.32 (60.33% RDA) while for females the mean was 597.32 mg/d (45.95% of RDA). Increasing the frequency of milk intake increases the calcium, phosphorous and magnesium intake. Although milk and milk products are not the main source of iron and zinc, it can be noticed that students with high consumption milk, have higher iron and zinc intake. It can also be notice that females have lower intakes than males in all nutrients and do not meet the RDA requirements.

Table 6. *The Relation between Milk Consumption and Mineral Intake.*

Sex	Frequency/week	Percent	Calcium* mg/d	Phosphorous* mg/d	Magnesium* mg/d	Iron* mg/d	Zinc* mg/d
Male	0	7.9	623.28 ±86.35	1264.34 ±106.51	330.65 ±28.68	11.49 ±0.73	9.62 ±0.65
	1-2	12.1	644.20 ±39.32	1442.37 ±96.72	352.71 ±29.30	12.26 ±0.83	11.49 ±0.76
	3-4	14.2	710.50 ±78.96	1597.01 ±125.97	370.82 ±27.32	14.30 ±1.02	11.89 ±0.64
	5-7	13.2	784.32 ±81.08	1631.1613 ±109.92	379.09 ±28.07	14.93 ±0.75	12.91 ±0.69
	Total	47.4	694.94 ±35.43	1507.34 ±57.85	361.21 ±14.29	13.43 ±0.46	11.65 ±0.37
Female	0	8.9	475.03 ±76.04	1074.98 ±83.48	251.03 ±28.91	10.40 ±0.99	8.10 ±0.52
	1-2	8.9	484.70 ±33.09	1083.93 ±112.22	266.59 ±17.55	10.53 ±0.62	8.10 ±0.52
	3-4	19.5	491.70 ±112.32	1147.69 ±77.45	280.31 ±19.514	10.65 ±0. 60	8.84 ±0.66
	5-7	15.3	597.32 ±71.83	1195.73 ±111.52	284.61 ±26.92	10.75 ±0.76	9.51 ±0.54
	Total	52.6	504.23 ±38.74	1125.00 ±48.92	267.48 ±11.91	10.58 ±0.39	8.75 ±0.32
Sig			0.000	0.000	0.000	0.000	0.000
Total	Total		594.57 ±27.23	1306.11 ±39.99	311.87 ±9.81	11.93 ±0.32	10.13 ±0.26

*Mean± SE

The above result are on the line of Xie *et al* [35] and DNPCNCD [11] study which reported that more than 70% of subjects did not meet RDA, and most of them did not even meet two-thirds of the RDA for calcium consumption. Additional nutrient deficiencies identified in the low-calcium diet group were phosphorus, magnesium, iron and zinc. Whereas iron has no known effect on bone health, zinc, phosphorus and magnesium do play a role [15]. Therefore, nutritional needs for phosphorus and magnesium must also be considered, as has been done in studies in which milk provided the main source of added calcium [7]. It can be observed that having dinner at home effects the consumption of milk and milk products, thereby increasing the calcium intake of the students.

3.5. Fruit and Vegetable Consumption

Fruits and vegetables are important sources of fiber and are low in total fat, saturated fat, and sodium, but the intake of these foods does not meet recommended guidelines. The frequency of fruit and vegetable intake was presented in table 7, it can be noticed that males consume fruit and vegetable more frequently than females. Also the mother's education is a factor affecting the frequency of fruit and vegetable intake, the higher the mother's educated the more fruit and vegetable the student consumes. Our results agree with work by Saleh [26] and Ibrahim *et al.* [18]. In agreement with the findings of the present study, Cockroft *et al*. [9] study reported a significant association between parent's education and fruit and vegetable intake in children. Eating fruit and vegetable may also be linked with of several factors such as house-hold income, living arrangement and sex of subjects [23].

Table 7. *Frequency of Fruit and Vegetable Intake vs. Sex and Mothers Education.*

	Fruit & Vegetable Intake times /week				Total
	0	2-4	5-7	>7	
		Sex			
Male	2.1%	17.4%	21.1%	6.8%	47.4%
Female	5.3%	20.0%	26.3%	1.1%	52.6%
		Mother Education			
Less than Intermediate	0%	7.9%	0%	0%	7.9%
Intermediate	4.2%	16.8%	5.3%	0%	26.3%
Graduate	0%	9.5%	19.5%	0%	28.9%
Post-graduate	3.2%	3.2%	22.6%	7.9%	36.8%
Total	7.4%	37.4%	47.4%	7.9%	100.0%

It can be observed that children that reported not having fruits and vegetables was 10.6% of the sample, their mean vitamin A intake was 2993.4 IU/d (59.87% of RDA) for males while for females the mean was 4840.40 IU/d (96.81% of RDA). The thiamine intake was 0.51 mg/d (34% RDA) for males and females were 0.64mg/d (58.18% RDA). Riboflavin intake was 1.04 mg/d (57.78% RDA) for males and 1.28 mg/d (98.46% RDA) for females. Niacin intake was 16.1 mg/d (80.5% RDA) for males and 10.93 mg/d (72.87% RDA) for females. Vitamin B_6 intake was 1.37 mg/d (68.5% RDA) for males and 0.92mg/d (61.33% RDA) for females. Folate intake was 171.12µg/d (42.78% RDA) for males and 253.38µg/d (63.3% RDA) for females. Finally, vitamin C intake was 40.80mg/d (68% RDA) for males and 56.98 mg/d (94.97% RDA).

From table 8, it can be noticed that students consuming fruits and vegetables >7 times weekly had vitamin A intake was 7952.6 IU/d (159.05% RDA) while for females the mean was 12437.0 IU/d (248.74% of RDA). The thiamine intake was 1.17 mg/d (78% RDA) for males, and females were 1.07mg/d (97.27% RDA). Riboflavin intake was 1.90 mg/d (105.56% RDA) for males and 1.39 mg/d (106.92% RDA) for females. Niacin intake was 19.74 mg/d (98.7% RDA) for males and 16.96 mg/d (113.07% RDA) for females. Vitamin B_6 intake was 1.93 mg/d; 2.04 mg/d (102% RDA) for males and 1.72mg/d (114.67% RDA) for females. Folate intake was 449.21µg/d; 484.79µg/d (232.4% RDA) for males and 378.04µg/d (154.47% RDA) for females. Finally, vitamin C intake was 114.98mg/d (191.63% RDA) for males and 72.6 mg/d (121% RDA).

Table 8. *The relation between frequency of fruit and vegetable consumption and vitamin intake.*

	Frequency/ week	Percent	Vit A* IU/d	Thiamine* mg/d	Riboflavin* mg/d	Niacin* mg/d	Vit B_6* mg/d	Folate* µg /d	Vit C* mg/d
Sex									
Male	0	2.1	2993.40 ±520.64	0.51 ±0.04	1.04 ±0.12	16.1 ±1.78	1.37 ±0.24	171.12 ±17.69	40.80 ±23.35
	2-4	16.0	5255.20 ±2100.95	0.94 ±0.07	1.79 ±0.39	17.51 ±1.53	1.65 ±0.19	356.24 ±43.61	53.78 ±10.90
	5-7	17.0	6282.50 ±3151.50	1.06 ±0.10	1.90 ±0.34	17.56 ±2.13	1.81 ±0.18	396.52 ±44.39	89.94 ±19.65
	>7	4.3	7952.60 ±3261.35	1.17 ±0.22	1.90 ±0.27	19.74 ±1.98	2.04 ±0.16	484.79 ±112.40	114.98 ±52.15
	Total	37.4	6715.90 ±1889.50	0.99 ±0.06	1.81 ±0.21	17. 70 ±1.09	1.75 ±0.11	377.55 ±29.63	75.33 ±11.31
Female	0	8.5	4840.4 ±1596.89	0.64 ±0.12	1.28 ±0.20	10.93 ±2.16	0.92 ±0.17	253.38 ±50.47	56.98 ±25.82
	2-4	22.3	6467.1 ±1435.07	0.72 ±0.05	1.32 ±0.15	13.44 ±1.18	1.2 ±0.09	273.50 ±19.81	59.43 ±18.93
	5-7	27.7	8010.0 ±5715.87	0.75 ±0.06	1.33 ±0.09	14.75 ±1.10	1.28 ±0.09	304.80 ±29.21	60.09 ±8.78
	>7	2.1	12437.0 ±10294.4	1.07 ±0.24	1.39 ±0.33	16.96 ±1.43	1.72 ±0.02	378.04 ±98.31	72.60 ±14.69
	Total	60.6	6293.8 ± 1199.85	0.73 ±0.04	1.31 ±0.11	13.69 ±0.75	1.21 ±0.06	285.88 ±15.95	64.50 ±7.17
Total			6459.9 ±1034.46	0.83 ±0.04	1.51 ±0.11	15.27 ±0.65	1.42 ±0.06	321.96 ±15.76	68.76 ±6.21

*Mean± SE

Increasing the frequency of fruits and vegetables intake increases the vitamin intake. It can be noticed that females have higher intake of vitamins than males. Also, having lunch with the family increases the frequency of fruit and vegetable intake resulting in an increase in vitamin intake.

4. Conclusion

Our findings are consistent with many recent studies among young people of different populations that have reported unhealthy dietary habits. Therefore, we conclude that nutrition education programs should focus on increasing intake of fruits, vegetables, milk and dairy products in parallel with decreasing consumption of high fat containing snacks, sweets, fast food and soft drinks, in particular, among children. Further studies especially longitudinal repeated measures of dietary pattern in children, rather than cross sectional assessment are needed to provide better opportunities for monitoring healthy eating behavior and nutritional status and for timely identifying the newly emerged factors which eventually help prevent disease occurring in later life.

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