

USING OF 24 HOURS FOOD RECALL METHOD TO STUDY NUTRITIONAL STATE FOR PREPARATORY SCHOOL STUDENTS

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ABSTRACT

This study was carried out to evaluate the nutritional state for preparatory school students aged from (12-15 years) by using of 24 hours food recall method. Questionnaire results indicated that the content of all meals for energy, vitamin A, vitamin C, vitamin D, vitamin B1(Thiamin), niacin, vitamin B6, calcium, phosphorus and Zink were less than those of Recommended Daily Allowances (RDA, 1989) for both sexes, while total iron and magnesium for females and vitamin E for males. Results indicated that total protein, carbohydrate, vitamin B2 (Riboflavin), vitamin B12, folate and sodium were more than those of RDA for both sexes. The content of total iron and magnesium for males, and vitamin E for females were more than those of RDA. From above mentioned results, that intake extra content from all meals for energy, vitamin A, vitamin C, vitamin D, vitamin B1(Thiamin), niacin, vitamin B6, calcium, phosphorus, Zink for both sexes, while total iron and magnesium for female, and vitamin E for male is recommended.

Keywords: 24 hours food recall, Recommended Daily Allowances, Questionnaire and Preparatory School.

INTRODUCTION

Nutrition has a great influence on the growth process of an individual. During late childhood and early adolescence, a person begins to develop at an accelerated rate. At this time, the nutritional value of the food a person consumes becomes very crucial to his or her biological and intellectual development. Failure to consume an adequate diet at this time can disrupt normal growth and pubertal development (Lifhithz *et al.*, 1993).

Adolescence is one of the most dynamic and complex transitions in the life span. The adolescence period is the transitory stage from childhood to adulthood, it is a unique stage process of growth and development; this period is accompanied by series of physical, physiological, biochemical, hormonal and psychological changes that occur during the growth spurt (Perry, 2000). Rapid physical growth creates an increased demand for energy and nutrients. Total nutrients needs during adolescence are higher than any other time in the life cycle, and failure to consume an adequate diet during the time can potentially affect growth and sexual maturation (Owen, and Frankle, 1986 and Story, 1992). So this stage is a critical period of human life (Pipes, 1989).

A dietary recall is a retrospective method of dietary assessment where an individual is interviewed about their food and beverage consumption

during a defined period of time, typically the previous day or the preceding 24 hours. Recall of intake over a longer time period is problematic due to the limitations of memory. Several national surveys use the 24-hour recall method because of its high response rate and its ability to obtain detailed information. The interview can be carried out in person, by telephone or increasingly via the Internet. In the Norwegian arm of the EPIC study no significant differences in the dietary data obtained were found when face-to-face 24-hour recalls were compared to telephone 24-hour recalls (Brustad *et al*, 2003).

This work aimed to evaluate the nutritional status of preparatory school students aged from 12:15 years using 24 hours recall method and comparing with Recommended Dietary Allowances, (RDA, 1989).

MATERIALS AND METHODS

Materials:

Sample size:

This study was carried out on 150 preparatory schools students divided into 75 male and 75 female .The age of the sample ranged between 12 to 15 years old in Menyet El-Nasr city; Dakahlia; Egypt.

Time of study:

This study was started in October 2009 and extended to April 2010.

Design of work:

A questionnaire was designed to collect data including 24 hours recall of dietary intake for 7 days according to (El-Wardany 2010).

Methods:

The questionnaire was done by interviewing and the students themselves. Questionnaire expressed the food intake for the previous 24 hours recall included basic meals namely, (breakfast, lunch and dinner) and between meals. The recalls were done for 7 days, our obtained data were calculated according to Diet Analysis Program (1995) in food laboratory, Home Economics Faculty, Menofiya University; Egypt.

Recommended Dietary Allowances (R.D.A):

Results were compared with R.D.A (1989) to evaluate the nutrition status.

RESULTS AND DISCUSSION

Nutritional status of preparatory school students aged from 12-15 years using 24 hours recall method was determined.

Food intake content of energy (K_{cal}), protein, fat, carbohydrate, vitamins and minerals in compare with Recommended Dietary Allowances was analysed.

Data presented in Table (1) demonstrated the means and standard deviation of nutrients for students aged (12:15) years. Results indicated that the amount of energy for male was $1415.65 \pm 43.00 K_{cal}$ and this amount could

not cover the requirements of energy in compare with Recommended Dietary Allowances (RDA.1989), which was 2500 K_{cal}/day (56.62% of RDA), while the amount of energy for female was 1198±14.58K_{cal} and RDA value was 2200 K_{cal}/day (54.64% of RDA).These results are in accordance with (Franz *et al.*, 2002).

Results in the same Table indicated that the amount of protein from animal, plant and total protein consumed by males were 33.09±6.28, 29.82±1.32 and 62.91±1.93 gm respectively, while with females were 22.42±1.09, 24.95±0.86 and 47.37±1.59 respectively. Total protein intake for the studied sample was higher than RDA for both sexes. The percentages of total protein were 139.8% and 102.97% of RDA for male and female respectively. These results were nearly agree with Wiltshire *et al.*, (2003).

It could be detected from the Table (1) that, mean of animal fat consumed by males and females were 24.07±1.28 and 18.30±1.13 gm respectively. While plant fat consumed by males and females were 23.43±1.25 and 19.43±1.11 gm respectively.

Data presented in Table (1), showed also that carbohydrates consumed by males was (191.33±5.48) higher than those consumed by females (171.67±4.15) gm. Carbohydrates intake was higher than RDA for both sexes, which represented 147.17% and 132.05% of RDA for male and female respectively.

Also, in the same Table it was detected that mean of fiber consumed is 16.13±0.31 gm for males and 14.48±0.31 for females.

Table (1): Nutrients intake for the students aged (12:15) years.

Nutrients	sex	Male			Female			T test	Sig. (2 tailed)
		Amount	RDA value	RDA%	Amount	RDA value	RDA%		
Energy (kcal)		1415.65±43.00	2500	56.62	1198.20±14.58	2200	54.40	-851-	-
Animal protein (gm)		33.09 ± 6.28	-	-	22.42 ± 1.09	-	-	1.674	-
Plant protein (gm)		29.82 ± 1.32	-	-	24.95 ± 0.86	-	-	3.083	**
Total protein (gm)		62.91 ± 1.93	45	139.8	47.37 ± 1.59	46	102.97	3.535	**
Animal fat (gm)		24.07 ± 1.28	-	-	18.30 ± 1.13	-	-	3.368	**
Plant fat (gm)		23.43 ± 1.25	-	-	19.43 ± 1.11	-	-	2.381	*
Total fat (gm)		47.5 ± 1.96	-	-	37.73 ± 1.76	-	-	3.579	**
Carbohydrate (gm)		191.33 ± 5.48	130	147.17	171.67 ± 4.15	130	132.05	2.857	**
Fiber (gm)		16.13 ± 0.50	-	-	14.48 ± 0.31	-	-	2.779	**

(*) P< 0.05 (**) P< 0.01 (***) P< .0001 (-) Negative Correlation

All values are the means of three replicates ± SD

Results illustrated in Table (2) showed that the means and standard deviations of several vitamins: fat soluble vitamins namely (A, D, E and K) and water soluble vitamins namely (C, B₁, B₂, Niacin, B₆, B₁₂ and Folate) intake for males and females in compare with RDA (1989).

Results showed that the amount of vitamin A was higher in males than females it was 269.17±14.80 and 210.80±14.58 mg respectively. The percentages were 26.91% and 26.35% of RDA respectively, this amount consumed was very lower than RDA for both sexes.

The results for vitamin A were compared with the Dietary reference intake for children 2 to 8 years old (400 mg/day) and children 9 to 13 years old (600 mg/day) (Food and Nutrition Board, 2001).

According to (FAO 2003) vitamin A deficiency among preschoolers and their mothers is considered to be sub-clinical, mild-to-moderate, public health problem in Egypt.

Fishman *et al.*, (2000) reported that children with a marginal or deficient vitamin A status had a significantly higher risk for iron deficiency anemia. Vitamin A is essential for the production of red blood cells and vitamin C protects mature red blood cells against oxidation and promotes iron absorption.

Results in the table (2) showed that the mean of vitamin C consumed by males was (35.36 ± 9.45 mg) higher than females (18.43 ± 1.09 mg). The percentages were 70.72% and 36.86% of RDA respectively. Vitamin C intake for the studied sample was lower than recommended dietary allowances for both sexes.

It could be observed that mean of vitamin D consumed by males was (2.76 ± 0.65 mg) higher than females (1.36 ± 0.86 mg). The percentages were 27.60% and 13.60% of RDA for male and female respectively. Vitamin D intake for the studied sample was very lower than recommended dietary allowances.

It was noticed that mean of vitamin E consumed by males was (9.44 ± 0.87 mg) higher than females (9.27 ± 1.59 mg). Vitamin E intake for the males was lower than recommended dietary allowances (94.4%) but for females was higher than recommended dietary allowances(115.87 %).

Results for water soluble vitamins indicated that, vitamin B₁ consumed by males was (1.15 ± 0.24 mg) higher than females (0.70 ± 1.13 mg). The percentages were 88.46% and 63.63% of RDA, respectively. So, vitamin B₁ intake for the both of male and female was lower than recommended dietary allowances.

It was noticed that mean of vitamin B₂ consumed by males was (1.68 ± 0.04 mg) higher than females (1.53 ± 1.11 mg). Vitamin B₂ intake for the studied sample was higher than recommended dietary allowances for both sexes. The percentages were 112% and 117.69% of RDA respectively.

From Table (2), the mean of niacin consumed by males was (9.46 ± 0.42 mg) higher than those of females (7.95 ± 1.76 mg). The percentages were 55.64% and 53% of RDA respectively. Niacin intake for the studied sample was lower than RDA for male and female.

Data showed that means of vitamin B₆ consumed by males was 1.06 ± 0.03 and 0.94 ± 4.15 mg for female. It was The percentages were 62.35% and 67.14% of RDA respectively. This amount consumed was lower than those of recommended dietary allowances.

For vitamin B₁₂ results in Table (2) showed that the amount of it consumed by males was (2.40 ± 0.10 mg) higher than females (2.10 ± 0.31 mg). The percentages were 120% and 105% of RDA respectively. Vitamin B₁₂ intake for the studied sample was higher than recommended dietary allowances for males and females.

It was also noticed that mean of folate consumed by males was (328.28±42.35 mg) higher than females (216.99±1.09 mg). The percentages were 218.85% and 144.66% of RDA respectively. Folate intake for the studied sample was very higher than recommended dietary allowances for samples.

Table (2): Vitamins intake for the students aged (12:15) years.

sex Vitamin (mg)	Male			Female			T test	Sig. (2 tailed)
	Amount	RDA value	RDA%	Amount	RDA value	RDA%		
Vitamin A	269.17±14.80	1000	26.91	210.80±14.58	800	26.35	3.110	**
Vitamin C	35.36 ± 9.45	50	70.72	18.43 ± 1.09	50	36.86	1.727	-
Vitamin D	2.76 ± 0.65	10	27.6	1.36 ± 0.86	10	13.60	2.082	*
Vitamin E	9.44 ± 0.87	10	94.40	9.27 ± 1.59	8	115.87	.143	-
Vitamin B1	1.15 ± 0.24	1.3	88.46	0.70 ± 1.13	1.1	63.63	1.835	-
Vitamin B2	1.68 ± 0.04	1.5	112	1.53 ±1.11	1.3	117.69	2.460	*
Niacin	9.46 ± 0.42	17	55.64	7.95 ± 1.76	15	53	3.137	**
Vitamin B6	1.06 ± 0.03	1.7	62.35	0.94 ± 4.15	1.4	67.14	2.764	**
Vitamin B12	2.40 ± 0.10	2	120	2.10 ± 0.31	2	105	1.890	-
Folate	328.28 ± 42.35	150	218.85	216.99 ± 1.09	150	144.66	2.549	*

(*) P< 0.05 (**) P< 0.01 (***) P< .0001 (-) Negative Correlation

Results in Table (3) showed the amount of several minerals namely Ca, P, Fe, Na, K, Zn and Mg intake for males and females compared with RDA (1989).

Data showed that a significant diffuseness observed in the amount of Calcium intake in both of male and female were 533.99±28.53 and 424.20±27.50 mg, and its percentages were 44.49% and 35.35% of RDA respectively. Calcium intake for the studied sample was very lower than RDA. These results were in accordance with (Michaelsen, 2003).

Results showed that, means of phosphorus intake for males were 907.32 ± 28.21 mg and females 777.55 ± 24.45 mg, and percentages were 75.60% and 64.79% of RDA. Phosphorus intake for males and females was lower than recommended dietary allowances for both sexes.

Moreover, means of iron from animal, plant sources and total iron consumed by males were 4.01±0.17, 8.99±0.50 and 13.00±0.56mg, respectively while with females were 3.40 ± 0.17, 7.28 ± 0.37 and 10.68±0.44mg, respectively. The percentages of total iron were 108.33% and 71.20% of RDA respectively for males and females. Total iron intake for males was higher than recommended dietary allowances but for females was lower than recommended dietary allowances.

Results indicated that the Sodium intake were lower content in female in compare with males (1271.09±54.77 and 1670.22±83.78mg) respectively and its percentages were 334% and 254.21% of RDA respectively. Sodium intake for the studied sample was very higher than recommended dietary allowances.

It was found that, mean of potassium intake for males were 1647.10±169.97mg higher than females 1182.27±44.62 mg.

Table (3) indicated that, the Zinc intake for males was 7.77 ± 0.20 mg and 6.95 ± 0.18 mg for females. Zinc intake for the studied sample was lower than recommended dietary allowances for both sexes, and its percentages were 51.80% for male and 57.91% for female of RDA.

Data indicated that, mean of magnesium intake for males was 306.52 ± 10.16 mg higher than females 265.82 ± 7.88 mg, and its percentages were 113.52% and 94.93%, for males and females respectively. Magnesium intake for males was higher than recommended dietary allowances but for females was lower than recommended dietary allowances.

Hassan and Amin (2004) reported that the most deficient nutrient was calcium (only 22.1 % consumed 100% of the RDA), followed by calories (26.4%), vitamin C (39.1 %) and niacin (44.8%). The least deficient nutrient was protein (98% consumed 100% of the RDA), followed by vitamin B₂ (71%) and vitamin A (60.3%).

Table (3): Minerals intake for the students aged (12:15) years.

Mineral (mg)	Male			Female			T test	Sig. (2 tailed)
	Amount	RDA value	RDA%	Amount	RDA value	RDA%		
calcium	533.99 ± 28.53	1200	44.49	424.20 ± 27.50	1200	35.35	2.770	**
Phosphorus	907.32 ± 28.21	1200	75.61	777.55 ± 24.45	1200	64.79	3.476	***
Animal iron	4.01 ± 0.17	-	-	3.40 ± 0.17	-	-	2.450	*
Plant iron	8.99 ± 0.50	-	-	7.28 ± 0.37	-	-	2.720	**
Total iron	13.00 ± 0.56	12	108.33	10.68 ± 0.44	15	71.20	3.245	**
Sodium	1670.22 ± 83.78	500	334	1271.09 ± 54.77	500	254.21	3.987	***
Potassium	1647.10 ± 169.97	-	-	1182.27 ± 44.62	-	-	2.645	**
Zinc	7.77 ± 0.20	15	51.80	6.95 ± 0.18	12	57.91	2.979	**
Magnesium	306.52 ± 10.16	270	113.52	265.82 ± 7.88	280	94.93	3.163	**

(*) $P < 0.05$ (**) $P < 0.01$ (***) $P < .0001$ (-) Negative Correlation

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استخدام طريقة استرجاع غذاء ٢٤ ساعة في دراسة الحالة الغذائية لطلاب المرحلة الإعدادية

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يهدف هذا البحث إلى دراسة الحالة الغذائية لطلاب المرحلة الإعدادية وذلك باستخدام طريقة استرجاع غذاء ٢٤ ساعة. وقد أوضحت نتائج الاستبيان من خلال تناول الوجبات الغذائية انخفاضاً في المتناول من الطاقة، فيتامين أ، ج، د، ب_١، نياسين، ب_٦، الكالسيوم، الفوسفور، الزنك للجنسين. والحديد والمغنسيوم للإناث وفيتامين هـ للذكور مقارنة لما هو موصى به RDA 1989. وأوضحت النتائج زيادة في المتناول من البروتين، الكربوهيدرات، فيتامين ب_٢، ب_{١٢}، الفوليك، الصوديوم للجنسين والحديد والمغنسيوم للذكور وفيتامين هـ للإناث. وبناء على ماسبق فإنه يوصى بزيادة تناول الأغذية المحتوية على الطاقة، فيتامين أ، ج، د، ب_١، نياسين، ب_٦، الكالسيوم، الفوسفور، الزنك للجنسين والحديد والمغنسيوم للإناث وفيتامين هـ للذكور.

قام بتحكيم البحث

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