Dietary Patterns of Secondary-School Students at Grade VII and Grade X

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ABSTRACT

Objective: To study dietary patterns of secondary-school students at Grade VII and Grade X.
Methods: Students both male and female at Grade VII and Grade X were taught about food exchange lists. Then the investigators asked them to fill their food intakes during the past 7 days by using food frequency. Also, the investigators measured their bodyweight and heights, then classified them by BMI into 3 groups which were normal weight (group I) overweight (group II) and obese (group III).
Results: The male students in normal bodyweight groups at Grade VII drank more milk than the females of the same group. The energy, carbohydrate, protein and fat intakes were not different between male and female students and among the 3 groups at Grade VII. In contrast, the male students at Grade X in normal bodyweight group and overweight group had more intakes of energy, protein and fat. Also the boys of the normal bodyweight group at Grade X drank more milk.
Conclusion: There were no differences in energy intakes among students of the same Grade of different BMI. Female students drank less milk than male students in the normal weight group. The male students in normal bodyweight and overweight groups at Grade X consumed more foods than the female students.

Keywords: Food intake; Student; Overweight; Obesity; Milk

Siriraj Med J 2006;58: 751-753
E-journal: http://www.sirirajmedj.com

Adequacy and appropriation of dietary intake during teenage are essential in promoting growth to full potential. Less than adequacy of energy and milk intake will result in malnutrition and stunt which are very common findings in developing countries. In contrary, more than adequacy of energy intake will result in overweight and obesity which are now high prevalence in developed countries.[1,2]

Students at Grade VII are in early teenage period while students at Grade X are in late teenage period. We thus study these groups of students about their dietary intakes in order to judge the adequacy of energy and milk intake and also study the difference in intakes between the male and the female. Besides, we study the dietary patterns in these students classified by their BMI in order to predict their nutritional status from their current intakes.

MATERIALS AND METHODS

The investigators studied dietary patterns of secondary-school students at Grade VII and at Grade X from Shinorosevithayalai School. We measured their bodyweights and heights, then classified each one of them into: normal weight, overweight and obese, by using their body mass index.[3]

Then we taught them about food exchange lists by demonstrating the actual foods. After completing the teaching, we asked them to fill in the questionnaires about their weekly dietary intakes by using food frequency and amounts of that particular food.

Statistical analysis

We used Mann Whitney U-test to find the difference between the groups. The significant difference should be at least $P<0.05$.

RESULTS

Table 1 shows that there are 459 students at Grade VII and 271 students at Grade X who participated in our study. There are 17% and 7% of students at Grade VII who are overweight and obese, respectively, while there are 8% and 7% of students at Grade X who are overweight and obese.

Table 2 demonstrates the dietary intakes of students at Grade VII. There are no difference in energy, carbohydrate, protein and fat intakes among the 3 groups and between males and females. But in Group I (normal weight)

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TABLE 1. Nutritional status of the studied students at Grade VII and Grade X.

	Grade VII (%)	Grade X (%)
Number	459	271
Male	246 (54%)	105 (39%)
Female	213 (46%)	166 (61%)
Group I: Normal	350 (76%)	231 (85%)
M/F	179 / 171 (51% / 49%)	84 / 147 (36% / 64%)
Group II: Overweight	79 (17%)	22 (8%)
M/F	48 / 31 (61% / 39%)	11 / 11 (50% / 50%)
Group III: Obesity	30 (7%)	18 (7%)
M/F	19 / 11 (63% / 37%)	10 / 8 (56% / 44%)

TABLE 2. Dietary intakes of students at Grade VII.

	Energy	Carbohydrate		Protein		Fat		Milk
	(kcal)	g	(%)	g	(%)	g	(%)	(ml)
Group I: Normal								
Male	2,875	343	(48)	111	(15)	116	(37)	824*
Female	2,935	338	(48)	106	(15)	120	(37)	733
Group II: Overweight								
Male	3,070	350	(47)	115	(15)	118	(37)	776
Female	2,662	302	(46)	99	(15)	102	(36)	711
Group III: Obesity								
Male	2,867	331	(49)	114	(15)	104	(36)	704
Female	2,552	327	(49)	98	(15)	97	(34)	837

*significant difference, P <0.05 compared to female of Group I

TABLE 3. Dietary intakes of students at Grade X.

	Energy	Carbohydrate		Protein		Fat		Milk
	(kcal)	g	(%)	g	(%)	g	(%)	(ml)
Group I: Normal								
Male	2,637*	315*	(48)	107*	(15)	111*	(36)	676**
Female	2,255	273	(48)	87	(15)	89	(36)	635
Group II: Overweight								
Male	2,980**	296	(46)	107**	(16)	108**	(39)	664
Female	2,066	258	(47)	80	(16)	81	(37)	623
Group III: Obesity								
Male	2,667	280	(47)	108	(16)	92	(36)	714
Female	2,269	245	(45)	88	(18)	78	(33)	704

*Significant difference, P <0.0001 compared to female at the same Group
**Significant difference, P <0.05 compared to female at the same Group

the milk intake of female students is significantly less than male students in the same group.

Table 3 exhibits the dietary intakes of students at Grade X. In Group I, the males have more intakes of energy, carbohydrate, protein, fat and milk than the females, where as the Group II, the male have more intakes of energy, protein and fat than the female in the same group.

DISCUSSION

Food frequency questionnaires which we employed in this study have been validated in pregnant women.[4] It is a simple self-administered questionnaire. It is used as a research tool in our population which provides important information about the nutrient intakes.

In our study, we found the prevalences of obesity of students at Grade VII and at Grade X are equal (7%) which are lower than the prevalence of childhood obesity (14%) surveyed by the Ministry of Public Health reported recently.[5] However, the students at Grade VII (17%) are more overweight than those who are at Grade X (8%). Thus, the students who are at Grade VII are at higher risk to become obese when they are at Grade X.

Dietary intakes of students at Grade VII (Table 2) in terms of energy, carbohydrate, protein and fat among Group I (normal weight), Group II (overweight) and Group III (obesity) are not different both in the males and in the females. It surprises us that we hope to find that the energy and fat intakes of students in Group II and Group III will be much more than those of students in Group I. These findings mean that with such energy intakes there will be no new case of obesity in the near future. Also, with the findings that the percentages of fat in the diets are the same, it rejects the hypothesis that the obese students tend to eat more fat than the normal. However, in Group I of students at Grade VII, the male drink more milk than the female which is the same as in our previous study.[6] Milk is the only high source of dietary calcium. Optimal calcium intake is especially relevant during adolescences, when most bone mineral accretion occurs. A well-rounded diet including dairy products, fruits and vegetables and appropriate physical activity are important for achieving good bone health.

Dietary intakes of the male students at Grade X in Group I (Table 3) are significantly higher in terms of energy, carbohydrate, protein, fat and milk than the female students. Likewise, the energy, protein and fat intakes of the male students in Group II (overweight group) are higher than those between the female students. This can be explained by the rapid growth of the male students during this period. While those in Group III (obese group), there are no different in dietary intakes between the male and the female. With this finding, the obese males will be slimmer in the near future.

From our study, the percentages of carbohydrate, protein and fat in students of both Grades and both males and females are between 45-49%, 15-18% and 33-39%, respectively. Greene-Finestone et al.[7] found that a large portion of adolescents consumed low-carbohydrate-density diets which is in contrast to our study. Low-carbohydrate-density diet results in lower intakes of vitamin C and fiber, and higher-consumption of cholesterol and total fat. Also, our results reject the hypothesis that the obese eat more carbohydrate, protein or fat than those who are of normal weight. Other factors such as differences in levels of activity and exercises might be the contributing causes of obesity.

ACKNOWLEDGEMENTS

The investigators would like to thank Miss Saowalak Hunnangkul for her statistical assistance and teachers and students of Shinorosevithayalai School for their participation in this study.

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บทคัดย่อ

การศึกษารูปแบบของอาหารในเด็กนักเรียนมัธยมศึกษาชั้นมัธยมศึกษาปีที่ 1 และปีที่ 4

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วัตถุประสงค์: ศึกษารูปแบบของอาหารในเด็กนักเรียนชั้น ม.1 และ ม.4

วิธีการ: ได้สอนอาหารแลกเปลี่ยนแก่นักเรียนชั้น ม.1 และ ม.4 ก่อนที่จะให้ตอบแบบสอบถามเกี่ยวกับความถี่ของอาหารของนักเรียนแต่ละคนในรอบ 7 วันที่ผ่านมา และได้ชั่งน้ำหนักและวัดส่วนสูง เพื่อแบ่งกลุ่มนักเรียนออกเป็น 3 กลุ่มตามค่าดัชนีมวลกาย คือกลุ่ม 1 คือ ปกติ, กลุ่ม 2 คือ กลุ่มน้ำหนักตัวเกิน และ กลุ่ม 3 คือ กลุ่มอ้วน

ผลการศึกษา: นักเรียนชายที่มีน้ำหนักตัวปกติในชั้น ม.1 จะมีการดื่มนมมากกว่านักเรียนหญิง ขณะที่รับประทานอาหารปริมาณเท่ากัน แต่นักเรียนชายในชั้น ม.4 ที่มีน้ำหนักตัวปกติและน้ำหนักตัวเกินจะรับประทานอาหารมากกว่านักเรียนหญิงอย่างมีนัยสำคัญ และนักเรียนชายในชั้น ม.4 ในกลุ่มปกติจะดื่มนมมากกว่านักเรียนหญิงในกลุ่มเดียวกัน

สรุป: นักเรียนในชั้นเดียวกันที่ได้ศึกษานี้มีการรับประทานอาหารที่มีพลังงานไม่แตกต่างในทุกกลุ่มดัชนีมวลกาย แต่นักเรียนหญิงดื่มนมน้อยกว่านักเรียนชายทั้งในชั้น ม.1 และ ม.4 ส่วนนักเรียนชายที่มีดัชนีมวลกายปกติและน้ำหนักตัวเกินในชั้น ม.4 จะรับประทานอาหารมากกว่านักเรียนหญิงในกลุ่มเดียวกัน