

Research article/Raziskovalni prispevek

DAILY MEAL FREQUENCY OF SECONDARY SCHOOL STUDENTS FROM LJUBLJANA IN RELATION TO SOME OF THEIR OTHER NUTRITIONAL AND LIFE-STYLE CHARACTERISTICS AND BODY MASS INDEX – PRELIMINARY RESULTS

ŠTEVILO OBROKOV V CELODNEVNEM JEDILNIKU LJUBLJANSKIH SREDNJEŠOLCEV V POVEZAVI Z NEKATERIMI PREHRAŠKIMI ZNAČILNOSTMI IN ZNAČILNOSTMI ŽIVLJENJSKEGA SLOGA SREDNJEŠOLCEV TER NJIHOVIM INDEKSOV TELESNE MASE – PRELIMINARNI REZULTATI

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Arrived 2001-02-06, accepted 2001-03-16; ZDRAV VESTN 2001; 70: 269-74

Key words: adolescents; meal frequency; dietary habits; life-style; body mass index

Abstract – Background. *The recommended number of daily meals is three to five. The aim of this study was to establish the number of meals, daily consumed by secondary school students from Ljubljana, and the relationship with nutritional and other habits, including bad habits, demographic and socio-economic characteristics of the secondary school students and their body mass index.*

Methods. *In 1999, an cross-section epidemiological study was performed on a proportional sample of 296 pupils attending the third class of Ljubljana secondary schools. The applied dietary data collection methods were the survey and the 24-hour dietary recall. The body mass index was calculated on the basis of the measured body height and body mass values. The Chi-square test, t-test, variance analysis and the multivariant linear regression method were used for the analysis.*

Results. *The students consume 3.16 meals per day on average (boys 3.44, girls 2.87). The students who reported a smaller number of meals per day consume statistically significantly less fruit, vegetables, milk, milk products and fish. They take hot meals less frequently, consume less often all daily meals, their daily meals are of a poorer quality in respect to their composition, they eat less often their meals in a sitting position, they feel a greater difference in diet between working week days and weekends, their regular nourishment is more influenced by school obligations, they have poorer knowledge of healthy dietary practices, smoke more often, are less satisfied with their weight, are less physically active and girls sleep less at nights. The inverse proportional relationship between the number of daily meals and the body mass index was not statistically significant. The multivariant linear regression model explained the low variance percentage ($R^2 = 0.28$).*

Ključne besede: mladostniki; frekvenca obrokov; prehranske navade; življenjski stil; indeks telesne mase

Izveček – Izhodišča. *Priporočeno število dnevnih obrokov je od tri do pet. Želeli smo ugotoviti število obrokov, ki jih dnevno zaužijejo ljubljanski srednješolci, in povezave s prehranskimi ter drugimi navadami in razvadami, demografskimi in socialnoekonomskimi značilnostmi srednješolcev in indeksom telesne mase srednješolcev.*

Metode. *Presečna epidemiološka študija je bila izvedena v letu 1999 na proporcionalnem vzorcu 296 dijakov tretjih letnikov ljubljanskih srednjih šol. Uporabljeni sta bili metodi ankete in jedilnika preteklega dne. Na podlagi izmerjenih vrednosti telesne višine in telesne mase je bil izračunan indeks telesne mase. Za analizo so bili uporabljeni test hi-kvadrat, t-test, analiza variance in multivariatna linearna regresijska metoda.*

Rezultati. *Dijaki v povprečju zaužijejo 3,16 obroka na dan (fantje 3,44, dekleta pa 2,87). Dijaki, ki zaužijejo manjše število dnevnih obrokov, uživajo statistično značilno manj sadja, zelenjave, mleka in mlečnih izdelkov in rib, manj pogosto uživajo tople obroke, manj pogosto uživajo vse dnevne obroke, imajo glede na sestavo slabšo kakovost dnevnih obrokov, redkeje uživajo hrano sede, bolj občutijo razliko v prehrani med delavnikom in za vikend, pri redni prehrani jih bolj ovirajo šolske obveznosti, imajo manj znanja o zdravi prehrani, pogosteje kadijo, manj so zadovoljni s svojo telesno težo, manj so telesno aktivni, dekleta pa manj spijo čez noč. Med številom dnevnih obrokov in indeksom telesne mase obstaja šibka obratnosorazmerna povezava. Multivariatni linearni regresijski model je pojasnil nizek odstotek variance ($R^2 = 0,28$).*

Zaključki. *Povprečno število dnevnih obrokov, ki jih zaužijejo dijaki, je na spodnji meji priporočil, povprečno število dnevnih obrokov, ki jih zaužijejo dijakinje, pa je pod priporočili. Preiskovane spremenljivke so sicer povezane s številom dnev-*

Conclusions. *The average number of daily meals consumed by schoolboys is at the lower border of recommendations, while the average number of daily meals consumed by schoolgirls is inconsistent with the recommendations. The research variables are related to the number of daily meals, though they explain only a small part of the variance in the number of meals.*

nih obrokov, pojasnjujejo pa majhen del variance v številu obrokov.

Introduction

The dietary needs in adolescence are greater than in any other period of life due to this highly anabolic stage of organism (1, 2). Adolescents relate the development of their bodies to a number of concerns, attentions, expectations and anxieties and this is reflected also in their attitudes toward food, body weight and their dietary habits (3). An adolescent may use food as a part of the individualisation process (1). Many health-related behaviour patterns, dietary patterns included, are developed or altered during adolescence (4).

Food preparation and service should be consistent with best practices for food safety and sanitation, food should be balanced and it should include a certain nutrition regime (5, 6). Food provided in quantities that balance energy and nutrients with the specific needs of children and adolescents represents one of the crucial positive factors in health protection of adolescents (7). The guidelines (8) state that the diet of children in the period between 2 and 5 years of age is gradually adjusted, while after the age of five it should comply with the dietary guidelines for the general population.

A healthy diet does not mean only safe and balanced food but also a correct dietary pattern (6). The dietary pattern includes the frequency and interval between meals, the size of daily meals and the energy density of the diet (9).

Since Fabry (10) published his thesis, namely that the number of daily meals* may potentially provoke the occurrence of certain pathological states in human beings, the research of meal consumption periodicity has been growing in the last decades (11).

In literature (12), many different methods of assessing the number of daily meals are indicated. The most frequently used criteria for the definition of main meals and snacks are meal times and food composition of the meal. Other definitions of meals are social (whether we eat a meal alone or in a social setting), energy (according to the minimum energy value of the consumed food defined as a meal), according to the food group consumed within a meal, according to the type and quantity of food consumed in a meal and according to the decision of an individual participating in the research about how to name a specific meal (12).

Given that various definitions of meals may have a distinctive impact on the outcome of the research and interpretation of results, the daily meal frequency research in the future should contain precise descriptions of daily meal frequency assessment methodology (12-14) and better dietary data collection procedures (15).

The factors which influence the number of daily meals are not entirely clear yet, in particular the extent of their impact on the number of daily meals and the complexity of relations between individual aspects (cultural differences, food availability, food preparation and consumption conditions, earnings an individual can spend on food (13), the nature of job and work schedule (16), physical activity (17), hobbies, psychological factors, such as mood (18) and attitude toward own body, gender, age, education and last but not least, also social facilitation, which, as it seems, is related also to genetic influences (15, 11). According to some authors (13), the frequency and

quantity of meals largely depend on food availability and cultural models of a specific social community.

The correlation between the number of daily meals and body weight of people has been subject to numerous researches for several decades (10). In some studies no relationship between the above two parameters was found, while in some other studies indicate a weak inverse relationship between eating frequency and body weight status (19). This contradiction is probably best explained by a combination of reporting by the respondents about a lower number of meals than actually consumed (»under-report«) and deliberate skipping of meals by people with excessive body weight (20). It seems that the situation in adolescents is not much different, as the analyses showed that after the modification of the sample (removal of boys being on a diet and girls concerned about their body weight), any relationship between the BMI and the daily meal frequency disappeared (19).

The objective of this research is to assess the number of meals consumed daily by the secondary school students in Ljubljana and the relationships between meal frequency, dietary and other habits and bad habits, demographic and socio-economic aspects of the secondary school students and the body mass index of the secondary school students.

Methods

An intersection epidemiological study was conducted in one season (from January to March 1999), with the impact of vacation or extended holidays being excluded. The respondents are the secondary school students in Ljubljana. At each of the six selected schools (Secondary Commercial School - Sales Assistant Programme [3-year course], Secondary School of Printing and Paper - Typographer Programme [3-year course], Secondary Construction Engineering School and School of Economics - Construction/Land Survey Technician Programme [4-year course], School of Economics Ljubljana [4-year course], Moste and Vič Grammar Schools) two third-year classes were included in the random sample.

The sample was proportional by gender and age. All smaller schools were excluded from the sample, as well as schools from the suburb and those attended by the students from all over Slovenia.

The research was approved by the Medical Ethics Committee at the Ministry of Health.

The **work methods** applied in the research are the following:

Individual interview method (survey), through which the data on dietary behaviour of secondary school students is collected as well as on specific demographic and socio-economic aspects and some other habits and bad habits of secondary school students (21-24).

The respondents were offered a structured daily menu scheme (20) in their questionnaires, as the pilot study showed that the students most easily assessed their meals in relation to the social and cultural norms established in our society (15). The students could roughly choose among six possible daily meals (breakfast - B, mid-morning snack - MMS, lunch - L,

afternoon snack – AS, supper – S and late meal – LM), and using these six options (regardless of the quantity of food or beverages consumed) they evaluated the meals consumed during the day, with at least an hour interval between each meal defined above.

For further analysis purpose the students are divided into three groups according to the answer about the number of consumed daily meals: the first group comprises the students with two or less daily meals, the second those with three meals per day and the third the students with four and more daily meals.

24-hour dietary recall method

The simplest and the most widely used method in dietary history is the 24-hour dietary recall (25), appropriate in particular for the assessment of adolescents who have problems in reporting about their dietary behaviour over a longer time period (26). This method is currently most frequently used for dietary research in the USA (27).

The nutritional quality of meals is evaluated with regard to the composition of specific dishes, with B+MMS, L+AS and D+LS being assessed together. A nutritionally adequate meal is a meal which, regardless of the number of dishes forming it, contains foods from at least three food groups: protein food, fruits and vegetables and grain products. A wholesome meal containing foods from all three above indicated food groups was scored 0. A meal not containing all three food groups was scored lower, i.e. 1, 2 and 3, depending on the number of missing food groups. Score 1 means that one food group is missing in the meal and score 3 that the respondent skipped the meal (21).

Anthropometric measurements

Anthropometric body height and weight measurements were taken according to the standardised procedures (WHO, 1995), with all the measurements carried out by the same person. The body mass index (BMI) was calculated using the formula (28):

$$\text{BMI} = \text{body mass (kg)} / \text{body height (m}^2\text{)}.$$

Statistical analysis

To process and analyse the data the SPSS 9.0 statistical package was applied.

In numerical variable analysis the linear regression was used and the Chi-square test in attributive variables. A multivariate linear regression method was used to assess the correlation between the described research parameters and the number of daily meals. For statistically significant difference the rejection of null hypothesis was taken into account at a risk of less than a five-percent (29, 30).

Results

The number of students envisaged to participate in the study, based on the identified sample, was 339, namely 167 girls and 172 boys; however, 296 students were involved (87.31% responsiveness), of which 148 girls (88.62% responsiveness) and 148 boys (86.04% responsiveness). In the 1998/99 school year, 6944 students were enrolled in the third year of the secondary schools in the city of Ljubljana, which means that the investigation involved 4.26% of all third-year students. The average age of the respondents was 18 years.

In the research sample no statistically significant differences exist between sexes, age and individual types of secondary schools.

The students eat 3.16 (SD = 1.04 meal) meals per day, boys 3.44 (SD = 1.08 meal), girls 2.87 (SD = 0.92 meal). The difference between both sexes is statistically significant ($p < 0.05$) (Fig. 1).

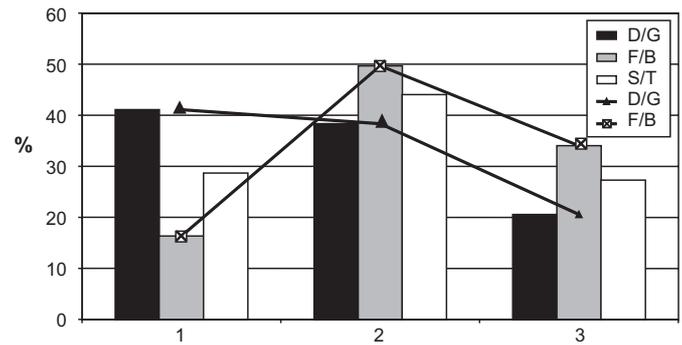


Fig 1. Daily meal frequency by categories: 1 (two and less per day), 2 (three per day) and 3 (four and more per day) in the daily nourishment scheme of the secondary school students ($n = 296$ total [T]) from Ljubljana, 148 girls (G) and 148 boys (B).

Sl. 1. Število dnevnih obrokov hrane, ki jih zaužijejo srednješolci ($n = 296$ skupaj [S]), po kategorijah: 1 (2 in manj obrokov na dan), 2 (3 obroki na dan) in 3 (4 in več obrokov na dan), po spolu (148 deklet [D], 148 fantov [F]).

The relationships between the test variables and daily meal frequency are presented in Tables 1 and 2, with p values indicated in statistically significant relationships.

As to the relationship between the number of daily consumed meals and the body mass index in testing by categories, a typical inverse relationship exists, $p < 0.05$ (the group with a lower number of daily meals relates to the group having higher BMI values), though the determination coefficient in linear regression explains only 3% of the model variance.

Many of the research variables were statistically significantly related in the univariate linear regression to the number of meals, daily consumed by the secondary school students, entered the multivariate regression model (sex, quality of breakfast and mid-morning snack, quality of lunch and afternoon snack, frequency of milk and dairy products intake, breakfast eating frequency, obstacle in meal consumption, awareness of health diet). The model thus created explained the low variance percentage (28.6%).

Discussion

The cross-section epidemiological study was aimed at assessing the number of consumed meals and the relationships between meal frequency, dietary behaviour, some other habits and characteristics and the body mass index of the secondary school students in Ljubljana.

The students eat three meals per day on average. The difference between boys and girls is significant, as boys eat three and a half meals daily and the girls slightly less than three meals. Similar results concerning the number of daily meals were also found with the secondary school students in Jesenice (31) and Gorenjska (32). It is worthwhile mentioning that as many as one third of all the girls eat two daily meals or less, and that only one eighth of the boys consume so few meals. Similarly, the boys among the secondary school students in Gorenjska also typically consume more daily meals than the girls (33). More than four fifths of the soldiers doing their military service in the Slovene Army find four daily meals and the intervals between them satisfactory (24), which may mean that four meals per day along with regular physical activity are appropriate for most of the adolescents. In a study assessing dietary behaviour of adult Slovene population the most irregular meal intake was reported in the 18- to 25-year age group (22). The studies conducted in other countries also report that in

Tab. 1. Relationship between individual nutritional variables and the number of meals (two and less per day [up to 2/d], three per day [3/d], four and more per day [4+more/d] in the daily nourishment scheme of the secondary school students [n = 296] from Ljubljana, by meal categories, by sex [Chi-square test]).

Tab. 1. Povezanost posameznih prehranskih spremenljivk s številom obrokov (dva in manj na dan [do 2/d], tri na dan [3/d], štiri in več na dan [4 + več/d]) v dnevnem jedilniku ljubljanskih srednješolcev (n = 296), po kategorijah obrokov, po spolu (test hi-kvadrat).

	Girls / Dekleta (%) n = 148				Boys / Fantje (%) n = 148				Total / Skupaj (%) n = 296			
	up to 2/d do 2/d	3/d 3/d	4+more/d 4+več/d	p <	up to 2/d do 2/d	3/d 3/d	4+more/d 4+več/d	p <	up to 2/d do 2/d	3/d 3/d	4+more/d 4+več/d	p <
Fruits* Sadje	36.7	48.2	63.3	0.05	41.7	40.3	52.0	n.z.	31.8	43.8	56.3	0.06
Vegetables* Zelenjava	30.0	41.1	56.7	0.05	33.3	41.7	52.0	n.z.	31.0	41.4	53.8	0.01
Milk, dairy prod.* Mleko in ml. izd.	42.2	50.0	65.5	n.z.	62.5	56.9	76.0	n.z.	48.2	53.9	72.2	0.005
Meat, meat prod.* Meso in mesni izd.	20.3	26.8	23.3	n.z.	29.2	40.3	47.9	n.z.	22.9	34.4	38.5	n.z.
Fish* Ribe	18.6	30.4	36.7	n.z.	25.0	37.5	54.0	0.05	20.5	34.4	47.5	0.001
Fast food* Hitra hrana	47.6	44.4	46.7	n.z.	66.7	48.6	64.4	n.z.	54.5	47.3	58.7	n.z.
Hot meal* Topel obrok	72.9	87.3	90.0	0.06	79.2	94.5	96.0	0.05	74.7	91.4	93.8	0.001
Freq. of B** Pogostost zajtrka	28.8	42.9	53.3	0.06	13.0	46.6	72.0	0.001	24.4	45.0	65.0	0.001
Freq. of MMS** Pog. dop. malice	44.1	64.3	83.3	0.001	56.5	58.3	86.0	0.005	47.6	60.9	85.0	0.001
Freq. of L** Pogostost kosila	81.7	96.4	93.3	0.05	83.3	97.3	96.0	0.05	82.1	96.9	95.0	0.001
Freq. of S** Pogostost večerje	28.3	50.9	70.0	0.001	58.3	86.3	82.0	0.01	36.9	71.1	77.5	0.001
Qual. of B+MMS*** Kakovost Z+DM	73.3	83.9	90.0	n.z.	62.5	87.7	96.0	0.001	70.2	86.0	93.8	0.001
Qual. of L+AS*** Kakovost K+PM	80.0	85.7	96.7	n.z.	75.0	90.4	94.0	0.05	78.6	88.4	95.0	0.01
Qual. of S+LM*** Kakovost V+PV	50.0	60.7	63.3	n.z.	75.0	84.9	90.0	n.z.	57.1	74.4	80.0	0.01

(Z - zajtrk, DM - dopoldanska malica, K - kosilo, PM - popoldanska malica, V - večerja, PV - povečerek)

Individual table fields contain the percentage of those respondents a certain definition applies to in each category (with reference to the number of daily-consumed meals).

V posameznem polju tabele je podan odstotek tistih preiskovancev, za katere v posamezni kategoriji (glede na število dnevno zaužitih obrokov) velja določena trditev.

* The listed foods intake frequency - the comparison was made for daily food intake with the exception of fish, where comparison was made for at least twice a week).

* Pogostost uživanja naštetih živil - primerjava je narejena za uživanje živil vsak dan, razen za ribe, kjer je primerjava narejena za uživanje vsaj 2-krat tedensko.

** The comparison was made jointly for the consumption of meals every day and 4-6 times a week; B - breakfast, MMS - mid-morning snack, L - lunch, S - supper.

** Primerjava je narejena združeno za uživanje obrokov vsak dan in 4-6-krat tedensko.

*** The quality was assessed according to the described method based on the previous day nourishment scheme with the comparison made jointly for the fully adequate meal and a meal with one missing food group (B - breakfast, MMS - mid-morning snack, L - lunch, AS - afternoon snack, S - supper, LM - late meal); the respondents consume a certain group of meals were taken into account).

*** Kakovost je določena po opisani metodi iz jedilnika preteklega dne, primerjava je narejena združeno za polnovreden obrok in obrok z eno manjkajočo skupino živil, upoštevani so tisti preiskovanci, ki uživajo določeno skupino obrokov.

n.z. no statistically significant difference

n.z. ni statistično značilne razlike

the past decades adolescents have developed irregular dietary patterns: skipping meals, snacks between meals, frequently eating away from home (4, 34).

The students who consume more daily meals report about more frequent milk and dairy products intake, they eat fruits, vegetables and fish more frequently and take a hot meal every day. In addition, they have a higher score in the quality of all the meals assessed. The fast food intake frequency does not differ in regard to the number of meals consumed. The number of meals forming the daily diet intake is typically related to the consistence of food intake with the recommendations of the Food Guide Pyramid (35).

It is interesting that insufficient fruit, vegetable, milk and dairy product intake was related to bad school results, low level of

communication in the family as well as to dissatisfaction with own body weight (36).

The students who smoke typically reported the lowest number of daily meals. One of the reasons reported by the teenage girls for their smoking is that they feel smoking protects them from impulsive feeding with all the consequences of increased body weight (37) or to skip a meal (38).

Alcoholic beverages and energy drinks intake and the time the students spend in front of the television, doing their school work, working on a computer and being engaged in extracurricular activities is in no statistically significant relationship with the number of meals in a daily diet.

It is interesting that those respondents who sleep more than 7 hours per night eat more daily meals. The distinction is more

Tab. 2. Relationship between individual demographic and life-style variables and the number of meals (two or less per day [up to 2/d], three per day [3/d], four and more per day [4 + more/day] in the daily nourishment plan of secondary school students from Ljubljana [n = 296], by meal categories, by sex [Chi-square test, variance analysis in attitude towards body weight]).

Tab. 2. Povezanost posameznih demografskih spremenljivk in spremenljivk življenjskega sloga s številom obrokov (dva in manj na dan [do 2/d], tri na dan [3/d], štiri in več na dan [4 + več/d]) v dnevnem jedilniku ljubljanskih srednješolcev (n = 296), po kategorijah obrokov, po spolu (test hi-kvadrat, pri odnosu do telesne teže analiza variance).

	Girls / Dekleta (%) n = 148				Boys / Fantje (%) n = 148				Total / Skupaj (%) n = 296			
	up to 2/d do 2/d	3/d 3/d	4+more/d 4+več/d	p <	up to 2/d do 2/d	3/d 3/d	4+more/d 4+več/d	p <	up to 2/d do 2/d	3/d 3/d	4+more/d 4+več/d	p <
Food intake at the table Uživanje hrane sede	52.6	74.1	90.0	0.001	52.2	52.1	61.2	n.z.	52.5	61.6	72.2	0.05
Commuters Status vozača	40.0	35.7	33.3	n.z.	20.8	41.1	36.0	n.z.	34.5	38.8	35.0	n.z.
Parents' education Izobrazba staršev				n.z.				n.z.				n.z.
- low - nizka	33.3	35.7	20.0		20.8	20.5	22.0		29.8	27.1	21.3	
- secondary - srednja	41.7	35.7	40.0		41.7	50.7	34.0		41.7	44.2	36.3	
- high - visoka	25.0	28.6	40.0		37.5	28.8	44.0		28.6	28.7	42.5	
Type of school Vrsta šole				n.z.				0.01				0.05
- vocational - poklicna	33.3	35.7	20.0		29.2	32.9	38.0		32.1	34.1	31.3	
- secondary professional - srednja strokovna	40.0	28.6	33.3		41.7	47.0	18.0		40.5	39.5	23.8	
- grammar school - gimnazija	26.7	35.7	46.7		29.2	19.2	44.0		27.4	26.4	45.0	
Obstacle for meal - yes Ovira za obrok - da	38.3	21.4	10.7	0.05	37.5	20.5	10.1	n.z.	31.8	20.9	10.0	0.001
Attitude towards body weight Odnos do telesne teže				0.01				0.005				0.001
- satisfied - zadovoljen	20.3	33.9	60.0		33.3	57.5	58.0		24.1	47.3	58.8	
- wishes to be slimmer - rad bi bil bolj suh	71.2	57.1	40.0		29.2	20.5	6.0		59.0	36.4	18.8	
Adequate no. of meals* Zdravo število obrokov				0.01				n.z.				0.005
- up to three - do tri	33.3	24.7	14.3		33.3	24.7	14.3		33.3	20.2	12.7	
- over three - več kot tri	66.7	75.3	85.7		66.7	75.3	85.7		66.7	79.8	87.3	
Smoking - yes Kajenje - da	43.3	19.6	16.7	0.01	41.7	23.3	20.0	n.z.	42.9	21.7	18.8	0.005
Physical activity - yes Telesna aktivnost - da	36.7	50.0	43.3	n.z.	58.3	71.2	74.0	n.z.	42.9	62.0	62.5	0.01
Hours of sleep per night Spanje na noč				0.05				n.z.				n.z.
- under 7 hours - manj kot 7 ur	52.5	42.9	23.3		41.7	47.2	40.0		49.4	45.3	33.8	
- over 7 hours - več kot 7 ur	47.5	57.1	76.7		58.3	52.8	60.0		50.6	54.7	66.3	

Individual table fields contain the percentage of those respondents a certain definition applies to in each category (with reference to the number of daily-consumed meals).
V posameznem polju tabele je podan odstotek tistih preiskovancev, za katere v posamezni kategoriji (glede na število dnevno zaužitih obrokov) velja določena trditev.

* Awareness of adequate number of meals in daily diet
* Znanje o zdravem številu dnevnih obrokov v dnevnem jedilniku

n.z. no statistically significant difference
n.z. ni statistično značilne povezanosti

evident in girls than in boys. In adolescence the sleeping patterns change considerably with adolescents going to bed later on average and getting up later (39), which may influence the breakfast intake frequency.

The students who eat more meals a day are also more physically active as reported also in other studies (14).

The number of daily meals and the body weight index are weakly inversely related in the Ljubljana secondary school students. The authors of the research (14) in which a special emphasis was put on preventing any under-report attempts, indicate a weak inverse relationship between the daily meal frequency and body mass in men but not in women.

Contrary to the research in other countries (4, 40), the data obtained from the study suggests no relationships between the number of daily meals and socio-economic factors (commuters, students receiving a grant, differences in educational levels of parents). The sample subject to investigation may have been too small for the described differences to emerge; it is also possible that food availability for secondary school students in our country is such that social differences are less pronounced (regardless of different economic possibilities the food availability and school schedules are equal for all). Obviously, availability is not the only significant factor for healthy diet. Equally important is also the information and

knowledge we provide to students on healthy diet (41). The students who say that a healthy diet contains several meals a day also eat more daily meals.

According to the data from literature the geographical areas are also among the factors influencing the individual's dietary and other habits (42). Given that only the city of Ljubljana is included in this study it is reasonably to expect that certain variables investigated in other secondary school students elsewhere in Slovenia will be different.

Even though a portion of the investigated variables is related to the number of daily meals, it explains but a small part of the variance in the number of meals. In order to explain a larger portion of the variance it would probably be necessary to include a higher number of respondents, redefine the collection of socio-economic status variables, cultural factors, free time activities, physical activity and add new variables, primarily from the area of energy value and energy food density. Similarly, the portion of food the students eat by the way, without calling it a meal, would have to be better identified.

Conclusions

The secondary school students eat three meals a day on average. The average number of meals eaten by boys complies with the recommendations, while the mean meal intake of girls is below the healthful food recommendations. The students who eat less daily meals report about a lower quality of daily meals as regards composition and are less physically active. A weak inverse relationship exists between the number of daily meals and body weight index.

The awareness of healthful food guidelines should be promoted among the students, girls in particular. What is more, they should be provided the opportunities for healthy diet, which means that the government will have to be involved in ensuring the proper conditions for this. As far as the girls are concerned all potential social pressures from the community, related to the ideal of (exaggerated) slimness, will have to be decreased. In antismoking campaign planning, smoking as a way of skipping daily meals must be taken into consideration in female adolescents.

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