

DOES KNOWLEDGE INFLUENCES OUR DIET? DIETARY HABITS OF ADOLESCENTS ENROLLED IN GENERAL PROFILE AND CATERING SCHOOL PROGRAMME

Dragana Lošić¹, Daniela Čačić Kenjeric^{2*}

¹Kralja Petra II 57, 78000 Banja Luka, Bosnia and Herzegovina

²Josip Juraj Strossmayer University of Osijek, Faculty of Food Technology Osijek, Franje Kuhača 20, 31000 Osijek, Croatia

Original scientific paper

Summary

Introduction and objective: During adolescence lifestyle is formed, including dietary habits, which mainly remain unchanged throughout the life. Dietary habits and physical activity influence one's health status. The goal of this study was to examine and compare dietary habits in the population of high school teens enrolled in general secondary school and catering school.

Methods: Study was performed using a one-time questionnaire which, among other sections included basic data needed for characterization of the group and a group of questions on participants dietary habits.

Results: Data collected during this research are expressed on the whole research group and also on subgroups created considering gender, environment and educational programme. Collected data about dietary habits show drastically low breakfast consumption, low consumption of fish, fruit, vegetables, milk and dairy products, high consumption of meat and meat product, carbonized beverages and sweets. Significant difference in dietary habits was obtained for breakfast consumption, frequency of vegetables, soft drinks, milk and coffee consumption, dieting habits due to estetic motives and fluid intake.

Conclusion: This study about dietary habits shows significant deviation from health recommendations, and therefore it is necessary to develop and organize promotional programmes of healthy behavior that is customized to teens needs.

Keywords: dietary habits, adolescent, nutrition

Introduction

Adolescence is a crucial period in a development of each person, during which intensive physical, psychological, emotional and personal changes occur. Currently, persons under 25 years of age make almost half of the human population, and number of adolescents is the highest in the human history (Kuzman, 2009).

Dietary habits are an important part of a healthy lifestyle and healthful nutritional practices need to be adopted during childhood and adolescence (Tupe and Chiplonkar, 2010).

Consolidation of nutritional behaviors and habits takes place in adolescence. They consolidate by the age of 15, and undergo a minor changes between 15 and 18 years of age. Acquired habits remain unchanged for the rest of our lifecycle (Djordjević-Nikić et al., 2013).

Dietary habits are influenced by the independence need, physical appearance and period spent outside of the house. In general, they are also influenced by culture, financial status and education of parents, personal preferences and many other factors. Early establishment of healthful dietary practices can have a positive impact on chronic

diseases that occur later in life; particularly obesity, cardiovascular diseases and type 2 diabetes (Rossiter et al., 2012).

Studies indicate recurrence of few dietary patterns in adolescents around the Globe. These are skipping breakfast, intake of fast food, eating away from home, low fruit and vegetables intake, low intake of milk and dairy products, high intakes of soft drinks, snacking and dieting with the purpose of weight regulation (Meandžija et al., 2006).

Current prevalence of obesity is ten times higher compared to 1970's indicating trend of epidemic proportions, and its prevalence in children and adolescents is a major concern (Sahingoz and Sanlier, 2011). Among main risk factors for obesity development are popularity and consumption of fast food and soft drinks on one side, and lack of physical activity on the other, and as mentioned above, both of these are highly represented in young adolescent population which seeks to build their own identity (Gómez-Martínez et al., 2012).

The aim of this study was to estimate and compare dietary habits in the population of high school teens enrolled in general secondary school and catering school (vocational school) in Banja Luka (Bosnia and Herzegovina).

*Corresponding author: daniela.kenjeric@ptfos.hr

Subjects and methods

Study was conducted following the principles of cross-sectional study in October of 2014 on the population of highschool pupils in Banja Luka.

Participants

Study was conducted on the group of 119 adolescents from the general high school and

vocational high school for the caterer profession in Banja Luka. Two grades of pupils were included from each high school, but due to the fact that general high school has larger study groups (grades) 55.5% of study participants were from the general high school and 44.5% of participants were from the vocational high school (Table 1). Due to the general interest in two selected study programmes 54.6% of participants were males, and 45.4% females.

Table 1. Basic characteristics of studied adolescent population

	General high school		Vocational high school		n	%
	n	%	n	%		
Total	66	55.5	53	44.5	119	100
Gender						
Males	26	39.4	39	73.6	65	54.6
Females	40	60.6	14	26.4	54	45.4
Living area						
Urban	56	84.8	41	77.4	97	81.5
Rural	10	15.2	12	22.6	22	18.5

Questionnaire

Study was conducted using the anonymous questionnaire which consisted of 36 questions. First part included basic categoring information (gender, age, height and weight, type of living residence). Second part consisted questions on dietary knowledge and third questions on the relationship between the diet and diseases. Part with questions relating their dietary habits was the last one, and consisted of ten questions including frequency of consumption for selected foods, number of meals and supplementation. Prior to questionnaire completing participant received the information about the study and instructions how to fill in the questionnaire. Participants were also informed that their participation is strictly voluntary and only interviewer will have an insight into their answers. In average 20 to 25 minutes were needed to fill in the questionnaire.

Data analysis

Collected data were analysed using the Excel and Statistica. Results are expressed on a whole study group as well as for subgroups based on enrolled school programme, gender and type of living residence. Data analysis was conducted using the t-test for parametric statistics at the $p < 0.05$ level of significance.

Results and discussion

Dietary habits of the studied population are presented using tables and figures. Fig. 1 shows the number of daily meals in a studied population. As is can be seen number of those eating 2-3 meals and those eating 3-5 meals daily is similar and in average is 45%. Just half of the participants consumes recommended number of meals. Exception are participants from the rural areas 72.7% of which has 3-5 meals daily in comparison with participants from the towns (37.1%).

Results of the cross-sectional AVENA study which included 1978 adolescents from five spanish cities show that 80.4% of boys and 75.9% of girls has four or more meals, which is much better that the results obtained in our study (Gómez-Martínez et al., 2012).

Breakfast consumption habit is presented on a Fig. 2. As visible, only 25% of participants are regular in breakfasting, and the difference is significant if the participants from the different schools are compared. 34% of the participants enrolled in a vocational highschool programme takes breakfast regularly, compared to only 18.2% of those enrolled in the general highschool programme. Reports from the Croatia indicate that 15% of children does not have breakfast on the working days, while 4% of them does not have breakfast even on weekends. Number of children eating breakfast decreases with the years

of age (77% of 11-year olds and 64% of 15-year olds) (HZJZ, 2012). Above mentioned AVENA study has shown that elevated body fat (skinfold thickness measured at 6 positions and waist circumference as indicators) is associated with dietary habits such as skipping meals, especially mid-morning snack and

afternoon snack, less than four meals daily and quick eating. They also confirmed lack of physical activity and skipping breakfast as a risk factors in obesity development. In their adolescent population boys had higher physical activity and less skipped breakfast and dinner than girls (Gómez-Martínez et al., 2012).

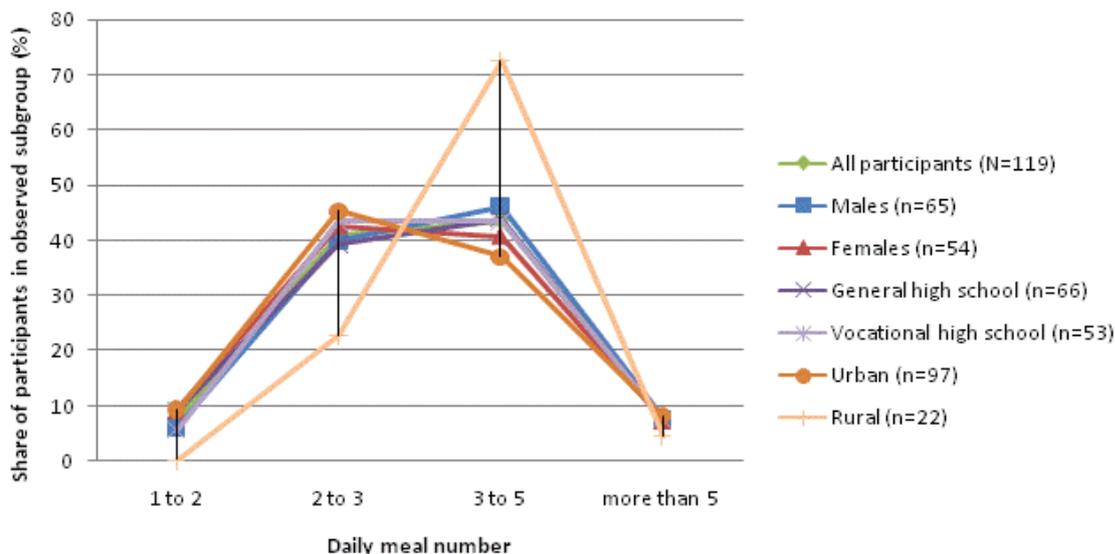


Fig. 1. Average daily meal number in studied population

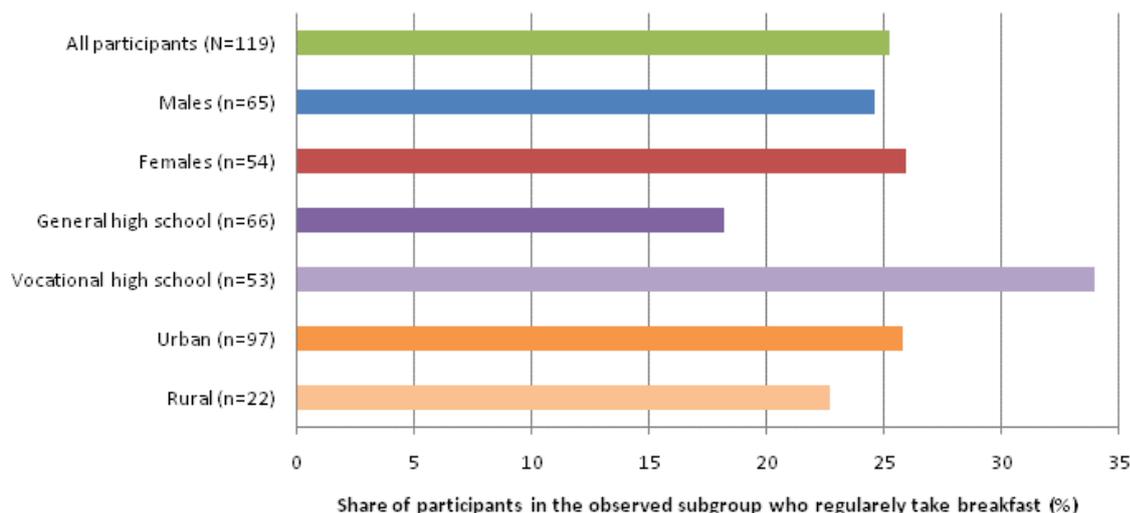


Fig. 2. Habit of regular breakfast consumption

Basic insight into dietary habits of the study group was achieved through the short food frequency questionnaire which encompassed selected food groups (Table 2). High content of essential fatty acids

makes fish one of the most valuable foods which, as such, should be consumed regularly. Most of the study participants (41.2%) consumes fish once a week which is in line with recommendations while

34.5% of them consumes fish only once a month. Fish consumption in the region where the study was conducted is in general low, and in Croatia it is just a little above 3 kg per person annually (Mandić, 2007). Most of the participants (35.3%) consumes meat 2-3x a week, while 30.3% of them eats meat once a day. High intake of meat and meat products is one of the risk factors for the development of obesity and cardiovascular diseases later in life. 22.7% of participants consumes fruit once a day, 31.3% of them 2x daily and 16,8% of them 3x daily. In comparison with fruit intake, vegetables are consumed once a day in 39.5%, twice a day in 23.5% and 3 times a day in 10.9% of the participants. Having in mind the recommendations for fruit and vegetables consumption (5 portions of 400 g a day) results are satisfying, especially having in mind the

fact that once a day consumption can equal 2 or more portions. Results of the EAT project on the fruit and vegetables intake in Minnesota (USA) show that their fruit and vegetables intake is significantly below the recommendations. Only 45% of the adolescents reported consumption of two or more fruit portions daily and 17 % three or more portions of vegetables daily. Altogether, only one third (31%) reported to be in line with the recommended 5 a day intake (Neumark-Sztainer et al., 2003). Considering the bread intake, 34.5% of participants consumes it 3x a day, while 25.2% of them bread consumes more than 3x a day. This was not a surprise since bread is traditionally a part of each meal in this region. Of all European countries, bread consumption is the highest in Estonia and Latvia (Vereecken et al., 2005).

Table 2. Consumption frequency of selected foods in studied adolescent population, all participants

	Frequency distributions of responses to selected foods (by percent)							
	once a day	2x per day	3x per day	>3x per day	once a week	2-3x per week	once a month	never
Fish	5.9	0.8	0.0	0.0	41.2	13.4	34.5	4.2
Meat	30.3	13.4	4.2	2.5	12.6	35.3	0.8	0.8
Fruit	22.7	31.1	14.3	16.8	5.0	9.2	0.8	0.0
Vegetables	39.5	23.5	6.7	10.9	6.7	10.1	0.8	1.7
Bread	13.4	21.8	34.5	25.2	1.7	0.8	0.8	1.7
Fizzy drinks	16.0	10.9	2.5	2.5	21.8	11.8	16.0	18.5
Sweets and cakes	32.8	17.6	7.6	14.3	11.8	10.1	1.7	4.2
Eggs	30.3	4.2	1.7	2.5	33.6	26.1	1.7	0.0
Milk/dairy products	35.3	24.4	6.7	13.4	9.2	7.6	1.7	1.7
Coffee	22.7	11.8	3.4	1.7	2.5	8.4	11.8	37.8
Alcohol	2.5	1.7	0.0	0.8	14.3	10.9	22.7	47.1

Soft drinks are in studied adolescent population consumed in most cases once a week (21.8%), while 18.5% of them does not consume this type of drinks. Number of once a day and once a month consumers is same (16.0%). Obtained results are better than those obtained in adolescents from Serbia (Jovanović et al., 2011).

Sweets are, together with soft beverages, the main source of added sugar. They are consumed on a daily basis by 50.4% of the participants. Similar devastating results are obtained by studies on adolescents in Serbia (Ilić, 2010), and EU countries (Vereecken et al., 2005). High intake of sweets and soft drinks, combined with sedentary activities (TV viewing) contributes to energy overload and obesity (De Bruijn and Van Den Putte, 2009).

Milk and dairy products are consumed on a daily basis in 59.7% of participants of our study, and similar results are obtained in study conducted by Jovanović et al (2011). Low intake of milk and dairy

products is reported in Canada's adolescent population. Milk consumption in adolescent population decreases while soft drink consumption remains unchanged or even increases indicating development of unhealthy dietary habits and increasing the risk of health problems in the future. Decreased milk consumption negatively influences calcium and vitamin D intake which are important for bone development, while simultaneous increase of soft drinks provides nothing but „empty calories“ and rises the risk of obesity (Rossiter et al., 2012).

Adolescence is a period of experimenting, and many young people during this period develop a habit of coffee and alcohol consumption, as well as a smoking habit. 37.8% of our study participants do not consume coffee, while 22.7% of them drink one coffee daily which is a good result. On the other hand, only 47.1% of the participants do not consume alcohol, 22.7% takes it once a month, and even 14.3% once a week.

Analysis of food frequency consumption in subgroups based on showed similar meat and bread consumption patterns in boys and girls, and pupils of both school while participants with residence in towns had slightly higher intake than those from rural areas. Higher fish consumption is noted in girls compared to boys, in general high school pupils compared to vocational school pupils and adolescents with residence in cities compared to those from rural areas. Higher fish consumption in towns than in rural areas was also reported in study conducted in Poland (Hoffmann et al., 2012) but intakes are in general higher in our study, which is positive. Girls have fruit and vegetables intake in line with recommendations in more cases than boys. Higher compliance with recommendations in girls than in boys was also found in adolescents from Virginia (USA) (Wilson et al., 2005). Fruit intake is similar in both school pupils and both residence types, while vegetables are more often consumed by general school programme pupils and children from town. 4.5% of participants from the rural areas does not consume vegetables at all. Fruit and vegetable intake is low in the adolescents from Canada as well (Rossiter et al., 2012). Boys more often drink soft beverages, and similar pattern is noted in adolescents in (HZJZ, 2012). They also eat more sweets than girls, and same pattern is reported for Turkish adolescents (Sahingoz and Sanlier, 2011). Lower soft drinks consumption is noted in general school pupils and adolescents from

towns. Milk intake is also higher in girls than in boys, in general school pupils than in vocational school pupils, as well as in children from town than those from rural areas. The results are in compliance with those reported by Rossiter et al. (2012). Considering the risk behaviour, coffee as well as the alcohol consumption is higher in boys than in girls. While, 64.8% of girls declared as non consumers of alcohol, this was the case in only 30.8% of boys. Coffee and alcohol consumption pattern was similar in children from town and rural areas, while vocational school pupils had higher intake of both coffee and alcohol.

Dieting practices for weight management (esthetic reasons) are noticed in 65.5% of participants (Fig. 3). It is interesting that more boys (81.5%) than girls (46.3%) were practicing fad diets. Results of the study conducted on university students in Croatia show dieting practices in 10% of boys and 42% of girls (Banjari et al., 2011). Self perception of 50% of girls and 20% of boys in Australia is to be overweight while 13% of girls tried to manage their weight by dieting, and 46% of Californian students wishes to lose weight (Gracey i sur., 1996). Compared to results from Croatia (Banjari et al., 2011) and Australia (Gracey i sur., 1996), participants of our study are more in favor of dieting, and even 5,9% of those dieting has used some weight reduction products (Fig. 3) with the prevalence among girls and vocational school pupils.

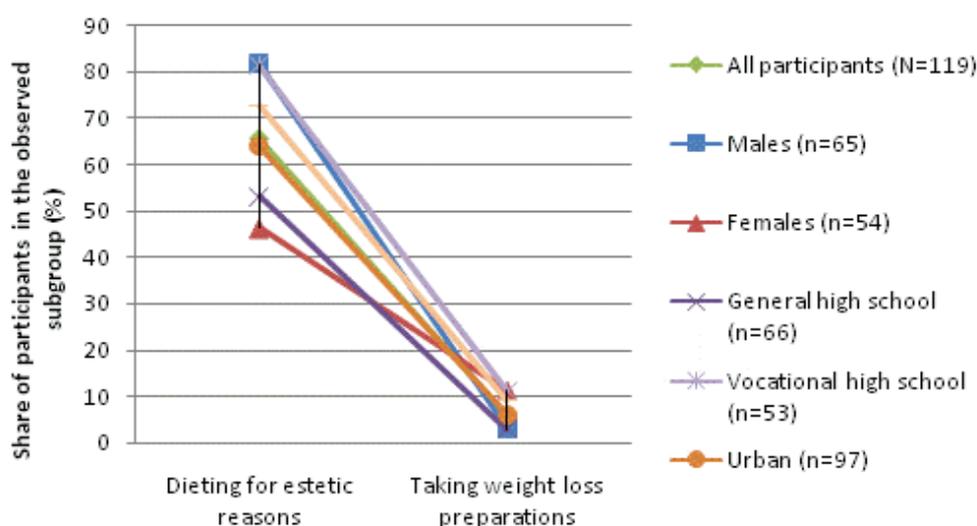


Fig. 3. Dieting and weight loss preparations consumption in studied adolescent population

Fluid intake (Fig. 4) recommendations (adequate intake, AI) of 1.8 L for girls and 2.6 L for boys (FNB and IOM,

2001.) is satisfied by 27.8% of girls and 36.9% of boys. Intake is higher in general school pupils.

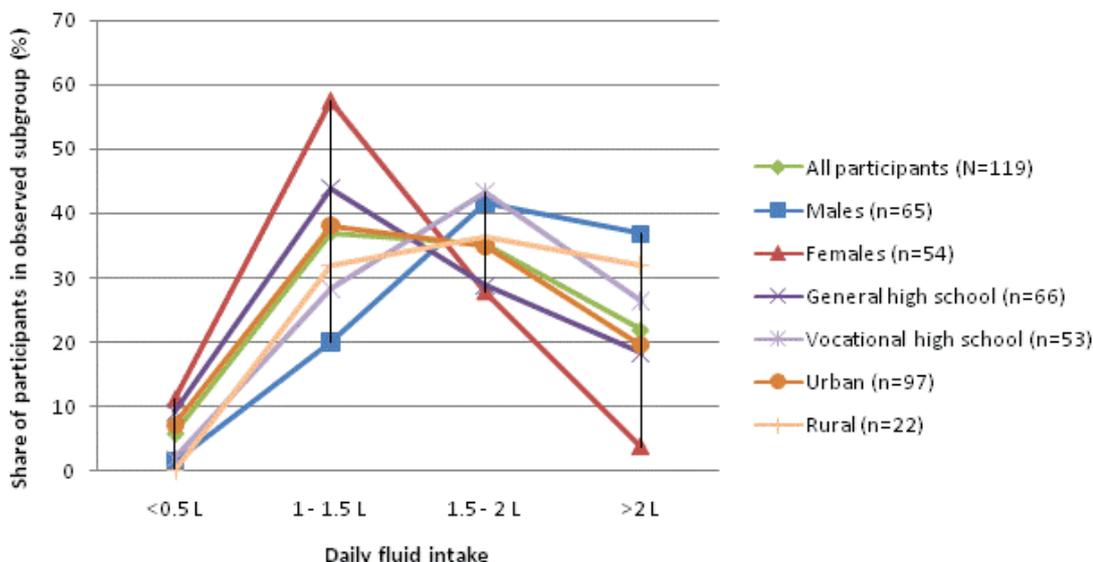


Fig. 4. Fluid intake in studied adolescent population

Although differences in nutritional patterns are noticed and discussed above, data analysis showed that only a few of them are significant (Table 3). Adolescents from the rural area consume significantly more daily meals than those from town ($p=0.033$) and those from town eat significantly more often fish than those from rural areas ($p=0.011$). Pupils of the general school programme more often take breakfast ($p=0.049$), consume more vegetables

($p=0.003$) and drink more milk ($p=0.009$) than those from the vocational school, while vocational school pupils have significantly higher soft drinks consumption ($p=0.004$) and coffee consumption ($p=0.007$). Coffee ($p=0.015$) and alcohol ($p=0.002$) consumption is significantly higher in boys than in girls. Vocational school pupils ($p=0.001$) and boys ($p=0.000$) are more often dieting, while girls more often ($p=0.027$) use weight management products.

Table 3. Significant differences (p values) in dietary habits of gender, high school and living area based subgroups

	High school	Gender	Living area
Daily meal number	0.838	0.511	0.033
Regular breakfast consumption	0.049	0.871	0.769
Fish frequency of consumption	0.318	0.399	0.011
Meat frequency of consumption	0.093	0.850	0.934
Fruit frequency of consumption	0.213	0.420	0.297
Vegetables frequency of consumption	0.003	0.663	0.538
Bread frequency of consumption	0.663	0.870	0.681
Fizzy drinks frequency of consumption	0.004	0.001	0.071
Sweets and cakes frequency of consumption	0.278	0.550	0.248
Eggs frequency of consumption	0.071	0.179	0.892
Milk and dairy products frequency of consumption	0.009	0.652	0.568
Coffee frequency of consumption	0.007	0.015	0.124
Alcohol frequency of consumption	0.061	0.002	0.467
Dieting for estetic reasons	0.001	<0.001	0.437
Taking weight loss preparations	0.142	0.027	0.483
Fluid intake	0.016	<0.001	0.109

*t-test of differences, $p < 0.05$

Conclusions

Altogether, results of this study indicate the need to improve dietary habits in adolescents. This can be

achieved through the education of this sensitive group and various promotive activities which will promote healthy lifestyle, as a part of it a healthy diet.

References

- Banjari, I., Kenjerić, D., Mandić, M.L., Nedeljko, M. (2011): Is fad diet a quick fix? An observational study in Croatian student group. *Periodicum Biologorum* 113, 377-381.
- De Bruijn, G.J., Van Den Putte, B. (2005): Adolescent soft drink consumption, television viewing and habit strength. Investigating clustering effects in the Theory of Planned Behavior. *Appetite* 53, 66-75.
- Djordjević-Nikić, M., Dopsaj, M., Vesković, A. (2013): Ponašanje i navike u ishrani i fizičkoj aktivnosti kod beogradskih adolescenata. *Vojnosanit pregl* 70, 548-554.
- Food and Nutrition Board (FNB), Institute of Medicine (IOM) (2001) *Dietary Reference Intakes for Water, Potassium, Sodium, Chloride and Sulfate*. National Academy Press, Washington DC.
- Gómez-Martínez, S., Martínez-Gómez, D., Perez de Heredia, F., Romeo, J., Cuenca-García, M., Martín-Matillas, M., Castillo, M., Rey-López, J.P., Vicente-Rodríguez, G., Moreno, L., Marcos, A. (2012): Eating Habits and Total and Abdominal Fat in Spanish Adolescents: Influence of Physical Activity. The AVENA Study. *Journal of Adolescent Health* 50, 403-409.
- Hoffmann, K., Bryl, W., Marcinkowski, J.T., Rzesos, A., Wojtyła, E., Pupek-Musialik, D. (2012): Dietary behaviours of adolescents from urban and rural areas in the district of Szamotuly-a preliminary study. *Annals of Agricultural and Environmental Medicine* 19, 103-107.
- Hrvatski zavod za javno zdravstvo (HZJZ) (2012) *Ponašanje u vezi sa zdravljem u djece školske dobi 2009/2010*, Zagreb. http://www.hzjz.hr/wp-content/uploads/2013/11/HBSC_10.pdf (08.08.2015.)
- Ilić, M. (2010): Navike u ishrani adolescenata u Zaječaru. *Timočki medicinski glasnik* 35, 57-63.
- Jovanović, V., Simić, V., Obradović, V., Vasiljević, S. (2011): Karakteristike ishrane mladih uslovljene socioekonomskim faktorima. *Zdravstvena zaštita* 40, 21-30, 2011.
- Kuzman, M. (2009): Adolescencija, adolescenti i zaštita zdravlja. *MEDICUS* 18, 155-172.
- Mandić, M.L. (2007): *Znanost o prehrani*. Sveučilište Josipa Jurja Strossmayera u Osijeku, Prehrambeno-tehnološki fakultet Osijek, Osijek.
- Meandžija, N., Jurišić, I., Ivanko, M. (2011): Prehrambene navike i uhranjenost školske djece u Brodsko posavskoj županiji. *Hrvatski časopis za javno zdravstvo* 7 (82).
- Neumark-Sztainer, D., Wall, M., Perry, C., Story, M. (2003): Correlates of fruit and vegetable intake among adolescents Findings from Project EAT. *Preventive Medicine* 37, 198-208.
- Rossiter, M.D., Evers, S.E., Pender, AC. (2012): Adolescents' diet do not comply with 2007 Canada's food guide recommendations. *Appetite* 59, 668-672.
- Sahingoz, S.A., Sanlier, N. (2011): Compliance with Mediterranean Diet Quality Index (KIDMED) and nutrition knowledge levels in adolescents. A case study from Turkey. *Appetite* 57, 272-277.
- Tupe, R., Chiplonkar, S.A. (2010): Diet patterns of lactovegetarian adolescent girls: Need for devising recipes with high zinc bioavailability. *Nutrition* 26, 390-398.
- Vereecken, C.A., De Henauw, S., Maes, L. (2005): Adolescents' food habits: results of the Health Behaviour in School-aged Children survey. *British Journal of Nutrition* 94, 423-431.
- Wilson, D.B., Smith, B.N., Speizer, I.S., Bean, M.K., Mitchell, K.S., Uguy, L.S., Fries, E.A. (2005): Differences in food intake and exercise by smoking status in adolescents. *Preventive medicine* 40, 872-879.