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Eating episode frequency and fruit and vegetable consumption among Italian university students

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Abstract

Objective. To analyze breakfast consumption, regularity of meals, fruit and vegetable consumption in the Italian university student population on a national level.

Design. Descriptive analysis evaluating data taken from the *Sportello Salute Giovani* (SSG) questionnaire.

Participants. 12 000 university students who self-administered a confidential survey. 8292 questionnaires were analyzed.

Variables measured. Age; sex; self-reported economic status; BMI; number of breakfast and portions of vegetables and portions of fruit usually consumed per week; number of eating episodes per day; intended weight loss.

Analysis. Descriptive and logistic regression analyses were conducted. Gender and age differences were tested by χ^2 and Mann-Whitney tests.

Results. 15.8% of males and 26.3% of females declared to consume at least one portion of fruit every day. Similar results were found for vegetable consumption. Age does not influence fruit or vegetables consumption, frequency of eating episodes or breakfast habit. Both a regular breakfast and a higher number of eating episodes are significantly associated both with a higher frequency of fruit and vegetables intake.

Conclusions and implications. This study underlines the need to promote nutritional education campaigns to increase adherence to nutritional guidelines.

Key words

- nutrition assessments
- habits
- students
- Italy

INTRODUCTION

A sufficient consumption of fruit and vegetables has proven to have an important protective effect towards heart disease, some forms of tumors, and even all-cause mortality [1-3]. High fruit and vegetable consumption has also proved to be significantly inversely correlated to body weight and body mass index (BMI), yet not with waist circumference [4]. Notwithstanding the evident health benefits deriving from sufficient fruit and vegetable consumption, most studies still report a widespread insufficient daily consumption of fruit and vegetables both in adolescents and adults [5, 6]. Studies have demonstrated the presence of an association between low meal frequency and breakfast skipping and insufficient consumption of fruits and vegetables among children and adults [7-9]. In fact, adolescents who consume meals more frequently tend to have a higher intake of fruit and vegetables compared to those who eat fewer meals [10]. However, this association was not found in other studies [11, 12]. Furthermore, studies that did prove an association between low meal frequency and low fruit and vegetable intake amongst school children also evidenced that age was not a determining factor [13, 14]. In Italy, the association between low fruit and vegetable intake and irregular breakfast habits was demonstrated by a study carried out by Lazzeri *et al.* [14]. in school children. However, up to now there hasn't been study on this association in the university population. Furthermore, even in international studies there is a lack of consistent evidence of this association in the university student population.

In consideration of all the above mentioned, the objective of this study is to analyze breakfast consumption, regularity of meals, and fruit and vegetable consumption in the Italian University Student population on a national level. In general, we must say that in Italy

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there is currently almost no statistical information on the age group of young adults. In fact, most Italian epidemiological studies analyze the pediatric or the adult population, giving therefore very little information on the young adult population. However, the population ranging from 18 to 35 years of age is particularly interesting for various reasons. First of all, it is an age group that might soon play a reproductive/parental role. In fact, the health of the young adult population is closely connected to the health of the new generations that will be born [15]. As is well known, numerous factors, ranging from sexual behaviour and substance abuse to general psychological and physical wellbeing, all have an influence on human reproduction [16]. It is also an age in which individuals achieve a great level of autonomy in their decisions and behaviors and some studies pointed out the risk of disordered eating for several reasons [17, 18]. Another aspect that is particular about this age group is that it should combine, on one hand, a greater maturity compared to the pediatric population, yet on the other hand, an important capacity to still learn and modify mentality and behavior [19]. In conclusion, it is clear that Universities should be kept in mind as environments in which health education programs can be particularly efficient.

Furthermore, this study collects a large amount of national data, which add knowledge to the research previously done by Lazzeri *et al.* in a younger age group (3291 students aged between 11 and 15 years old) [14]. Combining the information arising from these two studies, it is possible to achieve a broader understanding of the eating habits within the growing population that can be useful for effective health promotion and disease prevention strategies.

METHODS

The study evaluates data collected within the *Sportello Salute Giovani* (SSG) project, a cross-sectional multicenter study aimed at assessing the health status, attitudes and behaviors of university students in Italy [20]. The questionnaire used to carry out the study was based on the Health Behaviour in School-aged Children (HBSC) questionnaire, a validated international research protocol created to study the habits and life-styles of children aging 11, 13 and 15. The general validity of the HBSC questionnaire has been demonstrated by various studies [21, 22]. The SSG questionnaire was created by appropriately revising the HBSC questionnaire for our age group population by a multidisciplinary team composed of 22 experts in the field of epidemiology, fertility and reproductive health, nutrition and eating disorders, sports medicine, bioethics, physical and mental health, forensic and legal medicine. The adapted version was validated with experts of the Istituto Superiore di Sanità [23].

The final questionnaire is composed of 93 questions covering different fields of health related life-styles: eating habits, body perception, physical activity and sport, substance abuse, sexuality and reproductive health, personal satisfaction, and interaction with mass-media. The questionnaires were administered within the university classrooms, during lesson hours. They were completely anonymous and self-administered. According to the agreements made with the Universities, the questionnaire did not include questions that could associate the student with a particular region, origin, university, faculty or year of study. The distribution of the questionnaires commenced in May 2012 and continued till May 2013. 12 000 questionnaires were distributed to students of various faculties of 10 different Universities in 7 of the 20 Regions of Italy (Lazio, Lombardia, Marche, Molise, Sardegna, Sicilia, Veneto) [23]. Of the 12 000 questionnaires that were distributed, 9200 were fill-in and handed back in.

This study analyses the data deriving from 11 items: 1) age 2) sex 3) height without shoes in centimeters 4) body weight without clothes in kilograms 5) number of breakfast usually consumed per week 6) number of eating episodes per day 7) number of portions of vegetables usually consumed per week 8) number of portions of fruit normally consumed per week 9) intended weight loss 10) self-reported economic status.

Questionnaires of students over the age limit of 30 years old or with the evident presence of errors in the answers given were excluded.

The number of portions of vegetables and fruits usually consumed per week was analyzed respectively through the questions: "You usually eat vegetables" and "You usually eat fruit". The possible answers were: never, once a week, 2-4 days per week, 5-6 days per week, once per day, more than one portion per day. Since the Italian Guidelines for a Healthy Diet recommend a minimum of 1-2 portions of fruit and > 2 portions of vegetables per day [24], in our study we considered respectively all the answers that corresponded to a consumption 5-6 days per week or less of fruit or vegetable as a low frequency of consumption.

Information regarding breakfast consumption was collected through the question: "how many days per week do you usually have breakfast?" The students had to choose between 0 and 7. The answers that corresponded to 5 days or less per week were considered as irregular breakfast habits.

The number of eating episodes per day was analyzed through the question: "In average, how many times do you eat per day?" The possible answers were: 1, 2, 3, 4, 5, > 5. Considering that the INRAN guidelines recommend eating 5 times per day [21], a habit of eating less than 5 times per day was considered a low frequency of eating episodes.

Using the anthropometric values given by the subjects, we calculated the BMI and distributed the subjects according to the WHO classification of BMIs [25]. Weight status was defined by using the WHO BMI cut-off points and then dichotomized into overweight/not overweight. It is necessary to note that, even though self-reported weight and height can sometimes lead to BMI underestimation in adolescents [26], a recent study validated that there is a moderate to high agreement between the self-reported and measured anthropometric data in young adults [27].

The intention to lose weight was analyzed through the question: "Are you on a diet?" The possible answers were: no, my body weight is good; no, I would need to

gain weight; no, but I would need to lose weight; yes. The information was dichotomized into students who were trying to lose weight and those who were not.

The self-reported economic status was indicated through the question: "How would you define your economic situation?" The answers were: low, medium-low, medium, medium-high, high.

A descriptive analysis of the data was conducted through absolute frequency and relative percentage for the qualitative variables, and through the average value and standard deviation for the quantitative variables.

Sex and age differences are tested by χ^2 test and Mann-Whitney test, respectively.

Logistic regression analyses were used to study the association between eating episodes and fruit and vegetable consumption. Initially, we analyzed the entire sample implementing two models: one taking into account the consumption of fruit as the dependent variable and the other taking into account the consumption of vegetables, always as the dependent variable. The independent variables breakfast and number of eating episodes were included separately in the two models for a total of 4 regression analyses. Considering the increasing importance of the sex perspectives in medicine [28], stratum-specific ORs were also calculated within sex. Finally, in order to take into account the role of possible confounders, the multivariate models were adjusted for the following covariates: age, socioeconomic status, weight status and intended weight loss. Interactions were tested and included in the final model if significant [14].

The analyses were performed using IC Stata 12 for Mac statistical software package and statistical significance has been defined as $p < 0.05$.

RESULTS

8292 questionnaires satisfy the inclusion criteria and were included in the study. 5561 students (67%) were female and 2731 were male (33%). The mean age was 22.2 years (SD 2.0), without relevant differences between sexes (22.1 for females, 22.2 for males). 88% were younger than 25 years. The average BMI was 20.8 (SD 2.8) for females and 22.9 (SD 2.8) for males. BMI > 25 was more prevalent among males than females (18% *vs* 7% respectively). Detailed information on the sample demographic characteristics are reported in previously published papers [29].

For most of the eating habits, university students showed a higher prevalence of irregular behaviors than regular ones. As a matter of fact, 56% and 58% of students had an irregular weekly consumption of fruit and vegetables, and 91% of them did not reach the 5 eating episodes recommended by the INRAN guidelines. Nevertheless, most students (71%) had breakfast at least 6 days per week.

The analysis stratified by sex demonstrates a different eating behavior with males eating significantly less fruit and vegetables than females. Only 34.1% of males presented regular fruit consumption and 26.8% had regular vegetables consumption, compared to the female population (respectively 49.0% and 49.8%; $p < 0.01$). This was also confirmed when considering the optimal consumption of fruit and vegetables: only 15.8% (431) of males and 26.3% (1458) of the females declared to consume more than one portion of fruit every day ($p < 0.01$). Similarly, only 12.2% (333) of the males and 27.5% (1525) of the females declared consuming more than one portion of vegetables every day $p < 0.01$). Furthermore, males also tended to have more irregular breakfast habits (36.6% *vs* 24.9%; $p < 0.01$), and a lower frequency of eating episodes (92.5% *vs* 91.0%; $p = 0.03$) than females.

Stratification by age shows that age does not influence fruit or vegetables consumption, frequency of eating episodes or breakfast habit. However, our study indicates a tendency to have a greater vegetable consumption in the older age groups. Disaggregating the data for sex, this tendency proves to be true only for females, while males show an inverse trend.

When considering the logistic regression, the crude analysis between breakfast consumption, number of eating episodes and fruit consumption demonstrates that both a regular breakfast and a higher number of eating episodes are significantly associated with a higher frequency of fruit intake (OR = 2.19 and 1.83, respectively). This association is stronger for males (2.23 and 1.90) than for females (1.99 and 1.76) *(Table 1)*. The results of the adjusted multivariate models, which confirm these associations, were shown in *Table 2*.

Similarly, as regards to vegetable intake, the crude analysis demonstrates that a higher frequency of vegetable intake was associated with both a higher frequency of eating episodes and a regular breakfast habit (OR = 1.69 and 2.08, respectively). The association with breakfast habits is stronger for males (2.02) than for females (1.85), while the association with the number of eating episodes was similar between sexes *(Table 1)*. As for the previous models, also the adjusted multivariate analyses confirm the higher risk of irregular vegetables consumption in students with irregular breakfast and with less than 5 daily eating episodes *(Table 2)*.

Interestingly, in all the multivariate models, a higher socio-economic status and the intention to lose weight represented independent factors associated with a more favorable fruit and vegetable consumption. Conversely to what expected, there was no correlation between BMI and irregular fruit or vegetable consumption.

DISCUSSION

The aim of this research is to analyze the compliance of Italian university students to the INRAN Guidelines as regards to breakfast consumption, frequency of eating episodes, and fruit and vegetable consumption, and assess whether there is a confirmation of the association previously noted by other authors between these factors. The second aim of this study is to compare the results obtained in the Italian university population to those obtained by Lazzeri *et al*. [14] in the school-aged population.

As regards to the university student adherence to the guidelines on fruit consumption, we can observe that 65.6% males and 51.0% females do not currently adhere to the INRAN recommendations. These results can be compared to the ones deriving from the study done by

Table 1
University students described by the applied variables, % (n)

	Total		Girls		Boys	
	%	n	%	n	%	n
Fruit		8279		5553		2726
Irregular	56%	4630	51%	2833	66%	1797
Regular	44%	3649	49%	2720	34%	929
Vegetables		8277		5552		2725
Irregular	58%	4786	50%	2790	73%	1996
Regular	42%	3491	50%	2762	27%	729
Breakfast frequency		8267		5546		2721
Low	29%	2379	25%	1382	37%	997
High	71%	5888	75%	4164	63%	1724
Eating episodes		8105		5471		2634
Low frequency	91%	7416	91%	4980	92%	2436
High frequency	9%	689	9%	491	8%	198
On a diet		8254		5536		2718
No	89%	7347	87%	4796	94%	2551
Yes	11%	907	13%	740	6%	167
Economical level		8186		5487		2699
Very low	8%	617	8%	448	6%	169
Low	16%	1344	18%	968	14%	376
Medium	50%	4116	51%	2807	48%	1309
High	23%	1884	21%	1150	27%	734
Very high	3%	225	2%	114	4%	111
BMI		8018		5358		2660
Over and under weight	25%	2004	27%	1449	21%	555
Normal weight (18.5-25)	75%	6014	73%	3909	79%	2105
BMI		8018		5358		2660
< 18.5	14%	1121	20%	1051	3%	70
18.5-25	75%	6014	73%	3909	79%	2105
> 25	11%	883	7%	398	18%	485

Lazzeri *et al.*, in which 61.1% of males and 56.6% of females of the school-aged population are low fruit eaters [14]. As a consequence, we can observe that going from the school-aged population to the university student population, there is a confirmation of the high percentage of both males and females to not regularly consume the recommended amount of fruit, and also of the tendency of males to eat less fruit than females.

Similar results are found as regards to the consumption of vegetables. In the university population, 72.8% of males and 50.0% of females do not meet the recommended standards. When moving from the school-aged population to the university population, the percentage of low vegetable eaters varies from 75.5% to 72.8% for males and from 66.2% to 50.0% for females. Also in this case, we can observe that the trend of males in eating fewer vegetables than females in the school-aged popu-

Table 2
Breakfast consumption, frequency of eating episodes and fruit/vegetable intake: Logistic Regression Analysis

	Females			Males		
	Odds ratio	SE	P > z	Odds ratio	SE	P > z
Fruit (irregular *vs* regular)						
Breakfast (irregular *vs* regular)	2.04	0.14	0.000	2.11	0.19	0.000
Age	1.00	0.01	0.955	0.99	0.02	0.481
Socio-economic status	1.08	0.03	0.022	1.08	0.05	0.091
BMI (irregular *vs* regular)	1.07	0.07	0.291	0.94	0.10	0.567
Intended weight loss (no *vs* yes)	1.59	0.14	0.000	1.68	0.28	0.002
Constant	0.34	0.13	0.004	0.21	0.12	0.006
Fruit (irregular *vs* regular)						
Frequency eating ep. (low *vs* high)	1.79	0.18	0.000	1.84	0.28	0.000
Age	1.00	0.01	0.874	0.98	0.02	0.482
Socio-economic status	1.07	0.03	0.028	1.09	0.05	0.071
BMI (irregular *vs* regular)	1.06	0.07	0.343	0.96	0.11	0.734
Intended weight loss (no *vs* yes)	1.58	0.14	0.000	1.61	0.28	0.007
Constant	0.49	0.18	0.06	0.29	0.17	0.031
Vegetables (irregular *vs* regular)						
Breakfast (irregular *vs* regular)	1.84	0.12	0.000	1.99	0.20	0.000
Age	1.04	0.02	0.007	1.01	0.02	0.542
Socio-economic status	1.08	0.03	0.021	1.06	0.05	0.254
BMI (irregular *vs* regular)	1.06	0.07	0.344	0.99	0.12	0.905
Intended weight loss (no *vs* yes)	1.81	0.16	0.000	2.12	0.36	0.000
Constant	0.21	0.08	0.000	0.13	0.08	0.001
Vegetables (irregular *vs* regular)						
Frequency eating ep. (low *vs* high)	1.59	0.16	0.000	1.68	0.27	0.001
Age	1.04	0.02	0.004	1.01	0.02	0.613
Socio-economic status	1.08	0.03	0.024	1.07	0.06	0.173
BMI (irregular *vs* regular)	1.05	0.07	0.426	1.01	0.12	0.930
Intended weight loss (no *vs* yes)	1.83	0.16	0.000	1.96	0.35	0.000
Constant	0.29	0.11	0.001	0.19	0.12	0.006

SE: standard error.

lation is confirmed in the university student population.

The above mentioned sex differences are consistent with data from a large number of reports showing females' tendency to take healthier food choices and to be more concerned about the importance of food choice and eating behaviour than males [30].

This study also shows that, as previously demonstrated in the Italian school-aged population [14], in the University population there is a statistically relevant association between irregular breakfast habit and insufficient consumption of fruit and vegetables, and between low frequency of eating episodes and insufficient consumption of fruit and vegetables. Therefore, we can confirm the existence of this correlation and demonstrate that its validity persists in the university student population.

Limitations

The main pitfall of this study is that the data collected for this survey has been self-reported by participants who were voluntary enrolled in the survey. This may determine a selection bias since responders could have better attitudes towards health problems and more healthy behaviors.

Another limitation of studies performed by means of questionnaire is that they may be also affected by misclassification, both non differential and differential and lead to a recall bias. However, for the purpose of this research, misclassification may be ignored.

Finally, neither formal sample size calculation nor standardized sampling methods were used. Nevertheless, the large sample size is expected to guarantee a good representativeness, even thought generalization to the university students should be cautious because of convenience sampling.

CONCLUSION

The findings of the present research underline the current necessity to promote nutritional education campaigns in order to increase the adherence of the young adult population to the nutritional guidelines. This study also confirms that young adults that demonstrate habits of irregular consumption of breakfast and low frequency of eating episodes are more at risk of not reaching recommended levels of fruit and vegetable intake. Therefore, promoting the consumption of breakfast and of the recommended 5 daily eating episodes may prove to be useful instruments in obtaining a greater consumption of fruit and vegetables in the population in study. This strategy could prove to be particularly effective for male students, given that they present both more irregular breakfast habits and low frequency of eating episodes, and a lower consumption of fruits and vegetables. On the other hand, age does not seem to influence these behaviors.

As a consequence, educational campaigns promoting healthy eating habits should be brought forth not only in schools, but also in the universities. It is important to give young adults the necessary educational tools to promote a free choice towards behaviors that are coherent with health promotion and disease prevention.

It is also necessary to create practical strategies in universities that can facilitate the regularity of breakfast, frequent food intake, and fruit and vegetable consumption. These strategies should include: creating lesson schedules that enable and favor the regular consumption of three main meals and two snacks per day; increasing the availability, attractiveness and affordability of fruit and vegetables; proposing cafeteria meals that give students the flexibility to choose the fruits and vegetables they prefer. With regards to facilities, limiting availability of unhealthy foods near Universities, healthy food polices in cafeterias and canteens are valid examples of systems and policy change activities. Instead, while availability of fruits/vegetables in vending machines might not be positively related to the corresponding food intake by university students, it could be useful in influencing younger student's diets [31].

Even though this research highlights low breakfast consumption in the young adult population, as of now, in Italy there have been no extensive intervention programs aimed at stimulating breakfast consumption in university students. In fact, currently most initiatives are regional and aimed exclusively at lower age groups.

Furthermore, Universities are ideal environments for analyzing the efficacy of different healthy eating promotion strategies. In fact, there is still the need to further investigate the personal and environmental determinants of breakfast/food intake habits and of fruit and vegetable consumption. This would also allow health promoters to determine which strategies would be more effective also in workplace environments.

Conflict of interest statement

There are no financial associations or other possible conflicts of interest to be disclosed.

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REFERENCES

1. Dauchet L, Amouyel P, Dallongeville J. Fruits, vegetables, and coronary heart disease. *Nat Rev Cardiol* 2009;6(9):599-608. DOI: 10.1038/nrcardio.2009.131
2. Oyebode O, GordonDseagu V, Walker A, Mindell JS. Fruit and vegetable consumption and all-cause, cancer and CVD mortality: analysis of Health Survey for England Data. *J Epidemiol Community Health* 2014;68(9):856-62. DOI: 10.1136/jech-2013-203500
3. Hu D, Huang J, Wang Y, Zhang D, Qu Y. Fruits and vegetables consumption and risk of stroke: A meta-anaylsis of prospective cohort studies. *Stroke* 2014;45(6):1613-9. DOI: 10.1161/STROKEAHA.114.004836
4. Ghalaeh RS, Gholi Z, Banh SS, Azadbakht L. Fruit and vegetable intake, body mass index and waist circumference among young female students in Isfahan. *J Educ Health Promot* 2012;1:29. DOI: 10.4103/2277-

9531.99969
5. Cavallo F, Giacchi M, Vieno A, Galeone D, Tomba A, Lamberti A, Nardone P, Andreozzi S (Ed.). *Studio HBSC-Italia (Health Behaviour in School-aged Children): rapporto sui dati 2010*. Roma: Istituto Superiore di Sanità; 2013. (Rapporti ISTISAN, 13/5).
6. Walther J, Aldrian U, Stuger HP, Kiefer I, Ekmekcioglu C. Nutrition, lifestyle factors, and mental health in adolescents and young adults living in Austria. *Int J Adolesc Med Health* 2014;26(3):377-86. DOI: 10.1515/ijamh-2013-0310
7. Hartmann C, Siegrist M, Van der Horst K. Snack frequency: associations with healthy and unhealthy food choices. *Public health Nutr* 2012;16:1-10. DOI: 10.1017/S1368980012003771
8. Keski-Rahkonen A, Kaprio J, Rissanen A, Virkkunen M, Rose RJ. Breakfast skipping and health-compromising behaviors in adolescents and adults. *Eur J Clin Nutr* 2003;57(7):842-53. DOI: 10.1038/sj.ejcn.1601618
9. Wolfe WS, Campbell CC. Food pattern, diet quality, and related characteristics of schoolchildren in New York State. *J Am Diet Assoc* 1993;93(11):1280-4.
10. Neumark-Sztainer D, Hannan PJ, Story M, Croll J, Perry C. Family meal patterns: associations with sociodemographic characteristics and improved dietary intake among adolescents. *J Am Diet Assoc* 2003;103(3):317-22. DOI: 10.1053/jada.2003.50048
11. Neumark-Sztainer D, Wall M, Perry C, Story M. Correlates of fruit and vegetable intake among adolescents. Findings from project EAT. *Prev Med* 2003;37:198-208.
12. Roberts C, Freeman J, Samdal O, *et al*. The Health Behaviour in School-Aged Children (HBSC) study: methodological developments and current tensions. *Int J Public Health* 2009;54(Suppl. 2):140-50. DOI: 10.1007/s00038-009-5405-9
13. Moffat T, Galloway T. Food consumption patterns in elementary school children. *Can J Diet Pract Res* 2008;69(3):317-22. DOI: 10.3148/69.3.2008.152
14. Lazzeri G, Pammolli A, Azzolini E, *et al*. Association between fruits and vegetables intake and frequency of breakfast and snacks consumption: a cross-sectional study. *Nutr J* 2013;12:123. DOI: 10.1186/1475-2891-12-123
15. Verbiest S, Holliday J. Preconception care: building the foundation for healthy women, babies, and communities. *NC Med J* 2009;70:417-26.
16. Corchia C, Mastroiacovo P. Health promotion for children, mothers and families: here's why we should "think about it before conception". *Ital J Pediatr* 2013;39:68-71. DOI: 10.1186/1824-7288-39-68
17. Timko CA, Mooney K, Juarascio A. Change in eating and body related behaviors during the first year of university. *Eat Weight Disord* 2010;15(1-2):e93-7.
18. Cervera Burriel F, Serrano Urrea R, Vico García C, Milla Tobarra M, García Meseguer MJ. Food habits and nutritional assessment in a university population. *Nutr Hosp* 2013;28(2):438-46.
19. Zazpe I, Marqués M, Sánchez-Tainta A, Rodríguez-Mourille A, Beunza JJ, Santiago S, Fernández-Montero A. Eating habits and attitudes towards change in Spanish university students and workers. *Nutr Hosp* 2013;28(5):1673-80.
20. Di Pietro ML, Bellantone R, Pacifici R, Ricciardi W. The "Sportello Salute Giovani" project: Habits, lifestyles, risk behaviours of Italian University students and future perspectives. *Ann Ist Super Sanità* 2015;51(2):93-5. DOI: 10.4415/ANN_15_02_03
21. Liu Y, Wang M, Tyanjala J, *et al*. Test-retest reliability of selected items of Health behavior in School-aged Children (HBSC) survey questionnaire in Beijing, China. *BMC Med Res Methodol* 2010;10:73. DOI: 10.1186/1471-2288-10-73
22. Felder-Puig R, Griebler R, Samdal O, King MA, Freeman J, Duer W. Does the school performance variable used in the international Health Behaviour of School-Aged Children (HBSC) Study reflect students' school grades? *J Sch Health* 2012;82(9):404-9. DOI: 10.1111/j.1746-1561.2012.00715.x
23. de Waure C, Poscia A, Virdis A, Di Pietro ML, Ricciardi W. Sportello Salute Giovani project. Study population, questionnaire, data management and sample description. *Ann Ist Super Sanità* 2015;51(2):96-8. DOI: 10.4415/ANN_15_02_04
24. INRAN. *Linee guida per una sana alimentazione italiana. Revisione 2009*. Available from: http://nut.entecra.it/358/31/news/ecco-la-nuova-piramide-alimentare-della-dieta-mediterranea.html.
25. World Health Organization. *WHO BMI classification*. 2016. Available from: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.
26. Sherry B, Jefferds ME, Grummer-Strawn LM. Accuracy of adolescent self report of height and weight in assessing overweight status: a literature review. *Arc Pediatr Adolesc Med* 2007;161:1154-61. DOI: 10.1001/archpedi.161.12.1154
27. Pursey K, Burrows TL, Stanwell P, Collins CE. How accurate is web-based self-reported height, weight, and body mass index in young adults? *J Med Internet Res* 2014;16(1):e4. DOI: 10.2196/jmir.2909
28. Ortona E, Delunardo F, Baggio G, Malorni W. A sex and gender perspective in medicine: a new mandatory challenge for human health. Preface. *Ann Ist Super Sanità* 2016;52(2):146-8. DOI: 10.4415/ANN_16_02_02
29. Teleman AA, de Waure C, Soffiani V, Poscia A, Di Pietro ML. Nutritional habits in Italian university students. *Ann Ist Super Sanità* 2015;51(2):99-105. DOI: 10.4415/ANN_15_02_05
30. Arganini C, Saba A, Comitato R, Virgili F, Turrini A. Gender differences in food choice and dietary intake in modern western societies. *Public Health - Social and Behavioral Health* 2012;4:83-102.
31. Rovner AJ, Nansel TR, Wang J, Iannotti RJ. Food sold in school vending machines is associated with overall student dietary intake. *J Adolesc Health* 2011;48(1):13-9.