

Research Article

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Eating habits and food literacy: Study involving a sample of Portuguese adolescents

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Abstract: Adolescents tend to neglect food and their eating pattern is influenced by several factors. Adolescents' health literacy substantiates their ability to respond to the growing demands of health, being linked to health promotion in several areas, including food. The goal of this work was to analyze the relationship between sociodemographic and contextual variables with secondary school students' food literacy. A quantitative, cross-sectional, descriptive and analytical study was carried out with a sample of 181 non-probabilistic secondary school students, aged between 16 and 21 years (mean = 18.09 years \pm 1.45), mostly female (58.0%), from 11th grade (35.4%), who are part of a secondary school in central Portugal. As a tool for data collection, the questionnaire of the project "Your PEL – Promote and Empower for Health Literacy in the young population" was used, aggregating three areas: eating behaviors, harmful consumptions and sexuality. The results showed that 58.6% of young people eat 4–5 meals a day, consume fast food weekly (79%) and eat soup (82.3%). Additionally, they eat fruit and vegetables on a daily basis (94.5 and 83.4%, respectively). The results further showed that 10th grade students have higher levels of health and food literacy. It was observed that both girls and boys are interested in

receiving information regarding food, transmitted through social networks and by a communication application (84.5 and 73.5%, respectively), with significant differences ($\chi^2 = 4.768$; $p = 0.028$). Adolescents face unique health challenges and a critical level of health literacy compromises their understanding of information about diet and future health. The results indicate that educational plans to empower adolescents in these areas, which integrate gender and age differences and sources of information as important variables to be considered, are pivotal for increasing levels of health and food literacy.

Keywords: secondary school, food information, education, fast food, social network

1 Introduction

Of all WHO regions, Europe is the most affected by non-communicable diseases such as overweight/obesity, excessive food consumption associated with little physical activity and low consumption of vegetables and fruit (WHO 2017). The main causes of preventable chronic diseases are obesity and tobacco consumption. Despite all efforts to reduce their consumption, the advertising campaigns carried out that encourage consumption are in large-scale superior and have greater impact (Nikolaou et al. 2020). Noncommunicable diseases are the main causes of death and represent 38 million (68%) of the 56 million deaths worldwide in 2012. As modifiable risk factors, poor diet, poor food quality and physical inactivity arise (WHO 2018).

Adolescents with eating disorders have greater difficulty in losing weight in adulthood and, despite health promotion policies, implemented all over the world (promoting the use of public transport, sharing nonmotorized vehicles: bicycles, and others) no country has seen a significant drop in obesity. The increase in the intake of added sugars also contributes to obesity in adolescents (Nikolaou et al. 2020). The excessive consumption of added sugars, especially sugary drinks, is more significant in families with low socioeconomic status. In these

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subjects, there is an increased risk of caries, cardiovascular diseases (hypertension and diabetes mellitus, dyslipidemia and increased adipose tissue) and consequently of mortality from all these causes (Muth et al. 2019). The World Health Organization (WHO 2018) recommended a reduction in the consumption of free sugars, the intake of added sugars to less than 10% of the total consumed and, whenever possible and with the greatest benefit a reduction of calories intake by up to 5%. Sugary drinks represent the main source of sugars added to the diet of teenagers in the United States. These drinks have very little or no nutritional value, have a high energy density and do not increase satiety (Muth et al. 2019). As with the tobacco industry, the industry linked to the production of sugary drinks has developed numerous campaigns that associate their consumption with public figures, glamor, fashion and being trendy. Advertising is more aimed at teenagers, who are exposed to this type of pressure on a daily basis. In Portugal, the regulation No. 11391/2017, published on December 28th 2017, establishes conditions for the limitation of products harmful to health in spaces destined to the operation of bars, cafeterias and buffets, within the institutions of the Ministry of Health, in order to implement a set of measures for health promotion in general, and in particular for the adoption of healthy eating habits (DGS 2018).

Regarding physical exercise, Burns et al. (2019) and Pate and Dowda (2019) refer that young people and adolescents who successfully practice exercise, feel pleasure in physical exercise; they feel more confident with the practice of physical exercise; they are motivated by concerns about appearance, achievement or aptitude; have parents who support participation in physical activities; have friends and peers who consider physical activity as fun and important for health; live in houses and neighborhoods with resources for physical activity; attend schools that promote policies and practice of physical exercise by students and finally, participate in school sports.

Despite efforts to make positive changes in their eating habits, adolescents continue to adopt a sedentary lifestyle, with television viewing for more than 3 h, physical inactivity, fast food meals and excessive consumption of energy drinks. Policies to promote healthy eating habits and regular physical exercise might have a positive impact, according to the investment that is made in the younger age groups, and are feasible by adopting new tools provided by information and communication technologies, by increasing green spaces and by involving the schools (Alcântara et al. 2019; Muth et al. 2019; Nikolaou et al. 2020). Thus, the implementation of health promotion

actions will be more impactful if they are led by young people whose objective is to combat obesity-promoting behaviors (food, transport, environmental sustainability, social sustainability, justice, workers' rights, animal welfare, and so on) (Nikolaou et al. 2020).

The objective of this work was to study some food habits of Portuguese adolescents and their level of food and health literacy. Furthermore, the associations between sociodemographic and environmental variables and the food literacy levels were also investigated.

2 Materials and methods

A quantitative, transversal, descriptive and analytical study was undertaken, with a nonprobabilistic convenience sample of 181 secondary school students aged between 16 and 21 years (average = 18.09 ± 1.45 years), mostly females (58.0%) and in the 11th grade (35.4%).

A data collection instrument was used to analyze the relationship between sociodemographic and contextual variables of secondary school students' food literacy. The questionnaire was self-administered and was designed to assess health literacy related with food, with abusive consumptions and sexuality. It was applied in scholar context to young adolescents. The instrument was developed by the research team of the project "Your PEL – Promote and Empower for Health Literacy in the Young Population." It focuses on a health approach, supported by new technologies, adding three areas: food literacy scale, abusive consumptions (tobacco and alcohol) and sexuality.

The food literacy subscale consists of 25 items, from which 10 are in inverted scale, so those were recoded to match the rest of the items. This subscale was evaluated presenting the following psychometric properties: Kaiser–Meyer–Olkin test (KMO) = 0.912 and Cronbach's alpha = 0.825. The data collection period ran from February 1st to April 1st, 2020.

Data processing was carried out using the Statistical Package for the Social Sciences (SPSS) version 26 (v26).

With the statistical analysis, measures of central tendency were determined as mean and median, measures of dispersion or variability such as range of variation, standard deviation and coefficient of variation. To determine whether the variables have a normal distribution, the measures of Skewness (Sk) and Kurtosis (K) were used, by calculating the ratio between the value of the statistic and the standard error (Pestana and Gageiro 2014). The reference values oscillated between -2 and $+2$ are classified as: platykurtic (<-2), normal ($\geq -2 \leq 2$)

and leptokurtic ($>+2$). Chi-square tests (χ^2), the parametric Student *t*-test and the nonparametric Mann–Whitney *U*-test are done for independent samples. In parametric test, the statistical assumptions, namely the normality of the distributions and the homogeneity of variances in the two groups were evaluated using the Levene test. We also used the one-way analysis of variance (ANOVA). The statistical analysis with for *p* values <0.05 is considered as significant.

3 Results

The young people participated in this study were aged between 16 and 21 years, the average being 18.09 years (± 1.45 years) (Table 1). The mean values are slightly higher for males (mean = 18.20 ± 1.56 years) than females (mean = 18.02 ± 1.37 years), without statistical significance. The female sex represents 58.0% of the sample.

As a stage of preparation for adulthood, adolescence incorporates characteristics related to exploration and discoveries of multiple opportunities, sometimes leading adolescents to adopt risky behaviors potentially capable of compromising their health. Various behaviors can be risky, such as unhealthy eating habits, inappropriate physical activity, use of substances such as alcohol, cigarettes and other drugs or risky sexual behavior.

The results in Table 2 show that an expressive majority of the surveyed adolescents (87.8%) consume alcoholic drinks, regardless of gender (σ 88.2% vs ϕ 87.6%). With regard to the number of meals, it appears that 55.3% of young men and 58.6% of women eat 4 to 5 meals a day (Table 2). When asked whether they consume fast food weekly, 79% responded affirmatively. Weekly soup consumption accounts for 82.3% (σ 81.6% vs ϕ 82.9%). Of these, 90% eat soup three or more times a week (σ 54.8% vs ϕ 64.4%). The fruit is consumed daily by 94.5% (σ 96.1%; ϕ 93.3%). It appears that most young people consume 1 to 2 servings daily, that only 7.6%

consume fruit rarely (σ 9.6%; ϕ 6.15%) and the consumption of more than 3 servings of fruit daily is reported by 28.7% of young people. Most consume vegetables daily, 83.4% (σ 85.5%; ϕ 81.9%). The canteen emerges as the place of choice for daily meals (92.8%) and the majority report that they have more than 3 meals a week (87.4%) in the school canteen.

Regarding the use of social networks and communication applications, we found that the social network Youtube is used by all respondents, followed by the social network Instagram with 98.3%. The Snapchat social network is used mainly by young women (81.9%), with statistically significant differences ($\chi^2 = 22.344$; $p = 0.000$) between genders. The third most used social network is Facebook (90.1%), with no statistically significant differences found. Then comes the social network Twitter with 70.6% of the sample using this application (σ 68.4%; ϕ 72.1%). The social networks Tumblr and Reddit are used rarely by respondents. When asked about communication applications, young people described that they mainly use the WhatsApp application, followed by Skype and Viber (99.4, 93.1 and 91.8%, respectively) and no significant differences were found between sexes. The application that young people use less often is Viber ($n = 158$; average = 1.1) and the social network is Tumblr ($n = 26$; average = 1.85).

When asked if they are interested in receiving information regarding food, addictive consumptions (for example, alcohol) from social networks and through a communication application, it is observed that in both sexes the interest of young people is quite high (84.5 and 73.5%, respectively) with significant differences ($\chi^2 = 4.768$; $p = 0.028$) and the residuals representative of those differences are adjusted.

In the analysis of the statistics related to the score obtained for food literacy, it appears that the level of knowledge is low, with a minimum value of 16 and a maximum of 69, with an average of 49.50 (± 0.512), which is an indicative that young people lack training and great intervention in terms of promoting healthy eating habits. Regarding the relationship between the number of daily

Table 1: Characterization of age according to sex

Sex	<i>n</i>	Min	Max	Mean	SD	CV (%)	Sk/errors	K/error
Male	76	16	21	18.20	16	8.57	−0.034	1.17
Female	105	16	21	18.02	1.37	7.60	0.22	−0.92
Total	181	16	21	18.09	1.45	8.02	0.11	−1.05

Min = Minimum, Max = maximum, SD = standard deviation, CV = coefficient of variation, Sk = skewness, K = kurtosis.

Table 2: Contextual variables related to lifestyle according to sex

Variables	Sex				Total		Adjusted residues		χ^2	<i>p</i>
	Male		Female				Male	Female		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%				
Consumption of alcoholic drinks	(76)	(42.0)	(105)	(58.0)	(181)	(100.0)				
Yes	67	88.2	92	87.6	159	87.8	0.1	−0.1	0.12	0.913
No	9	11.8	13	12.4	22	12.2	−0.1	0.1		
Daily meals	(76)	(42.0)	(105)	(58.0)	(181)	(100.0)				
≤3	25	32.9	25	23.8	50	27.6	1.3	−1.3	1.929	0.381
4–5	42	55.3	64	61.0	106	58.6	−0.8	0.8		
≥6	9	11.8	16	15.2	25	13.8	−0.7	0.7		
Consumption of fast food on a weekly basis	(76)	(42.0)	(105)	(58.0)	(181)	(100.0)				
Yes	60	78.0	83	79.0	143	79.0	0.0	0.0	0.000	0.987
No	16	21.0	22	21.0	38	21.0	0.0	0.0		
Frequency of consumption of fast food	(60)	(42.0)	(83)	(58.0)	(143)	(100.0)				
Seldom	20	33.3	22	26.5	42	29.4	0.9	−0.9	2.413	0.299
1–2 times/week	30	50.0	52	62.7	82	57.3	−1.5	1.5		
≥3 times/week	10	16.7	9	10.8	19	13.3	1.0	−1.0		
Consumption of soup on a weekly basis	(76)	(42.0)	(105)	(58.0)	(181)	(100.0)				
Yes	62	81.6	87	82.9	149	82.3	−0.2	0.2	0.049	0.846
No	14	18.4	18	17.1	32	17.7	0.2	−0.2		
Frequency of consumption of soup	(60)	(41.6)	(87)	(58.4)	(149)	(100.0)				
Seldom	4	6.5	6	6.9	10	6.7	−0.1	0.1	1.650	0.438
1–2 times/week	24	38.7	25	28.7	49	32.9	1.3	−1.3		
≥3 times/week	34	54.8	56	64.4	90	60.4	−1.2	1.2		
Consumption of fruit on a daily basis	(76)	(42.0)	(105)	(58.0)	(181)	(100.0)				
Yes	73	96.1	98	93.3	171	94.5	0.8	−0.8	0.625	0.429
No	3	3.9	7	6.7	10	5.5	−0.8	0.8		
Frequency of consumption of fruit	(73)	(42.7)	(98)	(58.4)	(171)	(100)				
Seldom	7	9.6	6	6.1	13	7.6	0.8	−0.8	0.742	0.690
1–2 times/day	46	63.0	63	64.3	109	63.7	−0.2	0.2		
≥3 times/day	20	27.4	29	29.6	49	28.7	−0.3	0.3		
Consumption of vegetables on a daily basis	(76)	(42.0)	(105)	(58.0)	(181)	(100)				
Yes	65	85.5	86	81.9	151	83.4	0.6	−0.6	0.418	0.518
No	11	14.5	19	18.1	30	16.6	−0.6	0.6		
Frequency of consumption of vegetables	(65)	(43.0)	(86)	(57.0)	(151)	(100)				
Seldom	7	10.8	9	10.5	16	10.6	0.1	−0.1	3.363	0.186
1–2 times/day	36	55.4	59	68.6	95	62.9	−1.7	1.7		
≥3 times/day	22	33.8	18	20.9	40	26.5	1.8	−1.8		
Eat in the canteen	(76)	(42.0)	(105)	(58.0)	(181)	(100)				
Yes	69	90.8	98	93.3	167	92.3	−0.6	0.6	0.400	0.527
No	7	9.2	7	6.7	14	7.7	0.6	−0.6		
Frequency of eating in the canteen	(69)	(41.7)	(98)	(58.3)	(167)	(100)				
Seldom	1	1.4	1	1.0	2	1.2	0.3	−0.3	0.825	0.643
1–2 times/week	6	8.7	13	13.3	19	11.4	−0.9	0.9		
≥3 times/week	62	89.9	84	85.7	146	87.4	0.8	−0.8		

meals and food literacy, we found that young people who eat six or more meals have higher rates of food literacy (Table 3). In what concerns alcohol consumption, young people who eat up to 3 meals a day have lower rates for the literacy of alcohol consumption (Table 3).

In the analysis of subscales for food literacy and fast food consumption (Table 4), it is noticed that young

people who do not consume fast food have a higher average ranking in terms of food literacy (odds ratio, (OR) = 93.83 vs 90.25) and in abusive alcohol consumption (OR = 91.25 vs OR = 90.93), but without statistical significance between groups.

Weekly soup consumption was also another aspect that was intended to be analyzed in relation to literacy

Table 3: Kruskal–Wallis test between subscales of literacy and the number of daily meals

Subscales of literacy	Daily meals			<i>H</i>	<i>p</i>
	≤3	4–5	≥6		
	Odds ratio	Odds ratio	Odds ratio		
Food	84.62	92.86	95.88	1.096	0.578
Alcohol consumption	76.48	96.96	94.78	5.348	0.069

Table 4: Mann–Whitney *U*-test between subscales of literacy and the consumption of fast food

Subscales of literacy	Consumption of fast food					
	Yes		No		<i>z</i>	<i>p</i>
	<i>n</i>	Odds ratio	<i>n</i>	Odds ratio		
Food literacy	143	90.25	38	93.83	−0.375	0.708
Alcohol consumption	143	90.93	38	91.25	−0.033	0.974

Table 5: Mann–Whitney *U*-test between subscales of literacy and the consumption of soup

Subscales of literacy	Weekly consumption of soup					
					<i>z</i>	<i>p</i>
	Yes		No			
	<i>n</i>	Odds ratio	<i>n</i>	Odds ratio		
Food	149	94.65	32	74.02	−2.025	0.043
Alcohol consumption	149	93.59	32	78.95	−1.434	0.151

(Table 5). According to the Mann–Whitney *U*-test, there is a statistical relation between consumption of soup and food literacy ($z = -2.025$; $p = 0.043$), so that young people who consume soup have higher food literacy. However, the relation between consumption of soup and literacy about alcohol consumption was not found significant ($p = 0.151$), although young people who consume food tend to have higher literacy about the abusive consumption of alcoholic drinks (OR = 93.59 vs 78.95).

The analysis between daily fruit consumption and the different subscales did not reveal any significant

Table 6: Mann–Whitney *U*-test between subscales of literacy and the consumption of fruit

Subscales of literacy	Weekly consumption of fruit					
					<i>z</i>	<i>p</i>
	Yes		No			
	<i>n</i>	Odds ratio	<i>n</i>	Odds ratio		
Food	171	90.77	10	94.95	−0.246	0.806
Alcohol consumption	171	92.28	10	69.10	−1.361	0.174

Table 7: Mann–Whitney *U*-test between subscales of literacy and the consumption of vegetables

Subscales of literacy	Weekly consumption of vegetables					
	Yes		No		<i>z</i>	<i>p</i>
	<i>n</i>	Odds ratio	<i>n</i>	Odds ratio		
Food	151	94.08	30	75.50	−1.777	0.076
Alcohol consumption	151	95.29	30	69.42	−2.472	0.013

relationship (Table 6). Although not significantly different, it is young people who eat fruit daily that present a higher order in regard with alcohol consumption literacy (OR = 92.28 vs 69.10) but lower for food literacy (OR = 90.77 vs 94.95).

The daily consumption of vegetables was another aspect intended to be analyzed (Table 7). Higher literacy levels were found in all literacy subscales for vegetable consumers. The application of the UMW test reveals a statistically significant relationship for illicit alcohol consumption literacy ($z = -2.472$; $p = 0.013$) and marginal significance for food ($z = -1.777$; $p = 0.076$). This shows that young people who eat vegetables daily are those with highest levels of literacy in the areas under study.

From the application of the UMW test for the literacy levels among young people who eat or do not eat at school (Table 8), the differences between groups are not statistically significant ($p = 0.852$ and 0.651 for food literacy and alcohol consumption literacy, respectively). The results showed that young people who have lunch in the school canteen have higher food literacy levels (OR = 91.21 vs 88.50). However, when it comes to the literacy about alcohol consumption, young people who do not eat in the canteen showed higher levels of literacy (OR = 97.07 vs 90.49).

Table 8: Mann–Whitney U -test between subscales of literacy and the use of school canteen

Subscales of literacy	Eat in the school canteen					
	Yes		No		<i>z</i>	<i>p</i>
	<i>n</i>	Odds ratio	<i>n</i>	Odds ratio		
Food	167	91.21	14	88.50	−0.186	0.852
Alcohol consumption	167	90.49	14	97.07	−0.452	0.651

We found that young people interested in receiving information through communication applications have higher levels of literacy in both subscales of literacy (food and alcohol consumption), but without statistical significance ($p = 0.272$ and 0.773 for food literacy and alcohol consumption literacy, respectively) (Table 9).

4 Discussion

The results showed that most of the young people surveyed in this study consume alcoholic drinks, which would not be supposed, given that most of them are younger than 18 years, the legal age for drinking alcohol in Portugal.

In regard to food habits, the results also revealed that most participants eat 4 to 5 meals per day, which is advisable, and although the majority eat fast-food meals on a weekly basis, they do not do it with a high frequency (mostly once or twice a week). The fast-food consumption is associated with overweight, obesity and other health problems. Obesity, physical inactivity, smoking, mistreatment, poor communication with parents, antisocial behavior, school dropout and exposure to crime are more prevalent in adolescents living in families with lower

socioeconomic levels. For example, 27% of all adolescent obesity in Europe in 2014 was attributed to socioeconomic differences (WHO 2017). There are differences in the health behaviors of girls and boys. Girls are more likely to have better eating and hygiene habits, while boys are more likely to be physically active. Adolescents have a more negative self-perception of health (1 of 5 at the age of 15 years) having complaints related to body dissatisfaction, presenting lower levels of mental health and daily coffee consumption (WHO 2017).

The results of this study further revealed that young people in Portugal tend to consume soup on a weekly basis, most of them over 3 times per week. Also, most eat fruit and vegetables on a daily basis (1 or 2 times per day). Practically, all students eat in the school canteen, the lunch meal, over 3 times per week.

The National College Health Assessment (NCHA 2016) of the American College Health Association reported that 97% of young people did not consume 5 or more servings of fruit and vegetables (recommended daily amount) and 39% of them were overweight or obese. In Taiwan, according to a study conducted in 2011, 17% of university students were overweight or obese and less than 10% of young people followed the recommendations in terms of diet (Yahia et al. 2016). According to Lee et al. (2019), the eating behaviors of young students vary according to sex, area of residence, school year and perception of health status.

One third of calories is consumed outside the home by Americans, in food establishments. Any restaurant chain with more than 20 food distribution locations is required to display the caloric value of the meals provided, in order to persuade the population to choose healthier solutions when eating out (Williams et al. 2016). Children play a strong role in making decisions about choosing which foods to eat at home, and they choose their meals when they go to restaurants with their parents (Tandon et al. 2011). To study the behavior of 225 young students aged from 8 to 11 years, in 3 schools in New York, Williams et al. (2016) developed a quasi-experimental study. In this work, students' choices regarding caloric and nutrient content were analyzed after an intervention in a school context, where young people were given tools to develop the ability to read and analyze food packaging labels. For these authors, the existence of a label alone does not influence the behavior of young people when choosing what they want to eat. However, after an intervention in the classroom, there was 20% reduction in the purchase of caloric foods with low nutritional value and a significant reduction in the consumption of meals or foods with low nutritional

Table 9: Mann–Whitney U -test between subscales of literacy and the need for information through communication applications

Subscales of literacy	Information through communication applications					
	Yes		No		<i>z</i>	<i>p</i>
	<i>n</i>	Odds ratio	<i>n</i>	Odds ratio		
Food	133	93.57	48	83.89	−1.100	0.272
Alcohol consumption	133	91.67	48	89.14	−0.288	0.773

value. These data were maintained when the reassessment was performed 12 days after the intervention.

It is believed that an isolated intervention will not have a long-term impact since some fundamental factors such as the environment, family choices and social factors were excluded (Bohm *et al.* 2015; Williams *et al.* 2016). For the prevention of eating disorders and other associated problems, according to Sánchez-Carracedo *et al.* (2016), an effective and effective integrated approach is important. These authors developed a nonrandomized, multicentre controlled study, with baseline and post-test with follow-up measures for 1 year. The study involved young girls in the 8th grade school year from 6 schools ($n = 152$) in a city near Barcelona (the intervention group), and in 11 schools ($n = 413$ girls) in 4 neighboring cities (control group). Throughout this work, 45 risk factors related to eating disorders called MABIC were defined. The girls in the experimental group showed better results in terms of decreasing the idealization of beauty, reducing eating disorders, reducing provocations related to weight and dissatisfaction related to weight.

According to Treasure *et al.* (2010), worldwide the prevalence of eating disorders affects about 5% of young women according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM 4). Eating disorders are associated with high mortality rates and psychological disorders according to Arcelus *et al.* (2011).

López-Guimerà *et al.* (2013) referred that unhealthy behaviors and eating disorders, such as unhealthy weight control due to the desire to be thinner, are very common all over the world and are rooted, so all relaxation interventions need to be programmed in the long term and carried out in a systematic way.

The high prevalence of eating disorders, the wrong eating behaviors that tend to become chronic, the high morbidity associated with other mental disorders, bears associated physical and psychosocial consequences to health, as well as resistance to available treatment, conflicts with the health team and low response to treatment, so the approach should be focused on prevention (Sánchez-Carracedo *et al.* 2016).

Recently, there have been changes in terms of efficacy and effectiveness in integrated obesity and eating disorders programs. Efficacy refers to the benefits of health programs or policies that under optimal conditions in which they are implemented involve the systematic evaluation of the intervention. Effectiveness refers to the benefit of programs or policies in the real world. This dimension refers to the usefulness of the interventions, the applicability, feasibility and usefulness of the intervention in local or specific terms where it is

carried out and implemented (Sánchez-Carracedo *et al.* 2016).

Lee *et al.* (2019) argued that one of the forms of regulation of human behavior that goes through a healthy lifestyle, where healthy eating has been included, should include the design of an individual self-schema. The individual scheme represents an elaborate structure of semantic, episodic (of moments) and procedural knowledge (action based on memories, including skills, strategies and skills). The individual scheme in a specific domain reflects not only self-description, but also an important individual domain, which fits the process of the congruent information scheme and motivates the congruent scheme in behaviors. Each individual has a unique collection of individual schemes in different domains and content, which are derived from personal experience, values or social context (Lee *et al.* 2019). The contribution of an individual scheme of healthy eating behaviors and food literacy in the behaviors of 1,216 students from 6 Universities in Taiwan was studied by Lee *et al.* (2019). The results found demonstrate that both students with an individual scheme of healthy eating behaviors and those with high levels of food literacy have relevant knowledge, skills and cognitive functions, although they are levelled differently in the way they use this knowledge and these skills. Thus, having an individual scheme for healthy eating and food literacy allows greater regulation of eating behavior than any of these functions individually (Lee *et al.* 2019). It was also apparent that an individual scheme of healthy eating behaviors facilitates the way information is processed in relation to healthy eating behaviors, which is linked to learning and nutrition literacy and which leads to effective eating behaviors (Lee *et al.* 2019). To increase the effectiveness of interventions in food literacy, the individual scheme must be increased because, as soon as the individual realizes that it is important to him, he increases the level of literacy and self-motivation to have healthy eating behaviors (Lee *et al.* 2019).

The promotion of healthy eating and healthy individual diet should work individually, stimulating the individual's interest in healthy eating behaviors, giving them the opportunity to reflect on all their possibilities and choices. By directing the intervention toward decision making, it creates an awareness of the risks and benefits of their food options, with the establishment of short-, medium- and long-term goals (Lee *et al.* 2019).

Silva *et al.* (2018) developed a systematic literature review to study the prevalence and factors associated with negative self-perceived health in adolescents. According to them, the negative self-perceived health

was associated with socioeconomic and environmental factors and behavioral conduct. There was also an association with tobacco consumption, low level of physical activity, stress, dissatisfaction with weight and life in general and behaviors associated with suicide. The socioeconomic factors characteristic of adolescents with poorer self-perception of health were families with lower income and less access to leisure activities, education, housing conditions and health services. With regard to family problems, the distance and weak support for family structural decisions and less social support are highlighted. It was also more associated with females, as women are more likely to seek health services, perform more routine examinations, which increases the likelihood of early diagnosis of different pathologies, suffering from high levels of stress when compared with men. Women are more sensitive to the early detection of physiological changes and habits that are inappropriate for health, and therefore have poorer self-perception of health.

The results of our survey indicated that food or alcohol literacy are related with some eating practices. Studies of adolescents have recently emerged to assess their literacy level, however, there is still a long way to go according to Bröder et al. (2017). The authors carried out a systematic review of the literature with an inductive content of definitions and models of health literacy in young people up to 18 years old, with the objective of taking the first step toward future effective literacy interventions in health to promote the health of children and young people. According to them, children and young people acquire four skills: the search, understanding, evaluation and application of health information (as well as in health services, knowledge, attitudes and practices). These competencies cover health care, disease prevention, health promotion, with knowledge, skills and motivation being transversal (Bröder et al. 2017). The acquired information can be used to make informed health decisions and constitute a direct dimension that allows observing or measuring the health literacy of those children or adolescents.

Khajouei and Salehi (2017) developed a work with secondary school students in Kerman, Iran, with 312 young people aged 15–18 years. The north and south regions were separated by clusters, each region presented 25 schools by sex. Eight schools were selected at random, 30 students from each year in each school were randomized, the selection was done according to the numbering of the list for a final sample of 312 students. Iranian schools are unisex and there is no differentiation in the way health literacy classes are taught. The literacy level of young people was only suitable for 29% of students.

Girls had higher levels of literacy than boys and no association was found between educational level and literacy level.

Food literacy is an extension of health literacy, which refers to concerns related to diet, reflecting healthy eating skills and influencing eating behaviors. Secondary education is essential for training in terms of health behaviors, which includes the eating patterns. Young high school students have unhealthy eating habits, ingesting too much fat, salt and calories instead of consuming fruits and vegetables, which contributes to poor nutrition and therefore weight gain and the associated pathologies (Lee et al. 2019).

5 Conclusion

Adolescence is a period of transition with physical, psychological and emotional development of social and intellectual skills, which are extremely important for adult life. The factors that influence adolescent morbidity and mortality are mostly preventable. Preventing health risk behaviors in adolescents helps prevent disease, improve health and quality of life. An insufficient level of health literacy compromises skills to access, understand, evaluate and apply information to make health-related decisions.

We found that in terms of eating habits, young people eat 4 to 5 meals daily, most eat fast food weekly, but they also regularly consume soup (3 or more times/week), fruit (1–2 servings/day) and vegetables (1–2 servings/day).

Most young people choose to have 3 or more meals per week in the school canteen, but an expressive majority consumes fast food meals on a weekly basis (1–2 times/week).

Regarding the domains of food literacy evaluated, girls have more knowledge than boys about food and alcohol consumption. It should be noted that young people with more literacy are those who attend the 10th grade school year, which may reflect the recent policies to develop the concept of health-promoting schools, which promote healthy eating habits and regular exercise in their students.

WHO (2017) and Sánchez-Carracedo et al. (2016) refer that girls have a higher level of literacy in food and adopt healthier eating behaviors when compared with boys. Young people aged 16–18 years demonstrate more knowledge than slightly older people, with significant differences. The results obtained are in agreement with Alcântara

et al. (2019), Muth et al. (2019), Nikolaou et al. (2020) and Lee et al. (2019). Young people still frequently consume fast food, little fruit and vegetables, which contributes to the increased risk of cardiovascular disease, diabetes and obesity, among others.

Boys suffer more from alcohol consumption than girls, increasing the risk of excessive consumption of tobacco, alcohol and poor eating habits (WHO 2018).

Our results point to the importance of health intervention programs in schools where issues related to food take into account gender differences and the age of students. The information acquired allows informed health decisions to be made and contributes to positive changes in adolescent eating habits. The health education programs to be implemented should consider social networks and a communication application as the preferred source of information for this age group.

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