



STUDY OF THE EATING HABITS AND BEHAVIOR OF BULGARIAN STUDENTS AND THEIR IMPACT ON THEIR HEALTH

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ABSTRACT

Nutritional needs evolve with children and adolescents as they grow, making a balanced diet essential for their health and development.

This study **aims** to assess weight status, nutrition knowledge, dietary habits, beliefs, and motivations regarding healthy eating campaigns among adolescents across Bulgarian cities. Findings will guide recommendations to improve their health and quality of life.

Materials and methods. The study used a cross-sectional approach with an online survey from 2022 to spring 2023, targeting 14 to 19-year-olds in multiple Bulgarian cities. Data analysis utilized SPSS v.23.0 and Microsoft Excel, covering demographics, dietary and motivations.

Results. The study included 566 participants, diverse in age, gender, height and weight. Most were boys (55.8%) and girls (44.2%), averaging 16.09 years in age and 169.7 cm in height. Many fell within the 51-70kg weight range. While 65% were familiar with healthy eating principles, interest in educational courses varied, and 45.1% had tried dieting. Social media was the primary information source for healthy eating among youth.

Discussion. This study reveals good awareness of healthy eating among Bulgarian youth but identifies gaps, especially their heavy reliance on social media for nutritional guidance. Effective motivation is crucial for educational engagement, emphasizing both social and educational benefits. Targeted programs and strategic social media use are vital for promoting healthier lifestyles.

Conclusions. Social networks and online influencers significantly impact youth awareness of healthy eating, necessitating a critical approach to information. Education remains pivotal in fostering healthy dietary habits through tailored resources and campaigns.

Keywords: children and adolescents, nutritional needs, eating habits and behavior, balanced diet, lifestyle,

INTRODUCTION

The nutritional needs of children and adolescents change depending on their physical and cognitive developmental stages. As children and adolescents age, eating habits continue to play an important role in their proper physical and cognitive development. Physiology, metabolism, and nutritional requirements are related to the eating behaviors and feeding trends of children and adolescents. They need a balanced diet that provides sufficient nutrients necessary for their development. Additionally, adolescents have specific needs, such as an increased amount of calories and micronutrients, to support their active lifestyle [1].

Adolescent nutrition and transition are closely intertwined, as eating patterns and behaviors are influenced by many factors, including peer influence, parenting patterns, food availability, food preferences, price, convenience, personal and cultural beliefs, mass media, and body image [2].

Good eating habits and a healthy diet are important for preventing many diseases, such as diabetes, cardiovascular disease and obesity. Conversely, improper nutrition can lead to adverse health consequences, such as underdevelopment, weight loss, and even disruption of the immune system [3, 4].

The growth and development of children and adolescents depend on numerous factors, including their eating habits and behavior, which can have a significant effect on their health. Inadequate dietary patterns during childhood and adolescence are associated not only with the onset of obesity at a young age but also with an increased risk of developing certain diseases in adulthood. Therefore, establishing and maintaining a healthy diet at an early age is of great importance for public health [5].

Physical activity plays an important role in the for-

mation of eating habits and behavior of adolescents and young adults. It includes sports, exercise and various activities that significantly impact their diet and lifestyle [6]. Engaging in physical activity helps improve overall health, maintain proper body shape and strengthen muscles and bones. Additionally, physical activity helps improve mood and reduce stress, positively affecting people's mental well-being. To achieve maximum benefits, physical activity must be enjoyable and suited to young people's individual preferences and interests. Adequate physical activity and a balanced diet are crucial factors that affect a person's lifelong physical and mental health [8]. The effects of physical activity and eating habits also affect the development of chronic diseases in adulthood [8, 9]. Sport and other physical activities can encourage children to choose healthier foods to provide energy for their activities. All of this underscores the need to implement initiatives that promote physical activity and healthy dietary habits among children and adolescents, as well as maintain a healthy weight [10].

Statistics show that more than 80% of adolescents and young adults do not meet the minimum recommended amount of physical activity set by the World Health Organization (WHO). This deficiency of physical activity can lead to weight gain and even obesity, which, in turn, increases the likelihood of various health problems. In light of these data, it is essential to encourage physical activity among children and adolescents in order to improve their health and well-being [11].

The home is an important social environment in which a child develops and maintains eating habits that influence weight status [12]. Previous research has shown that parents play a powerful role in creating a home environment by providing some foods instead of others, home-cooked meals and advising on healthy food choices. Parents' eating practices are a key feature of the family environment in which children learn about food and nutrition [13]. Their influence on children's developing food preferences and eating behaviors, acting as eating behavior models, have a major impact on their future health problems [14]. Also, family gatherings related to various rituals and meals can affect how children and adolescents consume food. Extensive evidence suggests that parenting behaviors influence child development and growth, including cognitive and social-emotional development, as well as the development of self-regulatory skills. There is evidence of an existing relationship between parents' eating behavior and feeding practices and BMI expressed by the percentage of body fat in their children [15].

The influence of the social environment (peers, school and social media) significantly affects the eating habits and behaviors of children and adolescents. It can be used for influence, information and persuasion. Many adolescents and teenagers are exposed to advertisements

for food products that are rich in sugars and fats. A common tactic is the use of celebrities and influencers and the promotion of "unhealthy" products aimed at the adolescent population. These products may seem attractive and readily available, which can lead to poor eating habits and adverse health outcomes such as obesity, hypertension, and type 2 diabetes. [16, 17]

Social media platforms such as Facebook, Facebook Messenger, YouTube, Instagram, Twitter, blogs, websites and forums are part of this environment. Research shows that 95% of teens aged 13 to 17 own a smartphone, 51% use Facebook, 69% use Snapchat, 72% use Instagram, and 85% use YouTube [18]. Social media influences eating behavior as young people use these platforms to share ideas about their food and diet. Instagram and Facebook are among the most popular social media platforms that have been shown to influence both positive and unhealthy eating behaviors, which only underscores the importance of understanding and managing this influence to promote healthy eating habits and behaviors among young people [19, 20]. Social media mobile apps are gaining more influence due to global reach, popularity and activity. Research shows that digital and mobile applications for healthy eating can be a powerful tool for achieving wider dissemination and effectiveness of healthy eating patterns among children and adolescents. These tools provide new opportunities for education and information access that can play an important role in improving young people's eating behaviors and healthy habits [21, 22].

In the context of the school environment, common barriers to healthy eating are time constraints, unhealthy snacks, convenient high-calorie food, stress, high prices of healthy food and easy access to junk food and lack of education on healthy eating issues. Many students do not know how to choose food that is healthy for them. Also, many choose a food that is rich in sugars and fats, which can lead to weight and health problems. Schools can play an important role in the education and promotion of healthy eating among students. Factors contributing to healthy behaviors include improved food knowledge and education, meal planning, participation in food preparation, and physical activity [23]. The characteristics of the school environment, where children spend a significant part of their time, can facilitate or hinder the adoption of healthy eating habits among students [24]. Creating a supportive school environment that addresses these obstacles and promotes healthy behaviors may have a key role in stimulating public health and well-being among students [25, 26]. Research in this direction is of great importance for the development of effective programs to improve healthy eating habits among students [27].

A literature review showed that school interventions were generally able to influence attitudes, knowledge, behavior, and anthropometrics but that intervention

design influenced effect size. In general, food-focused interventions using an eco-friendly approach are the most effective. Thus, schools as a system have the potential to make lasting improvements, providing a healthy school environment to improve children's health in the short and long term [28, 29].

In Bulgaria, there are recommendations for healthy eating for students aged 7 to 19 years, which are in line with the nutritional recommendations of WHO and EU standards. These recommendations emphasize food diversity, regular meals, daily consumption of more vegetables and fruits, reduced sugars and fats, especially of animal origin, and low salt intake. Moderate consumption of meat, fish, eggs and dairy products is recommended, along with avoiding excess weight. It is also particularly important to maintain proper hydration by drinking a sufficient amount of water (at least 8 glasses per day) [30].

Bulgarian adolescents are at high nutritional risk, facing problems such as being overweight or obese and anemia. In this population, there is a lack of research aimed at understanding the contextual factors that influence the eating habits of adolescents in Bulgaria in order to provide information on the implementation of public health interventions. This study aimed to understand sociocultural influences on nutrition among adolescents using qualitative methods.

The aim of this study is to assess the state of weight, nutritional knowledge and habits, dietary beliefs and motivation to participate in campaigns to promote healthy eating among a sample of adolescents from several Bulgarian cities, which can be useful for making recommendations to promote health and improve the quality of life of this group of the population.

MATERIALS & METHODS

The methodology of the survey includes conducting a cross-sectional survey in the autumn of 2022 and spring of 2023 in several Bulgarian cities. Participating children and adolescents between the ages of 14 and 19 completed an online questionnaire that included questions related to their eating habits and behaviors, dietary beliefs and nutritional knowledge. For the analysis of the data, the Statistical Package for the Social Sciences (SPSS) v.23.0. and Microsoft Excel were used. The survey includes basic demographic data such as age, gender, height and weight, as well as issues related to healthy eating, such as familiarity with the principles of healthy eating, sources of information, willingness to participate in training courses on healthy eating, motivation to participate in a campaign to promote healthy eating, etc. After collecting the qualitative data, percentage distributions were derived from seeing adolescents' opinions on issues related to their eating habits and behavior. Quantitative data are expressed as means and standard deviation ($M \pm SD$). A correlation analysis was made to establish the relationship between the different variables. P-value at \hat{A} 0.01 is used to determine the significance level.

RESULTS

Demographics refer to study participants and include information about age, gender, height, and weight. The study involved a total of 566 participants, with a minimum sample size of 384 participants (Krejcie & Morgan, 1970; Sample Size Calculator, n.d.). This allows a confidence of 95% and ensures that the real value is within $\pm 5\%$ of the measured/studied value. The selected sample is representative of the general population, reflecting the percentage distribution of girls and boys: 44.2% girls and 55.8% boys (Table 1).

Table 1. Distribution of participants by sex

		Frequency	Percent Valid	Percent	Cumulative Percent
Valid	boys	316	55.8	55.8	55.8
	girls	250	44.2	44.2	100
	Total	566	100	100	

The average age of the participants was 16.09 ± 4.320 years. The average height of the participants was 169.7 ± 10.13 cm. The total number of valid observations to be used in the analysis is 566 (Table 2)

Table 2. Demographic data- age, height (n=249 girls, n=317 boys)

Descriptive Statistics					
	N	Min.	Max.	Mean	Std. Deviation
Age	566	9	69	16.0901	4.32044
Height (cm)	566	140	197	169.6908	10.12758
Valid N (listwise)	566				

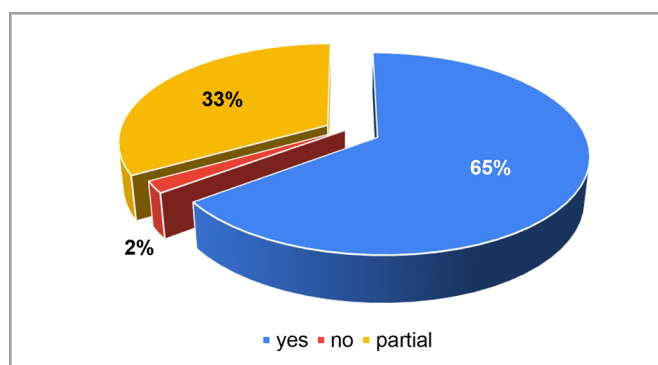
Table 3 provides information on the weight of the study participants. It presents the different weight intervals matched by the number of participants in each category. The lowest category is "under 40 kg", where 17 (3%) participants rank. Following are the intervals from 41 to 100 kg, in which there is a distribution of participants by number in each category. The most numerous, 99 (17.5%), were participants in the range of 51 to 55 kg, followed by those in the range of 56 to 70 kg, with the largest percentage of them, 91 (16.1%) falling within the range of 56 to 60 kg. From 71 to 100 kg, there are fewer participants, and their number decreases with weight gain. In the range from 71 to 75 kg, there are 46 (8.1%) participants, and in the range from 96 to 100 kg, there are only 10 (1.8%) participants. 5 (0.9%) of the total stand out with a weight "over 100 kg". Summarizing, the data show a variety in the weight categories of the participants, with the highest number in the intervals from 51 to 70 kg., which may be useful information for studying the weight distribution in the selected group of participants (Table 3)

Table 3. Distribution of participants according to weight categories

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 40 kg	17	3	3	3
	41-45 kg	61	10.8	10.8	13.8
	46-50 kg	61	10.8	10.8	24.6
	51-55 kg	99	17.5	17.5	42
	56-60 kg	91	16.1	16.1	58.1
	61-65 kg	56	9.9	9.9	68
	66-70 kg	60	10.6	10.6	78.6
	71-75 kg	46	8.1	8.1	86.7
	76-80 kg	26	4.6	4.6	91.3
	81-85 kg	13	2.3	2.3	93.6
	86-90 kg	10	1.8	1.8	95.4
	91-95 kg	11	1.9	1.9	97.3
	96-100 kg	10	1.8	1.8	99.1
	Over 100 kg	5	0.9	0.9	100
Total		566	100	100	

The data shows that most of the surveyed persons (65%) are familiar with the principles of healthy eating. Almost a third of participants are partly familiar, which may mean that they have some knowledge in this area, but there may also be shortcomings or gaps in their knowledge. On the other hand, only a small percentage (1.8%) are not familiar with the principles of healthy eating. This may mean that information on healthy eating is available and that there exists a knowledge base that can be expanded (Fig. 1).

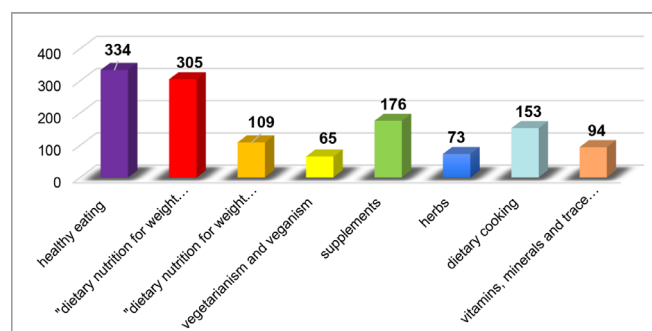
Fig. 1. Percentage distribution of familiarity with healthy eating principles among participants.



Healthy eating is a topic of great interest to children and adolescents (334), as it is the most frequently mentioned topic in their responses. This may mean that they realize the importance of healthy food and have an interest in what it is specifically and how it can affect their health and well-being. “Dietary nutrition for weight loss” (305) and “Dietary nutrition for weight gain” (109) are also highly appreciated, reflecting the desire of young people to learn more about dietary strategies related to weight con-

trol. Vegetarianism and veganism (65) also attract the interest of some young people, as well as the topics of supplements (176), herbs (73), dietary cooking (153) and vitamins, minerals and trace elements (94), which are also mentioned as interesting. Steroids are very rarely mentioned. These data demonstrate the diversity of interests and needs of young people in terms of healthy eating and can be useful in planning information and educational programs that meet their interests and needs (Fig. 2).

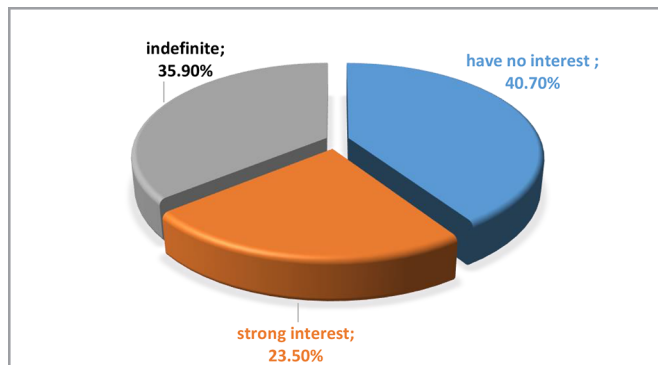
Fig. 2. Interests of young people on healthy eating topics



The respondents’ responses showed that almost a quarter, 133 (23.5%) of participants had an interest in training courses on healthy eating, with almost half 230 (40.7%) not interested in getting involved. The remaining 203 (35.9%) are indefinite and may be open to the idea of getting involved but have not yet decided. These results suggest an interest among young people in healthy eating courses, but unfortunately, not all are ready to engage in such programs. This can serve as a signal for further efforts to better inform and promote healthy eating training in order to increase interest and encourage more people to get

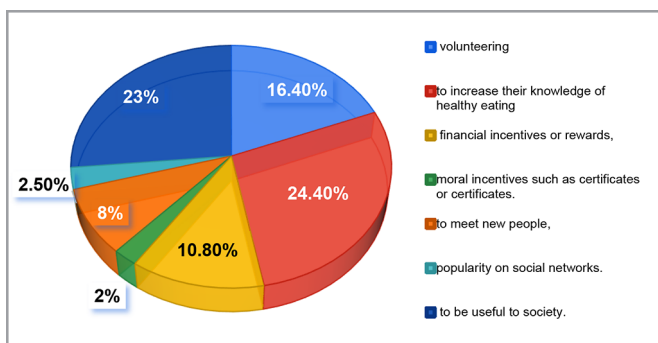
involved. It is important to note that the inclusion of young people in campaigns to promote healthy eating can benefit them and society as a whole by promoting healthy lifestyles (Fig. 3).

Fig. 3. Interest in participating in healthy eating courses among young people



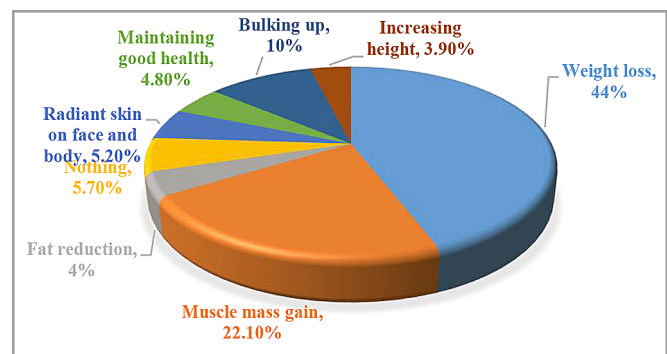
The statistics show us the motives of the participants in campaigns to promote healthy eating in their capacity as trainers. It is clear from the participants' responses that participation in campaigns to promote healthy eating as a trainer is motivated by various factors. The data shows that volunteering is an important motive for participating in the Healthy Eating Promotion Campaign as a trainer for 16.4% of participants, while more than half (47.4%) of participants participate to increase their knowledge of healthy eating or to be useful to society. Interestingly, only 10.8% of participants were motivated by financial incentives or rewards, and less than 2% wanted moral incentives such as certificates or certificates. 7% of participants would join the campaign to meet new people, while 2.5% want to increase their popularity on social networks. This may indicate that participants are more likely to participate in eating behavior change campaigns that have a social purpose than for personal gain. Most participants in the campaign are motivated by the desire to learn and develop their knowledge about healthy eating, not by the desire to obtain any formal certificates or recognitions. This may be related to the fact that the campaign can be aimed at people who already have an interest in healthy eating and wish to learn more about it (Fig. 4).

Fig. 4. Motivation to participate in campaigns to promote healthy eating as trainers/educators



According to the survey results, nearly half of the boys and girls (45.1%) have followed a diet at some point in their lives, 18.4% have tried to follow it, while 36.6% have not. These results highlight that the majority of young people surveyed realize the importance of healthy eating and weight control. However, it should be borne in mind that a diet attempt is not always successful and can have negative health consequences in certain cases. Figure 5 presents the motivations for adhering to a diet among the survey participants. This figure includes the percentage for each of the listed motivations, such as weight loss, weight gain, maintaining muscle mass, reducing fat, improving skin and growth. The highlighted percentage of 44% for weight loss clearly emphasizes that a large portion of the participants are motivated to control their weight. In other words, this is the primary motivation for many of them to choose specific diets and follow dietary practices. Meanwhile, the smaller percentage of 10% aiming for weight gain indicates that for a smaller number of participants, the goal is to increase body mass. The other motivations also highlight the variety of desires and goals among the participants, underscoring the complexity of their relationship with food and body (Fig. 5).

Fig. 5. Diagram of dietary habits and awareness of the importance of healthy eating among young people and girls

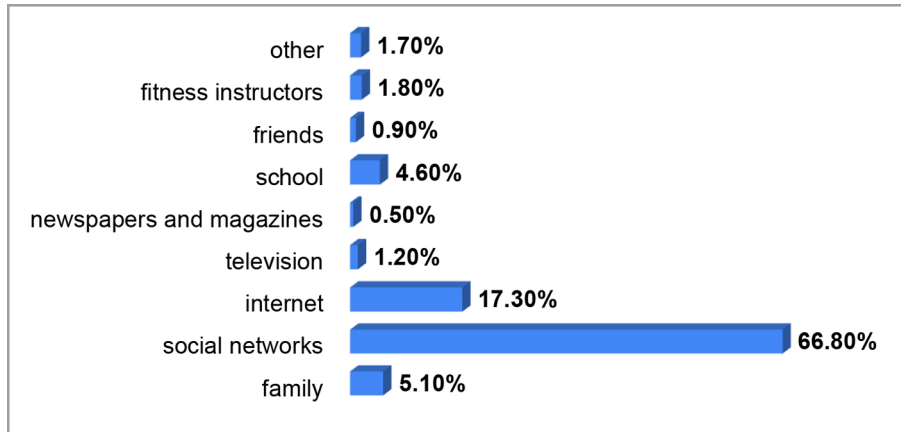


The study shows that social networks are the most frequently cited source from which boys and girls get information about healthy eating, with 66.8% of them choosing these platforms to search for information. This means that social networks play an important role for young people as a source of information, which can also be related to the fact that these platforms provide easy access to many types of information, as well as the opportunity to share personal opinions and experiences. This also includes information provided by vloggers and influencers that have a significant impact on the preferences and behaviors of young people and girls regarding healthy eating. However, it is important to keep in mind that the information obtained from social networks, incl. from these personalities, can be unreliable, which is why

it is important to show critical thinking and verification of information to ensure its relevance and credibility. The Internet was the second most frequently answered by participants, where 17.3% of respondents found the information, which included websites, forums, blogs, online news and other online sources of information. This means that online presence is of great importance for the information

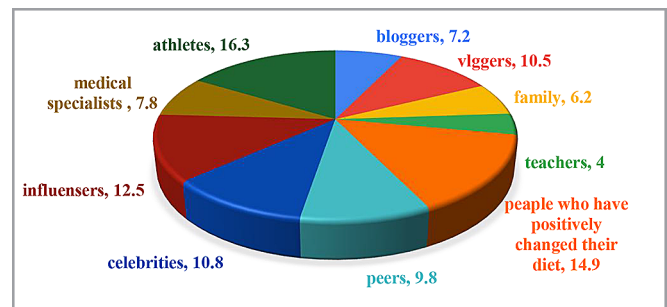
environment of young people and girls and that these groups tend to look for information about healthy eating, especially on the Internet, including social networks. The remaining sources of information, such as television, newspapers, magazines, friends and fitness instructors, were less indicated by the age group studied (Fig. 6).

Fig. 6. Preferred sources of information on healthy eating among young people and girls.



The survey data also gives us an idea of where students would most easily perceive information about healthy food. The most significant sources of information are athletes and people who have changed their diet in a positive direction with a visible result. This may be related to the fact that these groups have the opportunity to present a lifestyle related to healthy eating and inspire others to follow similar principles. Influencers, celebrities (musicians, artists and TV stars), vloggers, and bloggers are also cited as sources of information on healthy eating. This highlights the influence of these personalities on social networks and online, with young people being inspired and informed by them. Medical professionals are cited as important sources of information because of their expertise and specific knowledge. For the transmission of knowledge and examples of healthy eating, significant sources are also family and teachers, which emphasizes the importance of relatives and educational environments in this area. These data suggest that students would perceive healthy eating information from a variety of sources. It is important to bear this variety of sources in mind and to use appropriate methods to provide the information in a way that is easily understood and attractive to students. The development of effective educational tools to support nutrition-related learning is needed to improve nutritional knowledge on healthier habits (Fig. 7).

Fig. 7. Preference chart for sources of information on healthy eating among students.



After conducting a correlation analysis, a relationship between the different variables was found. There is a strong positive relationship between gender and height ($r=0.504$, $p < 0.01$), meaning that there is a propensity between gender and larger size sizes, with boys usually having larger height sizes than girls. There was also a strong positive association between height and weight ($r=0.683$, $p < 0.01$), meaning that participants with larger size sizes had more weight. Between age and weight, there was also a strong positive correlation ($r=0.195$, $p < 0.01$), meaning that older participants had more weight. All correlations that are significant at the 0.01 level (2-tailed) show statistically significant relationships between the variables (Table 4).

Table 4. Correlation analysis of factors: age, sex, height, weight.

		Correlations			
		age	sex	height	weight
age	Pearson Correlation	1	-0.061	.164**	.195**
	Sig. (2-tailed)		0.15	0	0
	N	566	566	566	566
sex	Pearson Correlation	-0.061	1	.504**	.386**
	Sig. (2-tailed)	0.15		0	0
	N	566	566	566	566
height	Pearson Correlation	.164**	.504**	1	.683**
	Sig. (2-tailed)	0	0		0
	N	566	566	566	566
weight	Pearson Correlation	.195**	.386**	.683**	1
	Sig. (2-tailed)	0	0	0	
	N	566	566	566	566

** Correlation is significant at the 0.01 level (2-tailed).
r - Pearson Correlation

DISCUSSION

This study provides important insights into the dietary habits and knowledge of young people in Bulgaria. With the inclusion of 566 participants, the study ensures a high level of representativeness. Most participants are familiar with the principles of healthy eating, but there is a need for additional educational efforts for the rest. The interests of the youth include healthy and dietary nutrition, vegetarianism, and dietary supplements. Social networks and the internet are the main sources of information about healthy eating. Many participants show interest in educational courses, but a significant portion remains uninterested, indicating the need for more effective motivation. Young people participate in healthy eating, campaigns mainly for social and educational reasons, with financial incentives playing a smaller role. The results highlight the need for targeted educational programs and the effective use of social networks to promote a healthy lifestyle.

CONCLUSION

Such studies reveal the significant impact of social networks, athletes, people with altered eating habits, and online influencers on the information class of young boys and girls about healthy eating. These sources play an important role in transmitting knowledge, inspiring, and exchanging experiences. However, criticism of the information obtained from these sources must be demonstrated, and its reliability and timeliness must be verified. Proper education and awareness are essential for promoting healthy eating and making informed decisions. The research highlights the need to create information resources that meet the needs and preferences of adolescents, personalize information and support them in achieving a healthy lifestyle. Mobile apps, educational games, social media, and educational campaigns are ways to reach children and adolescents and motivate them to eat healthily.

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