

Attitudes toward healthy lifestyle among students from two schools in Varna

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This research aims to investigate the attitudes towards a healthy lifestyle among students aged 12-19 from two schools in Varna. The healthy habits acquired in youth are key to maintaining good health in adulthood and old age. The research is anonymous, questionnaire-based, and conducted electronically using a Google Form from September to October 2022. It includes 125 students. The survey contains 28 questions related to various aspects of a healthy lifestyle - dietary habits, alcohol consumption, smoking, and physical activity. The survey results have been processed in Excel and percentages have been calculated. Regarding healthy eating, one of the criteria is the consumption of fruits and vegetables, which is reported by all respondents. Fish is part of the menu for a minority, with only 19.2% including it in their weekly diet. Fatty meats such as pork are preferred by 27.2% of students, while 56.8% prefer chicken meat. A significant percentage, 43.2%, consume alcohol, with 21.7% of them doing so daily. Smokers account for 21.6%. As for physical activity, the results favor a healthy lifestyle. Actively participating in physical education and sports classes are 81.4% of students. The study emphasizes the need for educational programs in schools related to the principles of nutritious eating and a healthy lifestyle, avoiding bad eating habits, and the benefits of physical activity for our health.

Keywords: healthy lifestyle, healthy eating, dietary questionnaire, adolescents, school-aged students, nutrition, activities

INTRODUCTION

Adolescence, which spans the ages of 12 to 19, is a critical period of growth and development. Establishing healthy eating and lifestyle habits during these years has a lasting impact on both physical and mental health. The World Health Organization (WHO) emphasizes the importance of a balanced diet and active lifestyle for adolescents to support their growth and cognitive development. Proper nutrition and healthy habits formed during adolescence can lay the foundation for a healthy adult life. This stage of life is crucial for promoting long-term health and well-being.

Many of the habits acquired during the teenage years persist into adulthood. For example, alcohol consumption and smoking habits developed during adolescence are often carried into later life. The likelihood of alcohol use in youth leading to addiction in adulthood is particularly high [1]. Overweight and obesity are risk factors for the development of various non-communicable diseases, including diabetes, cardiovascular diseases, and several types of cancer, as well as premature mortality [2-5].

In many countries and regions, childhood obesity is increasing [6,7]. If this trend continues, it is projected that by 2025, 20% or more of children and adolescents in over 30 countries around the world will be obese [8].

Healthy eating habits acquired during adolescence are essential for maintaining those habits throughout life [9]. Some chronic diseases begin and progress specifically during this age [10]. For these reasons, young people need to acquire healthy lifestyle habits during adolescence, which are crucial determinants of their long-term health. Motivated by this, we surveyed the approximate percentage of children and adolescents aged 12 to 19 who attempt to live healthily in two schools in Varna. The study was conducted as part of the project "Healthy Lifestyle? But How and Since When? Not Tomorrow, but Today and Now!", funded by the Municipality of Varna, Directorate of Youth Activities and Sports.

METHODS AND MATERIALS

Objectives of the Study

The study was conducted as a survey to examine the attitudes of school-aged students toward a healthy lifestyle. The participants were students from two schools in the city of Varna: the „Dr. Ivan Bogorov“ - Vocational High School of Economics and seventh-grade students from the „Otets Paisiy“ - Primary School.

The main objectives of the study are:

- Calculating the percentage of participants categorized as underweight, normal weight, overweight, or at risk of obesity;

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- *Calculating the percentage of participants* categorized as underweight, normal weight, overweight, or at risk of obesity;
- *Analysis of students' dietary and physical activity habits:* Determining the frequency and quality of meals, food preferences, and the level of physical activity among youth aged 12-19;
- *Assessment of the prevalence of harmful habits:* Investigating the frequency of alcohol consumption, smoking, and the use of carbonated drinks and unhealthy foods among young people;
- *Formulating recommendations for future research:* Providing guidance on expanding the scope of the study with larger samples and conducting a more in-depth analysis of the factors influencing students' healthy lifestyles.

Procedures and Participants

The survey was conducted by high school and medical students under the supervision of Senior Assistant Professor Y. Eneva, in collaboration with biology and computer science teachers from the "Dr. Ivan Bogorov" Vocational High School of Economics. It was administered using Google Forms and was conducted anonymously. The survey took place from September to October 2022 in an electronic format. Participation was voluntary, with 125 students taking part. No incentives were offered for participation. Consent for the anonymous use of the survey results was obtained from both participants and their parents or guardians.

The first two questions of the survey aimed to determine the age and gender of the participants. The results showed that 56% of the respondents were girls and 44% were boys. The age distribution was as follows: 72.8% were aged 16 to 19 years, while 27.2% were aged 12 to 15 years.

Determination of Body Mass Index (BMI) of the Participants

The last two questions collected information on the respondents' height and weight to calculate their Body Mass Index (BMI) [11]. BMI is a medico-biological indicator used to assess healthy weight relative to height and weight, and it helps diagnose underweight, normal weight, overweight, and obesity. Developed by Belgian sociologist and statistician Adolphe Quetelet in 1869, BMI is calculated using the formula:

$$BMI = \frac{W}{h^2},$$

where, *BMI* - Body Mass Index, *W* - weight (kg), *h*² - height (m)

Socio-economic status and ethnic origin were not subjects of our study, and questions related to these topics were not included in the survey.

Questions on Healthy Lifestyle Behaviors

Through 24 questions, we gathered information about the students' lifestyles. Twelve of these questions focused on their eating habits and how closely these align with healthy eating guidelines. The questions included:

- ✓ How many times a day do you eat?
- ✓ Do you eat between main meals?
- ✓ What do you like to eat between main meals?
- ✓ How do you eat (e.g., sit-down meals, eat on the go)?
- ✓ Do you have breakfast?
- ✓ How often do you consume sweets, fruits, vegetables, fish, and seafood?
- ✓ What do you prefer to eat during breaks?
- ✓ What types of meat do you enjoy?
- ✓ Do you follow the rule of not eating 2 hours before bed?

The next four questions focus on the use of alcohol and carbonated beverages. While it is well known that alcohol is highly detrimental to adolescents, studies indicate that many teenagers experiment with alcohol, sometimes frequently, and may view it as prestigious. Early alcohol consumption increases the risk of addiction in adulthood. Therefore, we included the following questions:

- ✓ Do you drink alcohol?
- ✓ How often do you drink alcohol?

Carbonated drinks are typically excluded from a healthy lifestyle, so we aimed to assess their prevalence in the daily lives of young people. To this end, we included the following questions:

- ✓ Do you drink carbonated beverages?
- ✓ How often do you drink carbonated beverages?

Another harmful habit that often develops during adolescence is smoking. To assess its prevalence among teenagers, we included two questions in the survey: "Do you smoke?" and "How often do you smoke?" For those who responded affirmatively to the first question, we also asked, "How many cigarettes do you smoke per day?"

An important indicator of a healthy lifestyle is physical activity. To assess this aspect, we included five questions in the survey:

- ✓ Do you actively participate in physical education and sports classes?
- ✓ How do you feel after physical education and sports classes?

- ✓ Do you play sports outside of physical education and sports classes?
- ✓ How often do you exercise?
- ✓ Do you enjoy walking in nature?

Physical education and sports classes are mandatory in the curriculum. The first question aims to assess students' attitudes towards these classes, while the second evaluates their impact – whether they feel tired or stimulated and if they help them relax. Many young people are active in sports, engaging in activities such as going to the gym, running, or playing tennis. The next two questions are designed to determine the percentage of active sports participants. Additionally, we included a question about walking in nature to understand students' attitudes towards this activity and its role in relaxation and fresh air. Walking outdoors is particularly important for a healthy lifestyle, as it helps the body to relax and recover.

We processed the survey results using Microsoft Excel, calculated the percentage for each response, and created pie charts to visualize the data. The results are presented in the figures.

Data Analysis

Using the data from the table, we determined the percentage of participants in various weight categories: 11.2% were overweight, 22.4% were underweight, 2.4% were obese, and 64% were of normal weight. These percentages are based on survey responses and provide an estimate of the participants' weight status. Further personal research is needed to refine these results.

According to the WHO, over 340 million children and adolescents aged 5-19 were overweight or obese in 2016, underscoring the urgent need to promote healthy eating habits and physical activity. Additionally, iron deficiency anemia affects approximately 25% of the global adolescent population, which can hinder cognitive and physical development.

A healthy lifestyle encompasses habits related to nutrition, physical activity, rest, and stress reduction. Proper nutrition is particularly crucial for adolescents, as their bodies are developing and growing, requiring adequate energy from food. Healthy eating for adolescents involves:

- ✓ consuming wholesome and varied foods;
- ✓ ensuring sufficient intake of vegetables and fruits;
- ✓ limiting the consumption of fats, sugars, and salts;
- ✓ drinking sufficient fluids.

A varied diet is achieved by including at least one item from each of the following main food groups in the daily menu:

- ✓ cereals and/or potatoes;
- ✓ vegetables;
- ✓ fruits;
- ✓ milk and dairy products;
- ✓ protein-rich foods such as meat, poultry, fish, eggs, and legumes;
- ✓ added vegetable oils and/or dairy fat/butter.

Boys typically require more calories and higher protein intake compared to girls. It is recommended that their diet predominantly includes animal-based proteins—such as milk, meat, fish, and eggs—since these provide essential amino acids necessary for growth.

In early childhood, individual energy and nutritional needs vary based on factors like growth, sex, health status, and others. Inadequate intake of essential nutrients (proteins, calcium) and energy can impair bone mineralization, growth, physical activity, and resistance to infections.

After age 10, gender differences in bone structure and muscle mass become more pronounced, affecting energy requirements. For boys aged 10-14, energy needs range from 1900 to 2350 kcal per day, while for girls, the range is 1780 to 2180 kcal. For adolescents aged 14-19, the energy requirements are between 2820 and 3250 kcal for boys and 2000 to 2270 kcal for girls. The increased rate of growth during this period heightens the body's need for both structural and catalytic nutrients.

Leading nutrition experts recommend eating five times daily, consisting of three main meals and two snacks. The suggested distribution of energy intake is as follows: breakfast should provide 20%, the morning snack 2-5%, lunch 30-33%, the afternoon snack 20%, and dinner 25%. Irregular eating patterns, especially skipping breakfast, can negatively impact children's behavior, leading to poorer concentration, increased distractibility, and irritability. As shown in the diagram (Fig. 1), 34.4% of respondents reported eating fewer than three times a day, which does not align with healthy eating principles. Additionally, 50.4% of respondents reported that they eat slowly and seated, while the remainder eat quickly, often in front of the computer, while reading, or multitasking (Fig. 1). Eating more than five times a day is reported by 3.2% of respondents, while 4.8% eat five times a day, and 15.2% eat four times a day. Assuming that eating five or more times a day is considered healthy, only 8% of adolescents adhere to this principle. If we accept eating four times a day as a reasonable

compromise, then 23.2% of adolescents follow this healthier eating pattern. This indicates a need for educational programs on healthy eating. It is possible that those who reported eating more than five times a day were also including snacks between main meals, despite the survey question asking, "Do

you eat anything between main meals?". To this question, 78.4% of respondents indicated that they like to snack, but only 32.4% of them choose fruit, which is considered healthy (Fig. 1). The rest prefer less healthy options.

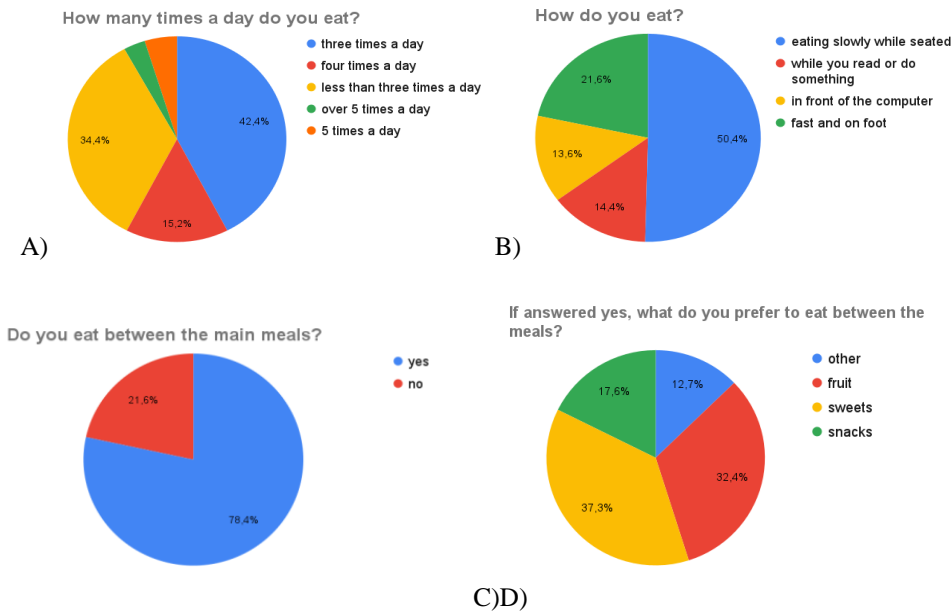


Figure 1. Illustration of respondents' answers to the questions: A) "How many times a day do you eat?"; B) "How do you eat (e.g., sit-down meals, eat on the go)"; C) "Do you eat between main meals?"; and D) "What do you like to eat between main meals?"

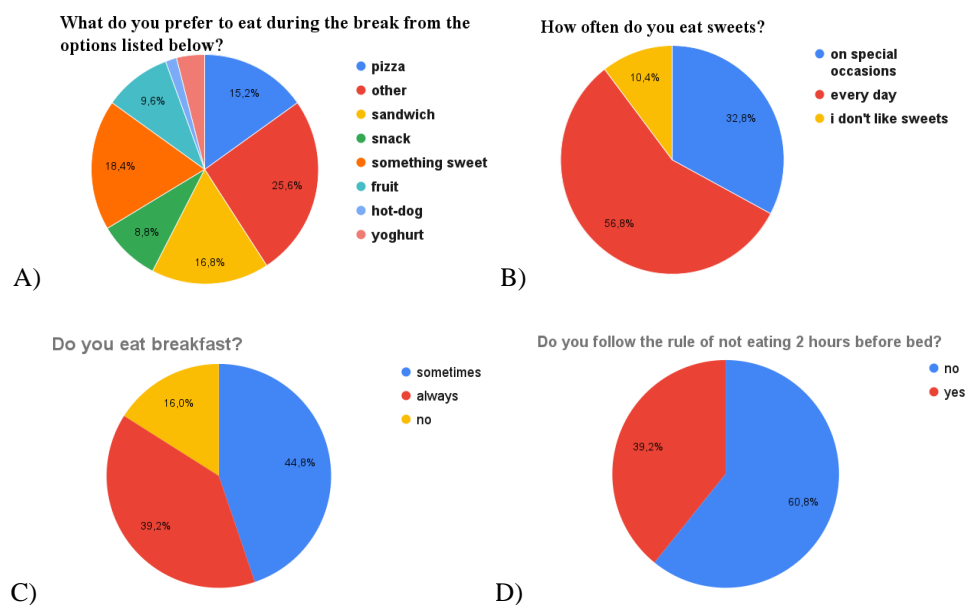


Figure 2. Illustration of respondents' answers to the questions: A) "What do you prefer to eat during breaks?"; B) "How often do you eat sweets?"; C) "Do you have breakfast?"; and D) "Do you follow the rule of not eating 2 hours before bed?"

To further explore eating habits, we asked, “What do you like to eat during breaks from the list below?” The results show that only 9.6% choose fruit, and 18.4% choose milk; the rest prefer items like pizza, sandwiches, breakfast foods, sweets, hot dogs, or other options (Fig. 2). Sweets are particularly popular, with 56.8% of students consuming them daily and 32.8% consuming them occasionally. The remaining 10.4% do not like sweets (Fig. 2). It is important to note that sweets and products with added sugars are not part of a healthy diet. Carbohydrates [12] should make up about 45-65% of an adolescent's daily caloric intake, serving as the primary energy source necessary for physical activity and brain function. Complex carbohydrates found in whole grains, fruits, and vegetables are preferable to simple carbohydrates because they provide sustained energy and are rich in dietary fiber. For instance, 100 grams of brown rice or oatmeal can offer substantial energy while supporting digestive health. Simple carbohydrates, such as those in sweet snacks and drinks, should be limited, as excessive consumption can lead to resistance changes, allergic reactions, dental caries, and obesity. The WHO recommends a daily intake of at least 400 grams of vegetables and fruits and at least 25 grams of fiber for individuals aged 10 and older.

Breakfast is one of the main meals of the day, yet only 39.2% of respondents report eating it regularly (Fig. 2). While eating breakfast is important, the

nutritional quality of the breakfast is also crucial; however, the survey did not include questions about the specifics of breakfast consumption. Another healthy principle is to avoid going to bed within two hours of eating, but 60.8% of students do not follow this guideline, meaning only 39.2% adhere to it (Fig. 2). Eating right before bed can lead to calorie storage around the waist, as the body metabolizes food more slowly and stores unprocessed food as fat. Additionally, this practice can impair the absorption of essential micronutrients, such as vitamins and minerals (e.g., vitamins B and D, iron, selenium, zinc, and chromium), leading to deficiencies that further slow down metabolism [13]. On the other hand, recent research [14] suggests that the effects of late eating, which refers to having dinner 1 hour before bedtime in the context of the study, may not be universally negative, particularly in healthy individuals, while traditional advice often recommends avoiding food close to bedtime to prevent impaired sleep quality. However, individual responses can vary, and factors such as the type of food consumed and personal health conditions should also be considered.

What teenagers consume – such as fruits, vegetables, fish, and seafood – along with their preferred types of meat, are key indicators of healthy eating. According to the survey, 45.6% of respondents eat fruit daily, and 67.2% consume vegetables daily (Fig. 3).

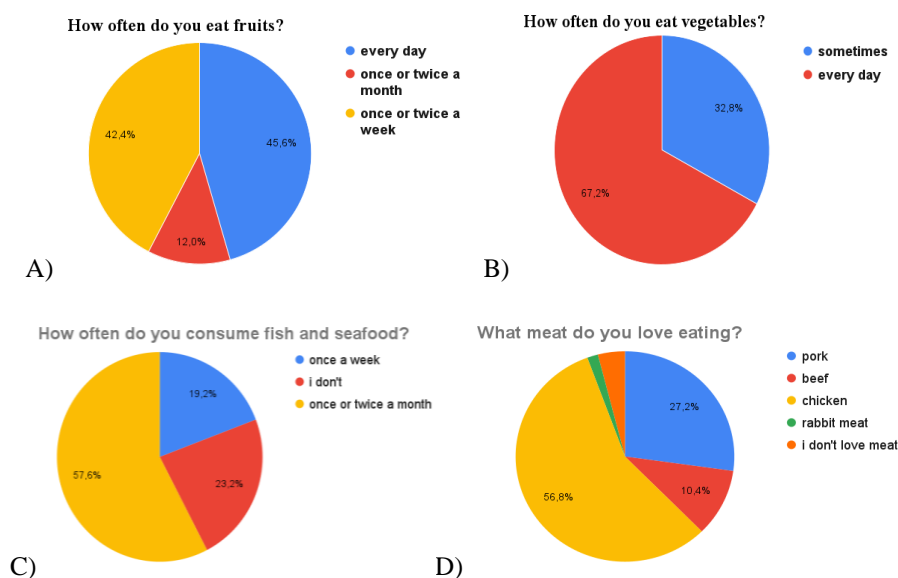


Figure 3. Illustration of respondents' answers to the questions: A) “How often do you eat fruits?”; B) “How often do you eat vegetables?”; C) “How often do you consume fish and seafood?”; and D) “What types of meat do you enjoy?”.

Only 19.2% of respondents consume fish once a week (Fig. 3). Fish is a well-known source of omega-3 fatty acids and proteins, which are essential for body growth. While fatty meats are not preferred, 27.2% of respondents favor pork, and 56.8% prefer chicken. The percentage of those who prefer rabbit or do not consume meat is very small—only 5.6% in total (Fig. 3). Protein is crucial for muscle development, tissue repair, and immune function. Adolescents need approximately 0.85 grams of protein per kilogram of body weight daily, which equates to about 50-60 grams per day for most. Protein sources should be varied and include lean meats (e.g., 100 grams of chicken breast), fish, eggs (one large egg contains around 6 grams of protein), beans, lentils, nuts (e.g., 30 grams of almonds), and dairy products. These foods not only provide the necessary protein but also essential amino acids and other nutrients that support overall growth and health [15].

Healthy fats are essential for brain development, hormone production, and overall health, contributing 25-35% of daily caloric intake. Unsaturated fats, found in foods such as avocados, nuts (e.g., 30g of walnuts), seeds, olive oil (one tablespoon contains about 14g of fat), and oily fish (e.g., 100g of salmon), are recommended. These fats help reduce inflammation and support cardiovascular health. In contrast, trans fats and saturated fats, commonly found in processed foods, should be limited, as they can increase the risk of heart disease and other health problems.

Adequate intake of iron, calcium, and vitamins is critical for adolescents. Iron is particularly important

for preventing anemia and aiding oxygen transport. According to the WHO iron deficiency anemia affects approximately 25% of the global adolescent population, which can hinder their cognitive and physical development. Girls, due to menstruation, require about 15 mg of iron per day, while boys need about 11 mg. Good sources of iron include 100 g of red meat, poultry, fish, lentils, beans, and fortified cereals. Calcium is essential for bone growth, with a recommended intake of 1,300 mg per day. This can be found in dairy products (e.g., one cup of milk provides about 300 mg), cheese, yogurt, fortified plant-based milk, and green leafy vegetables. Vitamin D, which is necessary for calcium absorption and bone health, should be consumed at around 15 mcg per day. Sources include fatty fish like salmon, fortified foods, and adequate sunlight exposure.

The age range of 12-19 is particularly vulnerable. Many lifelong habits are formed during this period, and unfortunately, vices such as alcohol abuse and smoking often begin at this age. WHO reports that in developed countries, 47% of boys and 36% of girls aged 15 consume alcohol more than once a week. Alcohol consumption is frequently linked to inadequate intake of certain vitamins and minerals, with folate deficiency often associated with chronic alcohol use. According to the survey results (Fig. 4), 43.2% of respondents reported drinking alcohol, with 6.7% consuming it daily, 21.7% weekly, 11.7% once or twice a month, and 60% only on occasion. Alarmingly, 7.7% of those who drink alcohol admitted to abusing it whenever they drank, and 29.9% had done so once or several times (Fig. 4).

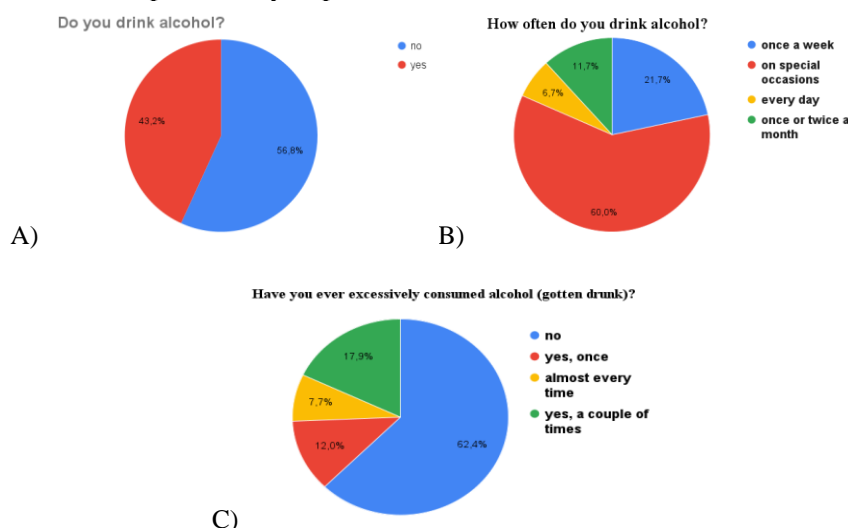


Figure 4. Illustration of respondents' answers to the questions: A) “Do you drink alcohol?”; B) “How often do you drink alcohol?”; and C) “Have you ever excessively consumed alcohol?”.

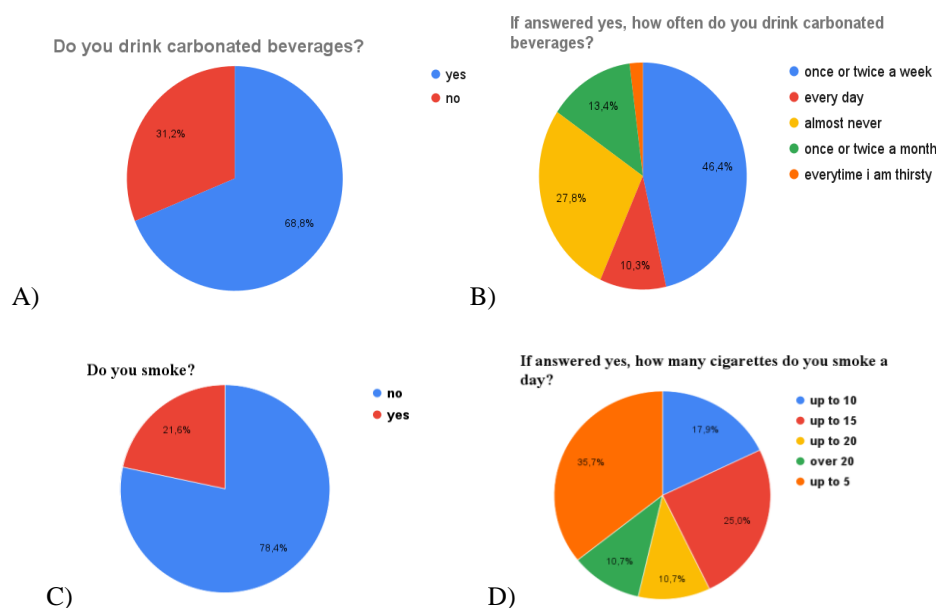


Figure 5. Illustration of respondents' answers to the questions: A) “Do you drink carbonated beverages?”; B) “How often do you drink carbonated beverages?”; C) “Do you smoke?”; and D) “How many cigarettes do you smoke per day?”.

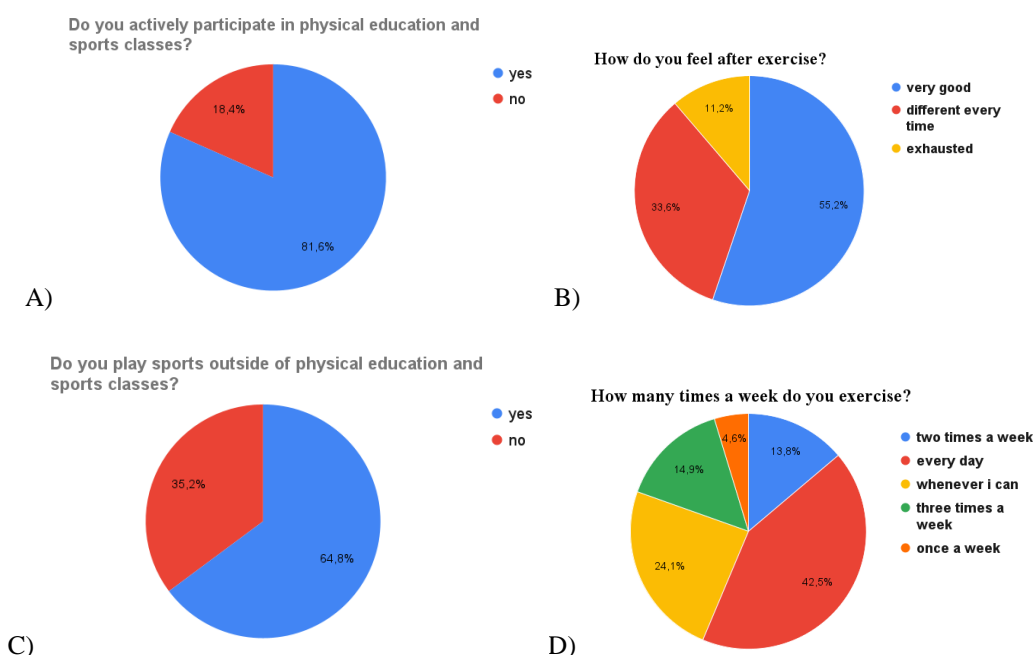


Figure 6. Illustration of respondents' answers to the questions: A) “Do you actively participate in physical education and sports classes?”; B) “How do you feel after physical education and sports classes?”; C) “Do you play sports outside of physical education and sports classes?”; and D) “How often do you exercise?”.

The consumption of carbonated drinks is also unhealthy, yet 68.8% of respondents indicated a preference for these beverages, with 10.3% consuming them daily and 27.8% consuming them only extremely rarely (Fig. 5). Carbonated beverages, particularly those high in sugar, can contribute to weight gain, tooth decay, and digestive

issues such as bloating and acid reflux. Regular consumption can increase the risk of chronic diseases like type 2 diabetes, heart disease, and osteoporosis, while also raising the likelihood of kidney stones and dehydration [16].

Smoking during adolescence can lead to addiction, respiratory issues, and an increased risk of

chronic diseases such as lung cancer, heart disease, and stroke. Around 90% of smokers begin before the age of 18, and early initiation is linked to more intense smoking habits and greater challenges in quitting later in life.

To the question "Do you smoke?" 21.6% of respondents answered Yes. Among the smokers, 35.7% limit themselves to up to 5 cigarettes a day, 17.9% smoke up to 10, 25% up to 15, 10.7% up to 20, and 10.7% smoke more than 20 cigarettes a day, which is extremely harmful to their health (Fig. 5). Despite the inclusion of smoking-related questions in educational programs, the survey shows that over 20% of respondents still smoke. Preventive strategies should focus on educating adolescents about the health risks, enforcing smoke-free policies, and reducing access to tobacco products. By raising awareness of the dangers of smoking and fostering a supportive environment, we can help reduce smoking initiation and promote healthier choices.

In terms of physical activity, the results are encouraging. Young people enjoy participating in sports. A significant 82% of respondents are actively involved in physical education and sports classes, and 54.9% report feeling very good afterward (Fig. 6). 64.8% of respondents identify as actively exercising outside of class, with 42.5% of them claiming to exercise daily (Fig. 6). The final question related to physical activity asks, "Do you enjoy walking in nature?" An impressive 93.6% responded positively. According to WHO, at least 60 minutes of moderate to vigorous physical activity daily is recommended. This can include sports, walking, cycling, running, swimming, and more. Regular exercise helps maintain a healthy weight, improves cardiovascular health, strengthens bones and muscles, and promotes mental well-being.

The analysis shows that the respondents' physical activity habits align more closely with the principles of a healthy lifestyle than their eating habits, which are concerning. Although some students exhibit an understanding of the principles of healthy living, their practical application in everyday life is limited. Factors such as insufficient knowledge, social influences, and the availability of unhealthy food options act as significant barriers to developing sustainable healthy habits. Additionally, physical activity, although widely practiced, needs to be paired with healthier dietary choices to ensure comprehensive well-being. To address these challenges, future efforts should focus on:

Educational programs: Implementing initiatives to raise awareness about the importance of regular, balanced meals and the health risks associated with harmful habits.

School interventions: Ensuring access to healthy food options in school cafeterias and creating environments that promote mindful eating.

Targeted research: Conduct detailed studies to explore the reasons behind irregular eating patterns, preferences for unhealthy foods, and the relationship between physical activity and nutrition.

Motivational strategies: Develop programs to foster intrinsic motivation for adopting and maintaining a healthy lifestyle among students.

Teacher training: Equipping educators with effective methods to teach health-related topics and instill lifelong healthy habits in students.

CONCLUSION

The study on attitudes toward a healthy lifestyle among students from two schools in Varna highlights a mixture of positive and concerning trends. While certain practices reflect awareness of healthful habits, others underscore significant gaps that require targeted interventions to encourage healthier behaviors.

Positive trends among the students include:

- ✓ A high percentage of students (82%) actively participate in physical education and sports, demonstrating an understanding of the importance of physical activity for their well-being.
- ✓ Daily consumption of vegetables (67.2%) and fruits (45.6%) by many students shows a basic awareness of the role of these foods in a healthy diet.
- ✓ A majority of students (56.8%) prefer chicken, reflecting some inclination toward healthier protein choices.

Areas of concern involve:

- ✓ *Unhealthy dietary habits:* Many students regularly consume unhealthy foods such as sweets (56.8% daily) and carbonated drinks (68.8% daily), while only 19.2% consume fish weekly. Additionally, 34.4% of students eat fewer than three meals a day, and only 39.2% have breakfast regularly, highlighting irregular and unbalanced eating patterns.

- ✓ *Social and structural barriers:* The lack of healthy food options in school cafeterias and the preference for fast food hinder efforts to establish better habits. Furthermore, only half of the students take adequate time to eat, often opting for quick and less mindful meals.

- ✓ *Harmful habits:* High levels of alcohol consumption (43.2%) and smoking (21.6%) among students emphasize the need for comprehensive health education and prevention programs.

Studies involving a larger, more representative sample of adolescents are necessary to draw more definitive conclusions. The findings from this study were used to develop project-based, non-formal education programs focused on promoting a healthy lifestyle among the participating students. The effectiveness of these programs will be the subject of future research.

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