ChatGPT and High School Students' Eating Habits: Benefits, Risks, and Insights from a Cross-Sectional Study

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Abstract: This study investigated the eating behavior of high school students and the impact of ChatGPT on it, based on a survey of 315 adolescents aged 15-19 years in the district of Haskovo, Bulgaria. Survey results highlight significant concerns among participants related to body image, with 18.1% expressing dissatisfaction and 24.8% aspiring to achieve a thinner physique. Anxious eating patterns, such as vomiting after meals and using laxatives, were reported in 10.5% of respondents. The following factors associated with body image dissatisfaction were identified referring to eating disorders factors, fear of weight gain, alterations in eating habits, and emotional distress. The study revealed that 31.4% of participants were used to getting information on healthy eating from the Internet, including ChatGPT, while only 10.5% were used to consulting their general practitioner (GP). While ChatGPT certainly demonstrates its value by delivering personalized nutritional guidance and fostering a positive body image through respectful language, caution is essential due to potential risks. Concerns include the possibility of misinformation, as users might solely rely on ChatGPT without cross-referencing information from reliable sources. Unintentional contributions to unrealistic beauty standards and a lack of content personalization are additional considerations. In conclusion, ChatGPT can serve as a reliable tool to guide high school students to a healthier lifestyle. However, reasonable usage is very important. Stakeholders in education should encourage critical thinking, advocate for fact-checking, and promote a balanced approach to leverage both the benefits and potential risks associated with AI-generated content on health and nutrition.

Keywords: ChatGPT, Artificial Intelligence, Eating behavior, Eating disorders.

Introduction

Adolescence is a critical phase in human development, characterized by rapid changes across physical, cognitive, and psychosocial domains. It is a time when individuals experience significant transformations in their bodies, minds and social interactions, shaping their identities and influencing how they perceive and interact with the world. During this period, adolescents undergo profound emotional and cognitive growth, which greatly impacts their ability to regulate emotions, process thoughts, make decisions, and navigate social relationships (World Health Organization, 2021). One critical aspect of this developmental journey is the acceptance of one's own appearance. This process of self-acceptance not only affects adolescents' self-esteem and overall well-being but also plays a crucial role in shaping their eating habits and levels of physical activity (Kos et al., 2020).

In today's rapidly changing world, characterized by constantly evolving lifestyle trends, adolescents are frequently exposed to a flood of new and sometimes conflicting information regarding health and well-being. With easy access to social media, internet forums, and peer networks, young people are frequently exposed to a plethora of lifestyle choices, often without fully understanding the implications of their decisions. The inherent inclination towards risk-taking and experimentation, typical of adolescence, can lead teenagers to adopt certain behaviors without fully considering the potential consequences (Pender et al., 2015; Yang et al., 2019). Unfortunately, these behaviors, including unhealthy eating patterns and sedentary lifestyles, can persist into adulthood, laying the groundwork for long-term health issues (Liao et al., 2019). Research indicates a strong correlation between behaviors established during adolescence and various health problems in adulthood, underscoring the importance of early intervention and prevention strategies (Liao et al., 2019).

Given the malleability of adolescent behaviors and attitudes, promoting a healthy lifestyle during this formative period is of paramount importance. Unlike adults, who may be resistant to change due to entrenched habits, adolescents are more open to adopting new behaviors and habits (Kos et al., 2020). By instilling healthy habits early on, we can empower young people to make informed choices that will benefit their long-term health and well-being.

Recent studies conducted in Bulgaria have shed light on the eating behaviors of high school students, revealing concerning trends among this demographic. Despite the majority of students maintaining a normal body weight, a significant portion of them exhibited unhealthy eating patterns and engaged in insufficient physical activity (Merdzanova et al., 2019). Moreover, a noteworthy percentage of high school students expressed a desire to modify their diets in pursuit of improved attractiveness, often turning to various sources, including the internet, for guidance (Andonova et al., 2022). Weight loss diets and the fundamentals of healthy eating emerged as particularly popular topics of interest among these students, with internet platforms such as social media, blogs, and vlogs serving as primary sources of information (Andonova et al., 2022).

In today's digital age, the internet has become a ubiquitous source of information on various aspects of lifestyle and well-being. However, the proliferation of misinformation and unreliable sources poses a significant challenge. Recognizing this need for accurate and trustworthy guidance, innovative solutions such as chatbots have emerged to provide personalized advice and support. Leveraging advanced language processing and machine learning algorithms, chatbots like ChatGPT offer a convenient and accessible platform for individuals seeking reliable information and guidance on health-related matters (Sallam, 2023). This study aims to investigate the eating behavior of high school students and the impact of ChatGPT on it, based on a survey of 315 adolescents aged 15-19 years in the district of Haskovo, Bulgaria.

Materials and Methods

Study Design

The study design is cross-sectional, based on an online survey conducted among 315 adolescents aged 15-19 in the Haskovo region, Bulgaria. A convenient sampling technique was used to collect the data from the students. A link was sent to them via their e-mails. The number returned and validly completed questionnaires was 315.

Questionnaire

A self-administered questionnaire was used to to assess the perception of body image, eating behaviors, and the impact of ChatGPT on the eating behaviors of high school students. The questionnaire consisted of a total of 30 questions related to the perception of body image and eating behaviors, along with 1 question concerning sources of information on healthy eating habits. For 25 out of the 30 questions, responses were ranked on a 4-point Likert scale regarding the frequency of harmful eating habits among students and dissatisfaction with body image. The survey also included questions related to demographic characteristics such as gender and age.

Data Collection

The study was conducted from October 2023 to November 2023 using the Google Forms application for response collection. A total of 315 adolescents aged 15-19 participated in the survey, with 56.2% (n=177) being female. The average age of the surveyed individuals was 17.41±0.871 years.

Data Analysis

The analysis of the data relied on descriptive statistics, providing a comprehensive understanding of the dataset. To test hypotheses and explore correlations, non-parametric tests were employed, along with the Spearman correlation method. Central tendencies, indicative of the dataset's distribution, were illustrated using both the mean (M) and the standard deviation (SD). Moreover, a significance level of $P < 0.05$ was established to evaluate the significance of the null hypothesis, ensuring a rigorous and reliable analysis approach. Data processing was performed using SPSS 23 and MS Excel 2016 software.

Results

The results revealed that a significant part of the students (62.9%; n=198), responded positively to the question of whether they are satisfied with their body shape. However, 30.5% (n=96) indicated that they are not always satisfied, while 6.7% (n=21) explicitly stated that they are not satisfied with their body image. A moderate to significant correlation was found between the responses to this question and the following three questions: "Do you feel dissatisfied when you see your body in the mirror?" ($r_s = -0.359$, P= 0.000), "Do you strongly desire to be thinner?" ($r_s = -0.359$, P= 0.000), and "Do you feel fat even though you are not overweight?" ($r_s = -0.461$, P= 0.000). The distribution of these responses is depicted in Figure 1.
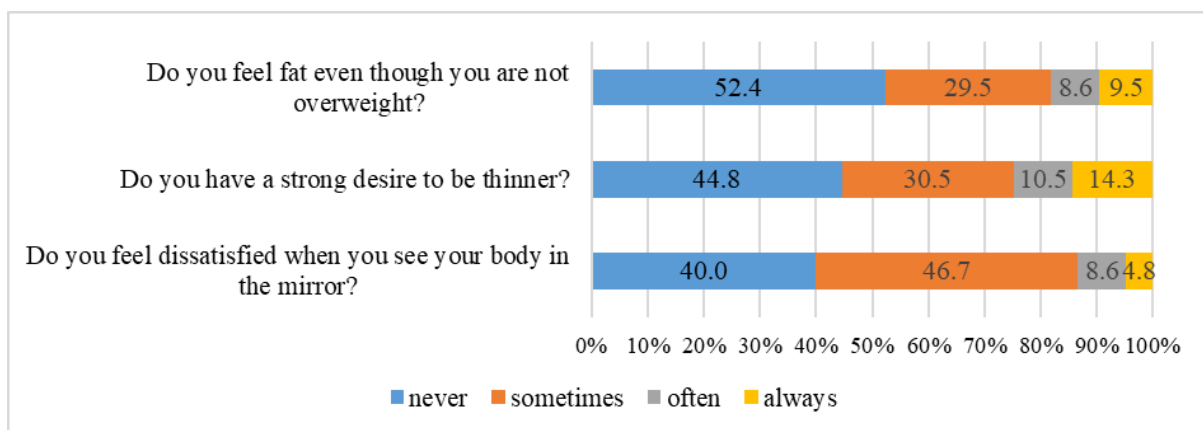

Figure 1. Body image satisfaction

A significant part of students, even if they are not overweight, are very afraid of gaining weight 39.0% (n=123). Almost a quarter (24.8%; n=78) wished to be thinner, with 18.1% (n=57) aiming to diet, while 33.3% (n=105) stated that their weight greatly affects their mood and self-esteem. A significant proportion of respondents noted that they exercised intensely to burn calories 38.1% (n=120).

The study identified harmful behavior patterns among students. Approximately one in ten students takes medication to reduce appetite (9.5%; n=30) and/or laxatives/diuretics to avoid gaining weight (10.5%; n=33). Similarly, approximately one out of every ten students reported frequently or consistently inducing vomiting after meals to avoid weight gain (10.5%; n=33). Additionally, nearly one-fifth of the surveyed individuals reported losing control while eating and consuming large amounts of food at once, followed by feelings of guilt (18.1%; n=57). Furthermore, 12.4% (n=39) prefer to eat alone to avoid others seeing how much and what kind of food they consume.

A significant finding from the study reveals that 31.4% (n=99) of participants rely on online resources, and more specifically ChatGPT, to acquire information on healthy eating, while only 10.5% consult a general practitioner (GP). The non-parametric Pearson Chi-Square test revealed a statistically significant difference in responses to this question between genders ($\chi2 = 34.578$, P=0.000). Girls prefer to receive health information from their GP, health seminars at school, or the internet, while boys prefer to obtain it from their parents, friends, or relatives.

The main topics for which students search for information on the internet are related to how many calories are in each food, which foods have high carbohydrate content, and which foods negatively affect their figure, leading to overweight and/or obesity.

Discussion

The current study revealed that while most surveyed students were content with their body shape, they harbored fears of weight gain, aspired to be thinner, and consistently adhered to diets. Similar results were noted in a prior study conducted in Bulgaria, where 79% (n=88) of respondents had a normal body weight. However, over half of the high school students attempted dietary modifications to enhance their attractiveness and commenced diets in pursuit of greater appeal (Andonova et al., 2022).

Unlike our findings, studies among adolescents in other European countries reveal significantly more negative outcomes concerning normal body weight and students' satisfaction with their body shape. For instance, in Slovakia, overall body dissatisfaction was reported at 24.5% (191/780), with a higher prevalence among girls (104/344, 30.2%) compared to boys (87/436, 20%). The prevalence of overweight boys was 21.1% (92/436), with 28% (35/92) classified as obese. Among girls, 17.7% (61/344) were overweight, with 36.1% (22/61) classified as obese (Štefanová et al., 2020). A comprehensive study among Polish students indicated that every third respondent was either satisfied or very satisfied with their body image, while 28% expressed dissatisfaction. The most prevalent response regarding satisfaction with body image among their respondents was a lack of opinion - 38% (Kos et al., 2020).

Even more negative results were reported in a study conducted in China. Among 1585 junior high school Chinese students, 81.01% expressed dissatisfaction with their body shape. Of these students, 66.37% desired to be thinner, while 14.64% wished to be more obese. Female students exhibited a higher dissatisfaction rate compared to males (Song et al., 2023). Similarly, to our findings, however, students with a normal BMI desired to be thinner. Conversely, half of the overweight/obese students perceived their body shape as normal (Song et al., 2023).

Some research indicates that sociocultural pressures contribute to the internalization of thin and/or muscular/athletic body ideals and foster social comparisons. Failing to conform to socially stereotyped body images results in body dissatisfaction among both men and women (Rodgers et al., 2011; Tylka, 2011). Consequently, body dissatisfaction correlates with disordered eating behaviors (Neumark-Sztainer et al., 2018). Body image concerns and eating pathology are linked to reduced psychosocial functioning and an unhealthy lifestyle in young adults (Neumark-Sztainer et al., 2018; Sharpe et al., 2018). Our study confirms these findings. Students reported using appetite suppressants, as well as laxatives/diuretics, to avoid weight gain or vomiting after meals. Additionally, respondents admitted to overeating and attempting to conceal their eating patterns.

The increase in the internalization of thin/low-fat ideals may be linked to a significant rise in the hours spent browsing the internet. Lithuanian university-aged students were asked to report their time spent on screen-based activities for leisure purposes, excluding time devoted to work or academic study. The findings of the study revealed that greater daily screen time and increased use of social media were associated with higher levels of internalization of thin body ideals, negative body image, poorer well-being, and increased incidence of disordered eating (Baceviciene & Jankauskiene, 2021).

A significant finding from our study reveals that one-third of participants rely on online resources, and more specifically ChatGPT, to acquire information on healthy eating. Similar results were obtained in a previous study conducted in Bulgaria, where Internet posts, social networks, influencers, vloggers, and bloggers emerged as the most popular sources for information on topics like weight loss diets and basic principles of healthy eating (Andonova et al., 2022).

Recent studies on the application of ChatGPT in delivering nutritional information indicate that while it cannot replace the expertise of registered dietitians, it holds promise in addressing common inquiries (Garcia, 2023; Abhari et al., 2019). A comparative study between ChatGPT responses and those from human experts revealed similar accuracy levels (Kirk et al., 2023). Additionally, ChatGPT's capacity to generate personalized meal plans for healthy individuals has shown potential, albeit with some discrepancies in caloric recommendations (Papastratis et al., 2024; Niszczota & Rybicka, 2023).

Regrettably, ChatGPT's reliance on various publicly available databases for nutritional information may raise concerns about the accuracy and reliability of the data provided (Garcia, 2023). Despite these limitations, further development of ChatGPT could improve its effectiveness in offering nutritional guidance, particularly for underserved populations (Sharma et al., 2023). There are also ethical considerations regarding the confidentiality of sensitive health data shared with the system, necessitating data protection measures (Sallam, 2023).

The consensus among experts suggests that ChatGPT cannot fully substitute for human professionals in dietetics and nutrition counseling, emphasizing the importance of human interaction, empathy, and personalized recommendations (Garcia, 2023; Sivasubramanian et al., 2023). Critical thinking and validation are essential when considering responses from the model, highlighting the need for training individuals to assess AI-generated recommendations critically.

Conclusion

ChatGPT serves as a promising tool for guiding high school students towards healthier lifestyles. However, responsible use is very important. Stakeholders in education should encourage critical thinking, advocate for fact-checking, and promote a balanced approach to leverage both the benefits and potential risks associated with AI-generated content on health and nutrition.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPSTEM Journal belongs to the authors.

Acknowledgements or Notes

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