



THE 19TH EDITION OF THE INTERNATIONAL CONFERENCE
EUROPEAN INTEGRATION
REALITIES AND PERSPECTIVES

Prevalence and Impact of Obesity among Middle School Students in Oradea (Romania)

Adrian Titus Serseniuc Urzică¹, Lucielav Vasile²

Objectives: This research aims to assess the prevalence of obesity among middle school students in Romania, identify associated risk factors, and propose comprehensive prevention strategies. Childhood obesity is a significant public health concern globally, and addressing it during the middle school years is crucial for long-term health outcomes. **Prior Work:** Recent data from the National Institute of Statistics indicate a concerning trend: approximately 20% of children and adolescents aged 6 to 17 in Romania are overweight or obese. This prevalence has increased significantly in recent years, reflecting a growing public health issue. **Approach:** A sample of 166 middle school students from Oradea-Bihar County (Romania), including 84 girls and 82 boys, participated in the study. Anthropometric measurements were conducted to assess weight, height, body mass index (BMI) and body composition. The study found that 18% of the students were classified as obese. Poor dietary habits and insufficient physical activity were prevalent among students. **Implications:** These findings have important implications for academics, researchers, and administrators of educational institutions in Romania. With a growing prevalence of childhood obesity, targeted interventions are urgently needed to address this issue. Strategies should include educational programs, creating supportive school environments, involving parents, and engaging with the community. **Value:** The key contribution of this paper lies in its comprehensive approach to obesity prevention among middle school students in Romania. By integrating evidence-based strategies and addressing the unique needs of this age group, this research provides valuable insights for practitioners and policymakers working in the field of public health and education.

Keywords: obesity; physical education; middle school students

1. Introduction

Amidst the global challenge of the obesity epidemic, Romania has not been spared, with its obesity rate mirroring a concerning upward trend that is particularly alarming among younger populations. This surge in weight gain, fueled by a combination of sedentary lifestyles and dietary habits, underscores a critical public health issue that necessitates immediate attention. However, it's in the picturesque city of Oradea where the specificity of this public health crisis sheds light on broader socio-economic and cultural patterns that influence obesity rates by country. Analyzing the BMI percentiles and anthropometric measurements of middle school students in Oradea provides a microscopic view into the

¹ PhD in progress, National University of Physical Education and Sports, Faculty of Physical Education and Sport, Romania, Address: 140 Constantin Noica Street, Bucharest, Romania, Corresponding author: adrian.titus@yahoo.com.

² Professor, National University of Physical Education and Sports, Faculty of Physical Education and Sport, Bucharest, Romania, Address: 140 Constantin Noica Street, Bucharest, Romania, E-mail: lucielav05@gmail.com.



macroscopic problem of obesity, highlighting the urgent need for targeted health education and prevention strategies.

This article embarks on a comprehensive exploration of the Romania obesity rate, with a zoomed-in focus on its prevalence among middle school students in Oradea. It will examine the multifaceted impact of obesity on this demographic, including physical health ramifications and psychological effects. To understand the roots of this issue, an analysis of contributing factors such as risk factors, socio-economic status, and the prevalence of a sedentary lifestyle will be presented. The discussion will progress to address the challenges inherent in combating obesity, the effectiveness of preventive measures, and the pivotal role of physical activity and nutrition. Drawing from success stories and case studies, the article will underscore the importance of community and familial involvement, specifically the role of parents and guardians in nurturing healthier generations. Through addressing these key areas, the intention is to offer a critical lens on the obesity rates in Romania and craft a roadmap for holistic public health interventions.

Middle school students represent a critical demographic for studying obesity due to their developmental stage and lifestyle changes. During these years, children are more susceptible to adopting poor dietary habits and decreased physical activity, which can lead to higher BMI and obesity. Moreover, the prevalence of obesity has shown a significant increase from 4.2% in the early 1960s to 18.8% in 2003-2004 among 6 to 11-year-old children, with similar trends observed in adolescents. Addressing obesity at this stage is crucial as it not only affects immediate health but also poses long-term health risks, including cardiovascular disease, type 2 diabetes, and psychological issues. Therefore, focusing on middle school students allows for early intervention and the implementation of school-based policies and programs that promote healthy eating and regular physical activity (Story, 2009).

2. Problem Statement

Childhood obesity significantly impacts the physical health of middle school students, leading to a range of serious medical conditions. These include fatty liver disease, sleep apnea, Type 2 diabetes, asthma, cardiovascular disease, high cholesterol, gallstones, glucose intolerance, insulin resistance, skin conditions, menstrual abnormalities, impaired balance, and orthopedic problems (1920). Additionally, children with obesity often experience exacerbated chronic health conditions such as diabetes and asthma, which lead to increased school absenteeism and further affect their academic performance (Balasundaram, 2023).

Several factors contribute to the high rates of obesity observed among middle school students in Oradea. Poor dietary habits and insufficient physical activity were prevalent among the students, as indicated by the research findings. Additionally, a study noted that the prevalence of overweight or obesity tends to decrease with age in middle school but shows a tendency to increase again by the 8th grade. This suggests that interventions need to be continuously adapted as children grow older. The local lifestyle, characterized by a lack of physical activity and unhealthy nutritional habits, has been identified as a major contributing factor to the rising obesity rates (Erdely, et. al, 2020).

The psychological and social implications of obesity in middle school students are profound and multifaceted. Obesity is one of the most stigmatizing and socially unacceptable conditions in childhood, leading to bullying, discrimination, and social marginalization. This stigma can significantly affect a child's self-esteem, emotional well-being, and social interactions. Children with obesity are more likely to experience low self-esteem, depressive symptoms, and reduced quality of life, comparable to children diagnosed with chronic illnesses like cancer. Furthermore, obesity increases the risk of mental health

disorders including anxiety, depression, and suicidal thoughts. The experience of stigma also contributes to behaviors such as binge eating and social withdrawal, which can perpetuate the cycle of obesity and mental health issues (Newson, 2024).

3. Concept and Terms

Obesity in children is defined as having a Body Mass Index (BMI) at or above the 95th percentile for children of the same age and sex, while severe obesity is classified as a BMI at or above the 120th percentile. This definition aligns with the criteria set by major health organizations to address the growing concern of obesity in the younger population (Tiwari, 2024). Various organizations have established different criteria for defining obesity and overweight in children.

For instance, the World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention (CDC) provide guidelines that differ slightly depending on age groups. The WHO uses child growth standards from birth to age 5 and recommends using BMI cut points that are higher compared to those of the International Obesity Task Force for preschool girls. In contrast, the CDC utilizes age- and sex-specific BMI percentiles for children ages 2 to 19 and modifies the WHO criteria for children from birth to age 2. These discrepancies highlight the complexity and the need for harmonization of international standards for childhood obesity (Monasta, 2011).

4. Related Work

The perception of overweight and obesity among students presents significant challenges in addressing these issues effectively. Studies have shown that there exists a negative perception towards the effects of overweight and obesity, which is significantly associated with age, gender, class, and body mass¹. This negative attitude is notably higher among students aged 13–15, males, and in specific school years, such as SS1 and SS3². Additionally, despite the awareness of the health repercussions of poor diet, the heavy marketing of junk food creates positive emotional associations with unhealthy food choices, leading to overconsumption and contributing to obesity³. The societal stigma attached to obesity can lead to psychological impacts such as low self-esteem and social withdrawal, further complicating efforts to address the issue (Kebbe, 2021).

Addressing obesity is further complicated by significant limitations in school and community resources. Many schools report a lack of standard facilities like spacious grounds or well-equipped gyms, which restricts the physical activities available to students. Additionally, the physical education syllabus in some schools is often limited to specific sports, which does not encourage a diverse range of physical activities. The role of the school canteen is also critical as it often provides unhealthy food options that contribute to poor dietary habits among students. Furthermore, rural residency increases the risk of obesity due to factors like limited access to healthy foods and places for physical activity, compounded by economic challenges (Almutairi, 2022).

The challenge of combating obesity is exacerbated by inadequate knowledge and awareness among students, parents, teachers, and healthcare providers. There is a noted gap in obesity education within healthcare training programs, which suggests that current and future healthcare professionals may be

¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6510078/>.

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6510078/>.

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10826704/>.

underprepared to tackle obesity effectively. Schools can play a pivotal role in improving knowledge by incorporating education about nutrition and physical activity into their curricula and by providing healthful food options and promoting physical activity through structured programs. However, a lack of awareness about the complex etiology of obesity, including genetic factors and the influence of socioeconomic status, remains a barrier to effective intervention and support (Elsafi, 2024).

5. Solution Approach

The impact of school-based interventions on obesity rates is evident from several studies. For instance, the Planet Health program significantly reduced the prevalence of obesity among girls, demonstrating the effectiveness of integrating health behavior interventions into school curricula. Similarly, an intervention in Ban-Rhin, France, focusing on promoting physical activity, resulted in a notable decrease in the prevalence of overweight and obesity, highlighting the benefits of environmental changes in school settings (Ponnambalam, et. al, 2022).

Schools have adopted innovative methods to engage students and promote healthy behaviors effectively. Programs like the one in Rio de Janeiro, which focused on discouraging the consumption of sugar-sweetened drinks, have shown significant reductions in their intake, particularly among girls, thus contributing to healthier dietary habits. Another approach involved aerobic dance classes, which not only increased physical activity but also improved the students' attitudes towards maintaining an active lifestyle (Skelton, et. al, 2020).

Collaborative efforts between schools, families, and healthcare providers have been crucial in the success of obesity prevention programs. For example, the HOME Plus program demonstrated how family-focused, multi-component programs could adapt to the unique needs of different families, helping them to make sustainable lifestyle changes. Engaging parents as co-researchers in the design and implementation of interventions has also proven effective, as it empowers them and enhances the program's relevance and sustainability. These case studies and programs illustrate the potential of targeted interventions and collaborative efforts in reducing obesity rates among schoolchildren. By addressing the specific needs of the community and involving key stakeholders, these initiatives have made significant strides in promoting healthful behaviors and preventing obesity (Myers, et. al, 2019).

6. Analysis of Results

This research involved 166 middle school students, who eagerly participated in a study to learn more about their health and physical activity. The group consisted of 84 girls and 82 boys (Table.1), all approximately 14 years old. As the study progressed, clear differences in the health profiles of boys and girls emerged. On average, boys weighed 59.53 kilograms, slightly more than the girls, who averaged 55.03 kilograms. This difference in physical build was further illustrated by their Body Mass Index (BMI), which accounts for both height and weight. The boys had an average BMI of 30.10, whereas the girls had a lower average BMI of 25.52 (Figure 1).

The higher BMI among boys suggested a greater body mass relative to their height. To understand the implications for overall health, researchers examined obesity grades, a key indicator of health risks. The average obesity grade for the students was 101.13, with a defined range of 90 to 125 used to categorize them. The results were striking. Twenty-three boys were below the lower limit, indicating they were within a healthier weight range. Conversely, 27 boys exceeded the upper limit, signifying higher levels

of obesity. This disparity underscored a significant health concern among the boys, with a notable portion facing elevated obesity-related risks (Figure 2).

Table 1. Summary of Health Metrics by Gender

Category	Total (n=166)	Boys (n=82)	Girls (n=84)
Average Age (years)	14.02	-	-
Average Weight (kg)	57.28	59.53	55.03
Average BMI	27.78	30.10	25.52
Average Obesity Grade	101.13	106.94	95.23
Lower Limit Obesity Grade	90	-	-
Upper Limit Obesity Grade	125	-	-
Boys/Girls Below Lower Limit	-	23	15
Boys/Girls Above Upper Limit	-	27	12
Average Measured Circumference of Chest	85.16	87.03	83.34
Average Measured Circumference of Abdomen	74.88	74.39	75.37
Average Measured Circumference of Hip	90.73	91.29	90.17
Average PBF (Percent Body Fat)	22.19	-	-

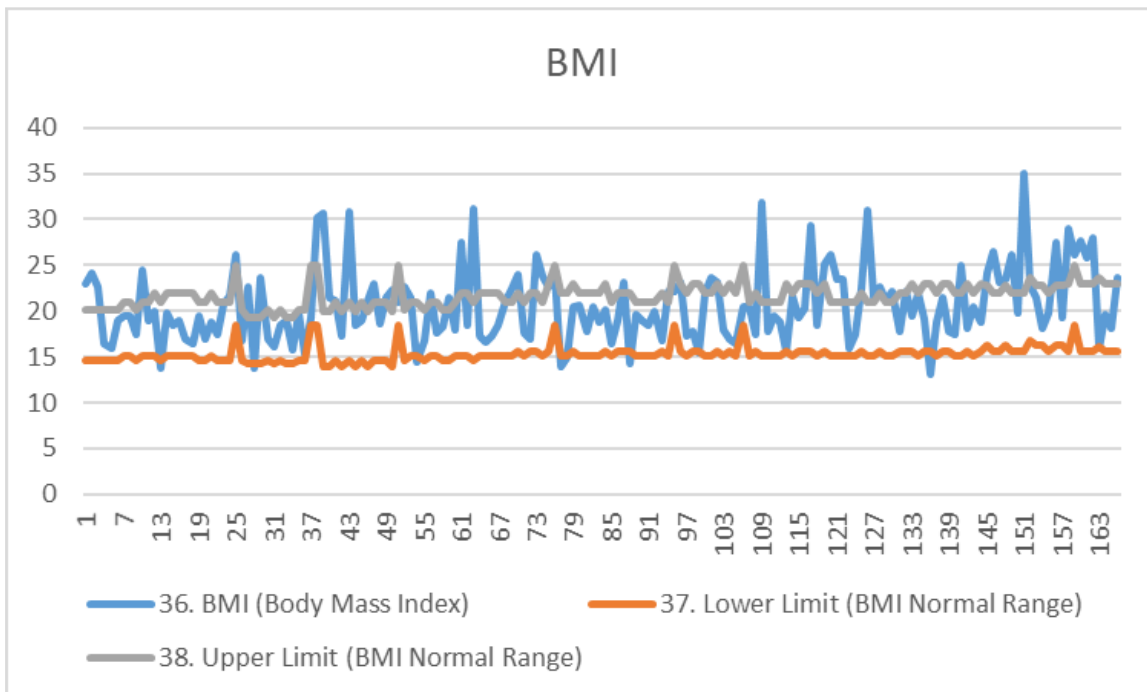


Figure 1. BMI Scale Among the Students

Within this group of 166 individuals, the average measured circumferences of the chest, abdomen, and hips were as follows:

Average Measured Circumference of Chest: 85.16 cm

Average Measured Circumference of Abdomen: 74.88 cm

Average Measured Circumference of Hip: 90.73 cm

Additionally, the average percent body fat (PBF) among these individuals was 22.19%.

These measurements are crucial in assessing body composition and provide a more detailed picture of fat distribution across various body regions. For instance, abdominal circumference is often associated with abdominal fat deposits, which can be linked to health risks such as heart disease and diabetes. By comparing these measurements with other data, such as weight and BMI, we can gain a more comprehensive understanding of the health and body composition of individuals within this group.

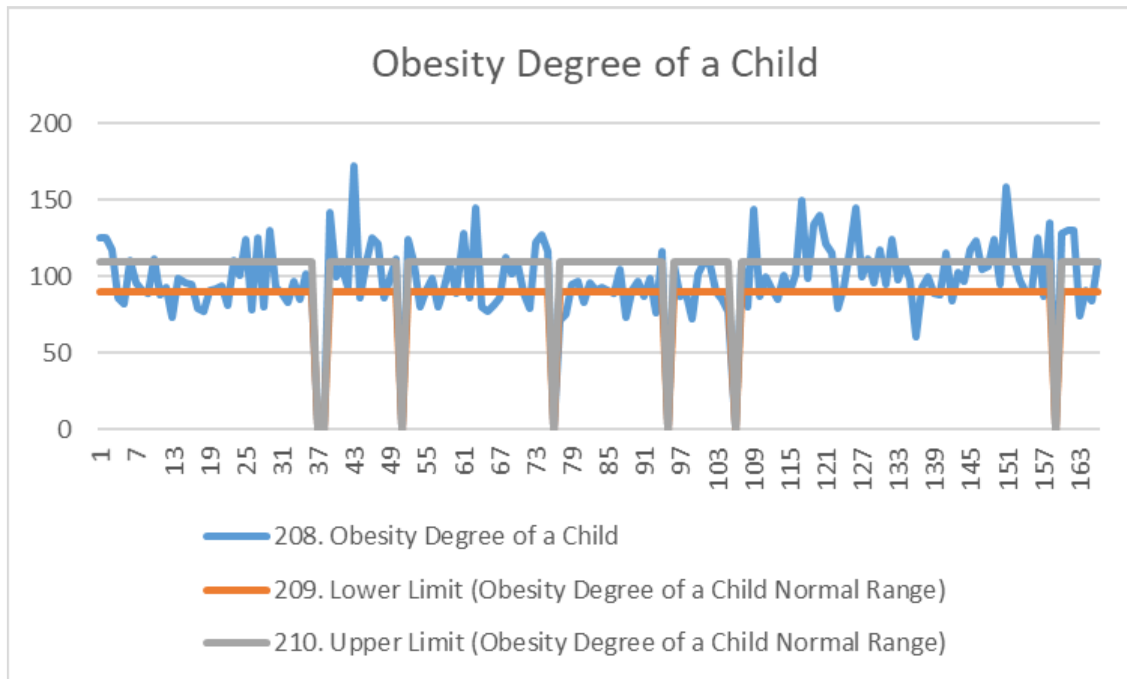


Figure 2. Obesity Degree of the Students

7. Conclusions

Physical activity is essential in preventing childhood obesity and its related health risks. Parents should encourage and engage in regular physical activities with their children to maintain a higher level of fitness. This can be achieved by becoming role models who participate in fun and enjoyable activities such as swimming, dancing, and sports, which not only foster the child's self-confidence but also improve their muscle strength and bone density. Moreover, parents can support their children's participation in physical education and organized sports programs at school and continue these activities at home. Encouraging active transportation like walking or cycling and limiting sedentary behaviors such as screen time are also effective strategies to enhance physical activity among children (Wyszyńska, et. al, 2020).

Parents and guardians play a crucial role in shaping the dietary habits of children. By being positive food role models, parents can significantly influence their children's food choices and attitudes towards nutrition. This involves consistently choosing healthy options during meals, whether at home or dining out, and demonstrating the importance of nutrition by always including breakfast and other balanced meals in the daily routine. Additionally, involving children in meal planning and preparation can enhance their interest in healthy foods and teach them about nutrition. Parents should create a healthy food environment at home by limiting unhealthy options and making nutritious choices readily available, such as keeping a bowl of fruit within easy reach (Daniels, 2015).

As this article delineates, the escalating obesity rates among middle school students in Oradea, Romania, mirror a multifaceted health crisis exacerbated by poor dietary habits, sedentary lifestyles, and socio-economic challenges. Through a comprehensive examination, it has been established that targeted interventions, community engagement, policy changes, and the pivotal role of family and school environments are integral to fostering healthier generations. The importance of addressing this concerning trend through holistic public health strategies, tailored to the unique demographic and socio-economic contexts of Oradea, cannot be overstated. The efforts to combat obesity in middle school

students not only have immediate benefits for the individual's physical and psychological well-being but also promise long-term positive outcomes for the broader community.

The collective endeavor to mitigate obesity's impact through school-based programs, parental involvement, and governmental initiatives highlights the critical importance of collaborative action. Success stories and case studies offer a beacon of hope, showcasing the significant strides possible when communities unify towards a common health objective. As we move forward, the emphasis on continued research, innovative solutions, and sustained engagement with all stakeholders remains essential. The fight against obesity in Oradea's middle schools is a quintessential example of how global challenges demand local action, reflecting the profound interconnectedness of public health efforts and their potential to transform lives.

References

- Aditi, Tiwari; Sharon, F. Daley & Palanikumar Balasundaram (2024). *Obesity in Pediatric Patients*. Stat Pearls.
- Andrea, M. Haqq; Maryam, Kebbe, Qiming, Tan; Melania, Manco & Ximena, Ramos Salas (2021). The Complexity and Stigma of Pediatric Obesity. *Childhood Obesity*, Vol. 17(4), pp. 229–240.
- Daniels, S. R.; Hassink, S. G. & Abrams, S.A. et. al. (2015). The role of the pediatrician in primary prevention of obesity. *Pediatrics*, Vol. 136(1), e275–e292.
- Erdely, Ștefan; Caciora, Tudor; Serbescu, Carmen; Papp, Bianca; Tamas, Felix & Bujorean, Emanuel; Baidog, Adriana; Furdui, Sorin; Ile, Marius & Herman, Grigore (2020). Trends in the lifestyle of students. Case study of a high school in Oradea, Romania. *Geosport for Society*, Vol. 12, pp. 1-12.
- Joseph, A. Skelton; Deepak, Palakshappa; Justin, B. Moore; Megan, B. Irby; Kimberly, Montez & Scott, D. Rhodes (2020). Community engagement and pediatric obesity: Incorporating social determinants of health into treatment. *Journal of Clinical and Translational Science*, Vol. 4(4).
- Justyna, Wyszynska; Susanne, Ring-Dimitriou; David, Thivel; Daniel, Weghuber; Adamos, Hadjipanayis; Zachi, Grossman; Robert, Ross-Russell; Katarzyna, Dereń & Artur, Mazur (2020). Physical Activity in the Prevention of Childhood Obesity: The Position of the European Childhood Obesity Group and the European Academy of Pediatrics. *Frontiers in Pediatrics*, Vol. 8.
- Lisa, Newson; Nicola, Sides & Amineh, Rashidi (2024). The psychosocial beliefs, experiences and expectations of children living with obesity. *Health Expectations*, Vol. 27(1).
- Mary, Story; Marilyn S. Nannery & Marlene, B. Schwartz (2009). Schools and Obesity Prevention: Creating School Environments and Policies to Promote Healthy Eating and Physical Activity. *The Milbank Quarterly*, Vol. 87(1), pp. 71–100.
- Michelle, L. Myers; Jayne, A. Fulkerson; Sarah, E. Friend; Melissa, L. Horning & Colleen, F. Flattum (2018). Case Study: Behavior changes in the Family-Focused, Obesity-Prevention HOME Plus Program. *Journal of Nursing Management*, Vol. 35(4), pp. 299-306.
- Monasta, L.; Lobstein, T.; Cole, T.J.; Vigneron, J. & Cattaneo, A. (2011). *Defining overweight and obesity in pre-school children: IOTF reference or WHO standard?* *Obesity Reviews*, Vol. 12(4), pp. 295-300.
- Naif, Almutairi; Sharyn, Burns & Linda, Portsmouth (2022). *Barriers and enablers to the implementation of school-based obesity prevention strategies in Jeddah, KSA*. *International Journal of Qualitative Studies on Health and Well-being*, Vol. 17(1).
- Palanikumar Balasundaram; Sunil Krishna. (2023), *Obesity Effects on Child Health*, Stat Pearls.
- Salah, H. Elsafi; Reem, H. Al-Dossari; Ruaa, A. Al-shaqi; Wateen, E. Fakirah; Rawan, F. Al-Dossari; Omniyyah, J. Al-sharif; Rawan, M. Maawadh; Lenah, D. Al Musallam; Abeer, Alaohali; Abdulelah, M. Abu Hassan; Othman, A. Alfahad; Yaser, A. Al Naam & Eidan, M. Al Zahrani (2024). Obesity-Related Knowledge and Practice Among the Healthcare Professions Students in Saudi Arabi. *Diabetes, Metabolic Syndrome and Obesity*, Vol. 17.

Sumathy Ponnambalam; Soundararajan Palanisamy; Rajeswari Singaravelu & Hemamalini Arambakkam Janardhanan (2022). Effectiveness of a school-based nutrition education program on waist circumference and dietary behavior among overweight adolescents in Puducherry India. *Journal of Education and Health Promotion*, Vol. 11(1).