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DO POLISH MEDICAL STUDENTS ACQUIRE SUFFICIENT COMPETENCIES FOR EFFECTIVE OBESITY MANAGEMENT? A CROSS-SECTIONAL ASSESSMENT

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ABSTRACT

Background: Obesity is one of the most prevalent chronic diseases worldwide, affecting an increasing number of populations. Despite its growing prevalence, awareness and understanding remain insufficient, contributing to its status as a major global health concern. This study evaluates whether students acquire the clinical knowledge and competencies necessary for effective obesity prevention, diagnosis, and management during their education.

Methods: An anonymous survey was conducted between February and October 2025. It involved 348 medical students in their fourth to sixth years of study. The survey consisted of 25 questions, most using a Likert scale, covering areas such as misconceptions about obesity, perception of obesity as a disease, evaluation of the current academic curriculum on obesity-related topics, and assessment of students' abilities to manage obese patients. The data were analyzed using statistical methods.

Results: Analysis showed that obesity is covered only fragmentarily throughout the curriculum, usually alongside other conditions rather than as a separate disease entity. Common myths and misconceptions remain a considerable challenge for most students. Significant gaps persist in both theoretical knowledge (particularly in a metabolic and bariatric surgery field) and practical training related to obesity and obese patients management. Although medical students progress through the program, uncertainty and deficiencies in clinical competencies remain apparent.

Conclusion: The current academic program is inconsistent and only superficially addresses the topic of obesity. Modification of the curriculum is required to integrate practical training, foster strategic thinking and improve the diagnostic and therapeutic process, enabling students to optimize patient care outcomes in response to the obesity epidemic.

KEYWORDS

Obesity Management; Clinical Competencies; Medical Education; Medical Students; Bariatric Surgery

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Abbreviations:

stmt - statement

MBS - metabolic and bariatric surgery

Introduction

Obesity is one of the most serious health issues that the majority of countries have to face. According to the WHO, adult obesity has more than doubled since 1990, while adolescent obesity has quadrupled [1]. A meta-analysis conducted by Xinyue Zhang revealed that approximately 1 in 5 children or adolescents have experienced excess weight so far [2]. In Poland, 21% of the adult population is obese and 38% are overweight [3]. The sixth round of the COSI study indicates that the prevalence of overweight and obesity among eight-year-old Polish children is one of the highest of all participating countries [4]. The forecasts for 2050 are not optimistic, suggesting that the problem of obesity will continue to rise worldwide [5]. As is well documented, the causes of obesity are multifactorial (e.g. genetic, environmental, lifestyle, energy imbalance), and the implications of this condition are detrimental to our organism - including cardiovascular diseases, mental health problems, a higher risk of cancers, and many more [3, 6]. Findings from a survey carried out for the American Society for Metabolic and Bariatric Surgery, indicated that only 38% of the surveyed people viewed obesity as a disease. For the rest, obesity is rather seen as a risk factor for other illnesses [7]. Surprisingly, the report realised in Poland in 2023 by SW RESEARCH Agencję Badań i Rozwoju showed that almost 92% of respondents with Body Mass Index (BMI) >30 did not regard a physician as an essential member of the obesity treatment team [8]. The data above and the matter that the issue of excess body mass is more and more popularised, it is noticed that awareness of people about obesity remains continuously low and it is a global problem.

Aim

The conducted study is aimed to determine whether medical school educational programs adequately address the growing problem of obesity and, in particular, whether students acquire the relevant knowledge and skills necessary for the effective treatment of obesity during their education.

Materials And Methods**Study Design**

The questionnaire was entered to the LimeSurvey platform, which is a specialized tool designed for creating this type of survey and enabling anonymous response collection. The entire survey structure was prepared by the research team. The study was conducted among the Polish medical students of Medical Universities. The students from 4th to 6th year of study were invited to the research. Finally, the questionnaire was filled out by 348 students. Survey's answers were collected from the half of February 2025 to the end of October 2025. The questionnaire was shared with students via a QR code and a survey link distributed through social media and communication apps of student associations across Poland.

Survey Content

Before completing the survey, students were informed about their anonymity. Students could stop filling out the survey at any time. The survey consists of 25 questions, most of which use a Likert scale. In the first part, questions (Q) 1-5 were devoted to common myths and misconceptions about obesity. In the next four questions (Q6-Q9), students were asked to evaluate the approach of both physicians and patients toward obesity as a disease. The third section of the questionnaire (Q10-Q12) addressed whether obesity was properly covered during the entire course of study. The final part of the survey (Q13-Q25) assessed students' ability to manage patients with obesity, their knowledge of obesity treatment - with particular emphasis on metabolic and bariatric surgery (MBS). The approximate content of the survey is presented in Table 2.

Statistical Analysis

Statistical analysis was performed using Python software (version 3.12.12). Selected questionnaire items were reverse-coded to ensure directional consistency for statistical testing. Descriptive statistics (mean $\pm$ SD, median, minimum, maximum) were calculated for quantitative variables. Qualitative variables were presented as frequencies and percentages. The normality of data distribution was assessed using the Shapiro-Wilk test. Due to the non-normal distribution of variables, non-parametric tests were applied. The Kruskal-Wallis test was employed to assess differences in responses across the years of study. Relationships between categorical variables were analyzed using the Chi-square test. Effect sizes were calculated to assess the magnitude of observed relationships: Eta-squared (η^2) for the Kruskal-Wallis test and Cramér's V (V) for the Chi-square test. The Wilcoxon signed-rank test was used to compare paired responses regarding attitudes toward patients versus family members. The level of statistical significance was set at $p < 0.05$.

Ethics Approval

This study did not require approval from an ethics committee, as the authors had no access at any stage of data collection to information that could identify the participants. The survey was conducted anonymously.

Results**Participants' characteristics**

Among all invited respondents ($n = 348$), there were over twice as many women as men. The mean age was 23.37 years ($SD = 2.13$). The largest group of participants were students in their 4th year of study (VII and VIII terms). A detailed list of the participating medical universities is presented in Table 1.

Table 1. Characteristics of participants

Category	Variable	n (%) / Value
Age of responders (n= 348)	M±SD Me Min-Max	23.37± 2.13 23.00 20.00 - 32.00
Gender (n= 348)	Women Men	236 (67.82%) 112 (32.18%)
Term of study (n= 348)	VII VIII IX X XI XII	103 (29.60%) 80 (22.98%) 31 (8.91%) 58 (16.67%) 23 (6.61%) 53 (15.23%)
Medical Universities	Medical University of Lublin Medical University of Bialystok Silesian Medical University in Katowice Medical University of Lodz Wroclaw Medical University Jagiellonian University Medical College in Cracow Pomeranian Medical University in Szczecin Medical University of Warsaw Poznan University of Medical Sciences Collegium Medicum of Jan Kochanowski University in Kielce	245 (70.40%) 19 (5.46%) 19 (5.46%) 18 (5.18%) 16 (4.60%) 15 (4.31%) 6 (1.72%) 4 (1.15%) 3 (0.86%) 3 (0.86%)

M±SD – mean ± standard deviation, **Me** – median, **Min-Max** – minimum and maximum

Perception of obesity as a disease

Most participants strongly agreed that obesity is a disease ($M = 1.63 \pm 1.32$). However, many students exhibit discrepancies in their opinions regarding the remaining myths and beliefs about obesity (statements 2–5) - Table 2. Students showed the greatest uncertainty towards the statement: "Anyone can lose weight if they have enough willpower." The statement: "There may be individuals within the population who, despite being classified as obese, can be considered healthy" caused the most difficulty. Students expressed that obesity is rather underestimated by doctors ($M = 2.79 \pm 1.27$) and underplayed compared to other diseases (stmt 8: $M = 3.58 \pm 1.26$). According to the respondents, individuals with obesity do not receive adequate care (stmt 9: $M = 3.26 \pm 1.07$) and are unsure about where to seek help (stmt 6: $M = 3.75 \pm 1.18$).

Table 2. The analysis concerns statements in which a 5-point Likert Scale was applied, where 1 = “Strongly agree” and 5 = “Strongly disagree.” **Lower mean scores indicate stronger agreement with the statements.** Considering the questions, one was multiple-choice and the second had a single correct answer.

Section	Statement	M±SD	Me
Myths and misunderstandings regarding obesity	1. Obesity should be regarded as a disease that requires proper diagnosis and treatment.	1.63±1.32	1.0
Myths and misunderstandings regarding obesity	2. There may be individuals within the population who, despite being classified as obese, can be considered healthy.	3.67±1.30	4.0
Myths and misunderstandings regarding obesity	3. Obesity is mainly caused by inadequate physical activity and suboptimal nutritional patterns.	2.35±1.15	2.0
Myths and misunderstandings regarding obesity	4. Obese people are less active than people of normal weight.	2.46±1.08	2.0
Myths and misunderstandings regarding obesity	5. Anyone can lose weight if they have enough willpower.	3.04±1.34	3.0
Perception of obesity as a disease (physicians and patients)	6. Patients with obesity have sufficient knowledge about where to seek professional help for obesity treatment.	3.75±1.18	4.0
Perception of obesity as a disease (physicians and patients)	7. Obesity is underestimated within the medical community.	2.79±1.27	2.5
Perception of obesity as a disease (physicians and patients)	8. Obesity is treated by physicians with the same level of importance as other diseases, such as cardiovascular or oncological diseases.	3.58±1.26	4.0
Perception of obesity as a disease (physicians and patients)	9. Individuals with obesity receive adequate, professional, and effective medical care.	3.26±1.07	3.0
Medical curriculum coverage	10. The topic of obesity and metabolic diseases is sufficiently discussed during a study curriculum.	2.84±1.26	2.0
Medical curriculum coverage	11. The topic of obesity is more often discussed in the context of other diseases rather than as an independent condition during medical studies.	2.16±1.22	2.0
Medical curriculum coverage	12. On which clinical subjects were issues related to the treatment of obesity presented? (multiple choice) Endocrinology Internal Medicine Surgical Courses Oncology Gynecology and Obstetrics Urology Geriatrics Family Medicine Pediatrics Other: the most common Diabetology	% 76.15 69.83 24.14 5.46 20.11 2.01 9.20 32.47 33.33 -	
Clinical practice and decision-making	13. I am able to recommend a treatment plan for a patient with obesity in accordance with evidence-based medical practice.	2.63±1.10	2.0

Theoretical knowledge about obesity	14. Body mass index (BMI), measurements of weight and height, and waist circumference are considered as the fundamental screening tools for detecting overweight and obesity.	2.26±1.17	2.0
Theoretical knowledge about obesity	15. Diet is effective for a long-term treatment of obesity.	2.31±1.25	2.0
Theoretical knowledge about obesity	16. The optimal rate of weight reduction in a patient undergoing dietary modification should be 5–10% of initial body weight within the first 3–6 months?	2.32±0.94	2.0
Clinical practice and decision-making	17. What would be your first-line recommendation for a patient with a BMI of 42 kg/m ² ? Pharmacological treatment Lifestyle modification Surgical intervention I don't know	n (%) 87.00 (25.00%) 213.00 (61.21%) 37.00 (10.63) 11.00 (3.16)	
Theoretical knowledge about obesity	18. Initiating pharmacological treatment for obesity eliminates the need for comprehensive non-pharmacological management.	4.43±1.31	5.0
Metabolic and bariatric surgery topics	19. Surgical treatment for obesity is suitable for every patient with obesity.	4.38±1.20	5.0
Metabolic and bariatric surgery topics	20. Surgical interventions for obesity and metabolic diseases are safe.	2.86±1.02	3.0
Metabolic and bariatric surgery topics	21. Surgical treatment carries a greater risk of potential complications than the possible benefits of the procedure for most individuals with obesity.	3.14±1.12	3.0
Metabolic and bariatric surgery topics	22. One of the factors disqualifying a patient from undergoing surgical treatment for obesity is an unstable psychological condition.	2.19±1.22	2.0
Metabolic and bariatric surgery topics	23. Surgical and pharmacological interventions for obesity should be regarded as complementary strategies rather than competing therapeutic approaches.	2.03±1.23	2.0
Clinical practice and decision-making	24. I would recommend surgical interventions as a treatment option to my patient with obesity.	2.45±1.10	2.0
Clinical practice and decision-making	25. I would recommend surgical interventions as a treatment option to a family member with obesity.	2.64±1.21	2.0

M±SD – mean ± standard deviation, **Me** – median

Evaluation of the academic curriculum with respect to obesity-related themes

Although the topic of obesity is moderately covered throughout the curriculum (stmt 10: $M = 2.84 \pm 1.26$), obesity is more often discussed in correlation to other diseases rather than as a self-dependent condition (stmt 11: $M = 2.16 \pm 1.22$). Subjects in which obesity is regularly addressed include Endocrinology (76.15%), Internal Medicine (69.83%), Family Medicine (32.47%) and Pediatrics (33.33%) whereas Surgical Courses received considerably lower ratings in this respect (24.14%) - Table 2.

Students' assessment in caring for patients with obesity and their familiarity with available treatment methods

This section consisted of three subgroups. Specifically, questions Q14-Q16 and Q18 addressed theoretical knowledge of obesity, Q19-Q23 are focused on MBS topics, while Q13, Q17, Q24, and Q25 are related to clinical practice and decision-making. Results showed that students are familiar with the theory about

obesity and basic information about conservative and invasive treatment methods of obese patients. Additionally, they reported that they are able to recommend a treatment plan for a patient with obesity based on EBM to some extent ($M = 2.63 \pm 1.10$). Simultaneously, the results indicated that respondents had more difficulty answering questions requiring deeper knowledge about available treatment methods, particularly MBS - related topics, and clinical practice (statements 15,17,20 and 21) - Table 2. Comparison of students' attitudes toward patients and family members regarding the recommendation of MBS revealed a significantly greater willingness to propose this treatment to patients than to family members (median 2 [IQR: 2–3] vs. 2 [IQR: 2–4]; Wilcoxon signed-rank test: $Z = 492.5$, $p < 0.001$) (Table 3).

Table 3. An analysis of students' attitudes toward patients and their families in relation to MBS treatment

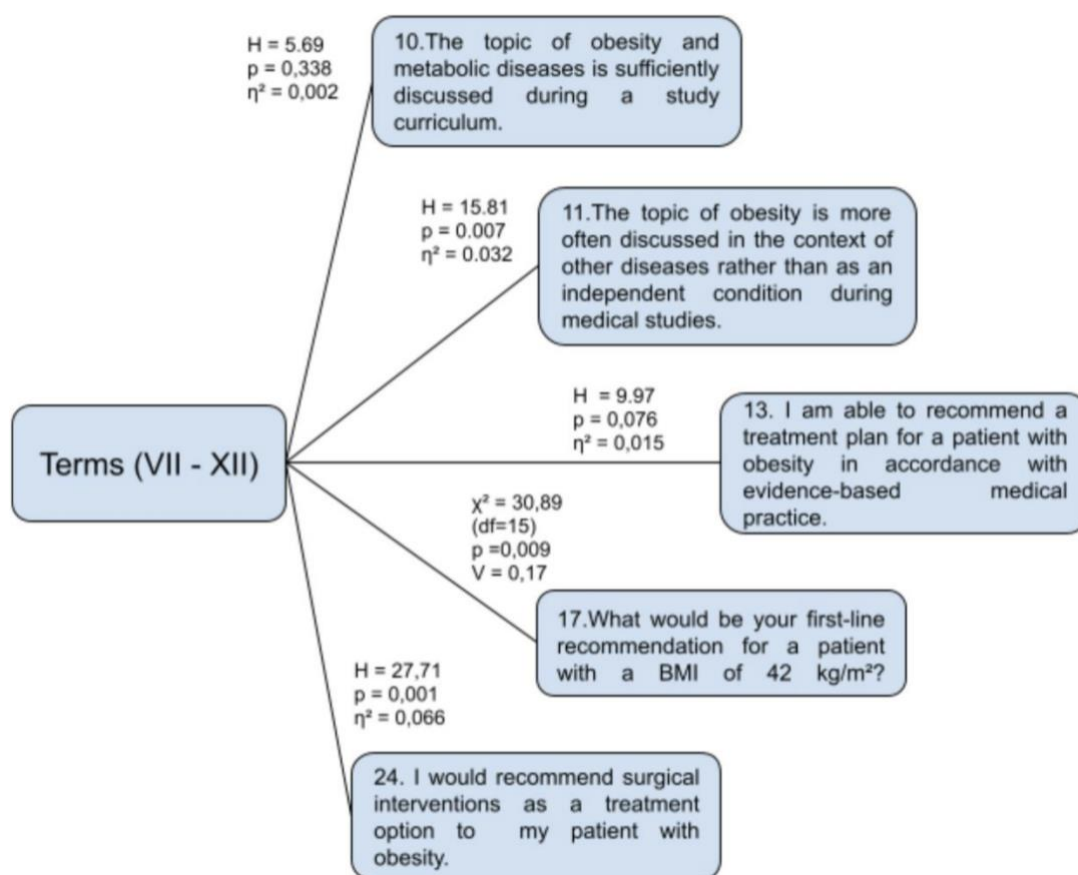
	Patient (Q24)	The member of family (Q25)
Mean (Likert Scale 1-5)	2.45	2.64
Median (IGR)	2 (2-3)	2 (2-4)
The Wilcoxon signed-rank test	$Z = 492.5$; $p = 0.000$	

IGR - Interquartile Range, p - p-value; $p < 0.05$ statistically significant

Impact of academic progression on the evaluation of teaching adequacy and students' self-assessment competencies in the management of obese patients

The results indicate that the evaluation of the educational program over time remains consistently low concerning obesity-related topics and reveals gaps in this area (stmt 10, $p > 0.05$) – Figure 1. There is a lack of dedicated courses throughout the curriculum where obesity is addressed comprehensively, as it is often discussed only in the context of other conditions. Progression through the program appears to enhance clinical decision-making, likely due to the gradual development of critical clinical thinking and knowledge consolidation. However, uncertainty in competencies exists independently from year of study and becomes apparent when students are required to propose clinical treatment based on EBM (stmt 13, $p > 0.05$). These findings suggest that the curriculum on obesity treatment should be deepened and better integrated to fully support the development of relevant clinical competencies (Figure 1).

Figure 1. Impact of academic progression on the evaluation of teaching adequacy and students' self-assessment competencies in the management of obese patients (semesters VII–XII).



H - Kruskal-Wallis test, p - p-value, η² - eta squared, χ² - Chi-square test, (df) - degrees of freedom, V - Cramer's V

Note: p < 0.05 statistically significant; Effect sizes: V/η² < 0.01 negligible, 0.01–0.06 small, 0.06–0.14 medium, >0.14 large.

Discussion

Several findings emerged from this study that necessitate further consideration. Firstly, students present various viewpoints towards common myths and misunderstandings about obesity, which might result in incorrect reasoning leading to inappropriate treatment, downplaying obesity and ignoring patients. Phelan et al. demonstrated that students' belief patterns influence patient care and, to some extent, shape treatment approaches [9]. Students in our analysis expressed considerable skepticism toward the statement that some people with obesity may be regarded as healthy despite their BMI classification. Many publications explain the meaning of metabolically healthy obesity (MHO), which conclude individuals who meet BMI over 30 kg/m² and have excessive adipose tissue, but do not have an insulin resistance and other elements of the metabolic syndrome [10, 11]. The belief that sufficient willpower alone can lead to weight loss generated the greatest uncertainty among participants. Weight regain after nutritional and lifestyle weight loss interventions is commonly observed in patients, often beginning as early as 36 weeks after the intervention, with a full return to baseline weight typically occurring within 1–2 years [10,12]. This process is linked to endogenous mechanisms, including immune-related obesity memory, alterations in the gut microbiome, and dysregulation of appetite control [13]. These findings demonstrate that willpower alone is insufficient for sustained weight reduction, as multiple metabolic and biological factors contribute to weight regain. Additionally, it helps explain why dietary interventions alone are ineffective as long-term obesity treatments. In this context, majority respondents likewise adopted an incorrect perspective. Hereby, medical students, as future physicians, should acquire comprehensive foundational knowledge about obesity. This awareness enables them to avoid myths and stereotypes, as such misconceptions could otherwise lead to adverse patient outcomes.

Secondly, responders agreed with the disturbing problem of underestimating obesity as a disease. Underplaying obesity has been extremely common in healthcare sectors, usually in primary care (PC) settings, which should serve as the first line for early identification of obesity and for taking appropriate diagnostic

steps [14–18]. An analysis of National Health and Nutrition Examination Survey showed that only 40.4% of patients with overweight and obesity received counselling to control/lose weight by PC physicians [19]. In Poland, the report from 2024, which concerns the control of Polish PC institutions, published by Najwyższa Izba Kontroli (NIK) highlighted that many clinics had neglected to record patients' weight status, height, as well as data on the number of obese patients under active care [20]. Other studies showed that overweight and obesity are left as a discharge diagnosis and are not mentioned in the patients' problem lists [21–22]. The information presented above emphasizes that obesity is often downplayed and poorly documented, leading to negligence in recognizing it as a coexisting condition and, more importantly, as a disease in its own right, ultimately resulting in inadequate treatment.

Thirdly, the academic curriculum does not provide sufficient coverage of obesity-related topics. Many students reported that obesity is addressed only as a secondary issue when other diseases are discussed, particularly in subjects closely associated with obesity-related conditions. In contrast, in courses where obesity does not appear to be a primary focus, the topic is often overlooked entirely. Surprisingly, students gave low ratings to surgical courses, raising concerns in light of the increasing use and importance of MBS in obesity management. Notably, our research identified a knowledge gap in bariatric topics, aligning with findings from the prior study conducted by Matłok et al. [23]. Most students showed limited awareness of safety and the risk-benefit balance associated with invasive treatments. Böckelman et al. clearly demonstrated that post-bariatric surgery mortality rates are low and comparable to or lower than those of other common elective surgery procedures such as hysterectomy or knee arthroplasty [24]. The subsequent study confirms bariatric surgery safety in patients over 65, revealing similar outcomes and complication rates to younger patients [25]. Furthermore, it is indisputable that MBS, due to its long-term benefits, considerably improves patients' well-being by maintaining durable weight loss, stabilizing T2DM, hypertension and dyslipidemia, reducing adverse cardiovascular events, and lowering HbA1c and fasting glucose levels [26,27]. Therefore, medical curricula should be revised and adapted to meet current educational needs. Obesity is a complex and multidimensional condition, thus education on this topic should not be discussed superficially. As both conservative and invasive treatment continue to evolve, students need to stay informed as obesity is a major challenge medically and socially. Banasiak et al. reported that students who completed rotations in bariatric surgery services achieved significantly higher survey scores in the field of treatment efficiency and clinical management compared with those who did not [28]. Consequently, the introduction of additional obesity-focused classes or a dedicated course addressing this disease entity would be beneficial.

Last but not least, medical students have a problem applying knowledge in everyday medical practice. A few publications demonstrated that deficiencies specifically appeared among the fields of diagnosis, treatment and clinical management, which is coherent with our results [28, 29]. In our analysis, clinical decision-making ability increased with years of study. However, uncertainty regarding the management of obese patients persisted regardless of academic year. Accordingly, incorporating practical training, beyond reliance on theory alone, is crucial for fostering effective clinical reasoning and a fluent approach to various clinical scenarios. The curriculum should be more precisely designed to maximize benefits for students as future practitioners.

Limitations

Although this analysis is multicenter, the survey response rate is unsatisfactory. Moreover, among the participants, a large proportion are fourth-year students compared to students in higher years of study. These students are typically at the early stage of their clinical education, which may result in limited, particularly specialized, knowledge of obesity. Furthermore, self-reported measures may have led to inaccurate self-assessment. Future studies in Poland are needed with a higher response rate.

Conclusions

The current curriculum is inconsistent and fails to address students' needs. Although medical students advance through the academic program, significant gaps remain in both theoretical knowledge and practical training related to obesity and the management of obese patients. Therefore, modification of the curriculum is necessary, incorporating modern, innovative, and integrated approaches to better develop competencies and improve patient care outcomes in response to the obesity epidemic.

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