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RESEARCH

Anthropometric characteristics and consumer preferences for wooden chairs designed for bariatric users

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Abstract

Background/Purpose The article examines the relationship between population body dimensions and the practical design of wooden furniture, with a particular focus on wooden chairs intended for bariatric individuals. Given the growing prevalence of obesity, there is an increasing need to reassess the ergonomic, dimensional, and strength requirements of seating furniture for this population group. The aim of the study is to analyse selected body dimensions of bariatric respondents in Slovakia and to identify their opinions and preferences regarding seating furniture designed for overweight users.

Methods The research was based on a comprehensive analysis of selected body dimensions of 319 bariatric respondents in Slovakia. In addition, a structured questionnaire survey was conducted to assess 350 respondents' preferences and their level of satisfaction with the existing portfolio of wooden seating furniture.

Results The findings indicate that the current portfolio of wooden furniture does not sufficiently meet the needs of bariatric users. Respondents emphasized the need for improved chair dimensions and greater structural strength. The results also show consumer interest in furniture adapted to above-average body weight and dimensions.

Conclusions The study confirms the necessity of redesigning wooden seating furniture to better accommodate bariatric individuals. Special attention should be paid to ergonomic parameters, load-bearing capacity, and appropriate dimensions in order to increase user comfort, safety, and satisfaction.

Keywords Bariatric respondents · Above-average weight · Ecological production · Preferring domestic products · Seating furniture

1 Introduction

With the development of society, there has been an increase in overall well-being, which has also been accompanied by a rise in obesity rates. Obesity has now become a defining issue of our time. Adolescent obesity has quadrupled. In 2022, 2.5 billion adults (18 years and older) were overweight (https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight). Obesity results from the interaction of genetic, metabolic, behavioural, and environmental factors (Haththotuwa et al., 2020). It is often linked to excessive food consumption and is exacerbated by technical progress, the digitalization of society, and a corresponding lack of physical activity. Obesity is one of the most widespread diseases in the developed world, with its incidence rapidly increasing. The fundamental cause of obesity is an energy intake that exceeds expenditure. Beyond its role in energy storage, thermal insulation, and mechanical protection of the body, adipose tissue also functions in hormone

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and cytokine secretion. Additionally, it helps protect against increases in blood lipid levels after meals and their deposition in inappropriate areas. Physiologically, humans, like other mammals, are adapted to survive periods of food scarcity. However, they are not equipped to handle an excess of food. Without an energy surplus, body weight gain is not possible.

The causes of obesity can include an inappropriate diet, the quantity and composition of food, lack of physical activity, metabolic and psychological factors, hormonal abnormalities, endocrine diseases, the influence of hormonal medications, or even genetic and congenital conditions (Kang & Park, 2012). More than 60% of adults already have a body weight above the normal range (BMI up to 25 kg/m^2). A quarter of adults suffer from obesity, and approximately 10 to 20 percent of children are overweight or obese (Langová et al., 2021). Obesity significantly increases the risk of developing various chronic diseases, making it not only a medical issue but also a societal one (Maury Mena et al., 2025). The spectrum of obesity-related comorbidities includes type 2 diabetes, cardiovascular diseases, several types of cancer, neurodegenerative diseases such as Alzheimer's and Parkinson's, and osteoarthritis. Obesity is also linked to a higher incidence of occupational accidents (Fraeyman et al., 2023). For the purposes of this study, the term bariatric users refers to adults with obesity (BMI ≥ 30.0) who may require adapted furniture dimensions and load capacity.

One of the many areas of bariatric care to consider is the appropriate selection of furniture, armchairs, and beds for bariatric users (Bakewell, 2007). When selecting furniture for bariatric users, it is essential to consider factors such as weight capacity, size, stability, and comfort (Gallagher et al., 2020; Malone & Dellinger, 2011). The work aims to analyse selected body dimensions of bariatric respondents in Slovakia and to survey the opinions and preferences of bariatric respondents (BMI ≥ 30.0) on seating furniture that should be designed for the overweight population.

2 Theoretical background

Consumer behaviour represents one dimension of human conduct. It refers to the behaviour of final consumers related to the acquisition, use, and disposal products. According to Solomon (2006), consumer behaviuor is the subject of process-oriented study that encompasses a wide range of reasons behind the purchase decisions and product usage by individuals or groups, aimed at satisfying their needs.

Our research focuses on wood-based furniture due to its long-term sustainability and ecological benefits as a renewable material. Another key reason is the strength and dimensional stability of wood, making it a viable alternative to conventional materials. According to the furniture classification by Smardzewski (2015), furniture can be categorized based on purpose, functionality, form, structure, technology, and quality. Among these, functionality is the most valuable criterion for users. The relevance of this research lies in the increasing legislative frameworks and stringent environmental requirements, including emissions, aimed at ensuring sustainability and energy efficiency in furniture production. The primary challenge is the availability, diversity, and cost of wood materials that meet strict environmental criteria while maintaining sustainability with minimal environmental impact. It is essential to note that furniture industry strategies and policies are increasingly prioritizing the carbon footprint of buildings throughout their life cycle, including the carbon stored in materials. Wood and wood-based materials are being recognized as sustainable alternatives to steel and plastic, offering long-term carbon storage. Beyond environmental benefits, sustainable wood and wood-based materials contribute to the circular economy by repurposing waste products that would otherwise end up in landfills. Integrating these materials into manufacturing processes enhances industry sustainability and meets the growing consumer demand for environmentally responsible products.

The tendency to gain weight is a symptom of the human body's maladaptation (both genetic and phenotypic) to rapidly changing environmental conditions. Risk factors for obesity include social conditions and individual genetic predisposition (Luo et al., 2020). The direct causes of obesity are an improper diet, lack of physical activity, and certain diseases (Wiggermann et al., 2017). Obesity also presents psychological challenges, particularly due to limited mobility. For instance, bed sizes must accommodate involuntary changes in body position during sleep (Adami et al., 2011). Figure 1 shows the rate of growth of obesity in the adult population in Slovakia.

Slovak consumers are increasingly interested in purchasing products made in Slovakia (Loučanová et al., 2022). When choosing a new chair, consumers consider aspects of physical properties, performance, and suitability for meeting individual sleep needs (Haritha, 2020).

Bariatric respondents were analysed between 2022 and 2024 in hospitals across Slovakia. The survey included a total of 350 respondents. Each participant verbally agreed to data collection under the condition of anonymity. The collected data included gender, age, weight, height, hip circumference, and waist circumference. Measurements were taken using certified measuring devices and gauges. All respondents had a BMI of at least 30.0. Statistical analysis was conducted using STATISTICA 12.

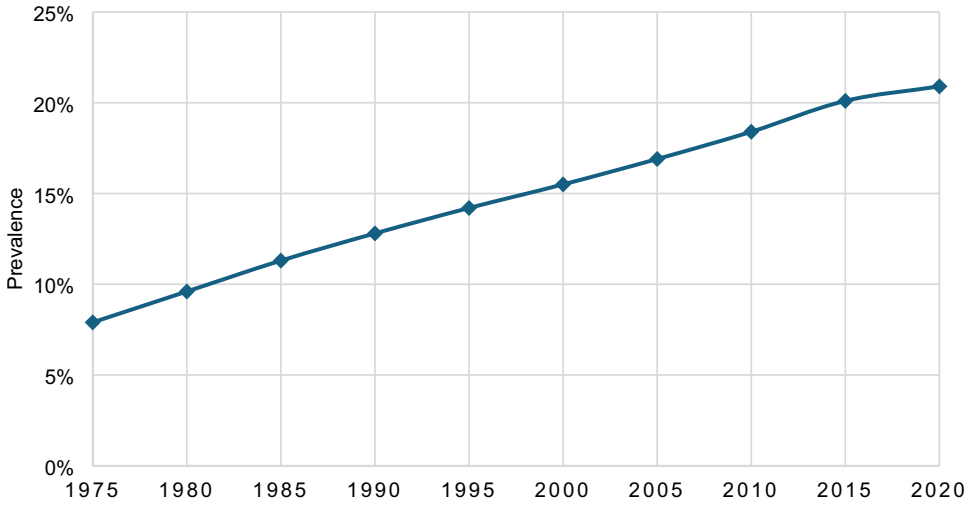


Fig. 1 Prevalence of obesity (BMI>30) among adults, ages 18+, 1975-2020, in Slovakia. Source: Riley, 2022

The data collection was in accordance with the principles of the Code of Ethics and Academic Integrity of the Technical University of Zvolen No. 8/2021 (2021). All respondents were informed about the purpose, use of the research and protection of the obtained data. The study used an oral consent approach from participants, ensuring anonymity and minimal risk associated with the research. This approach is in line with the specific requirements of the UCMJE, which allow for the use of oral consent.

A primary quantitative study on consumer preferences for purchasing wooden chairs for bariatric respondents was conducted with a sample of 350 participants. The minimum BMI of respondents was ≥ 30.0, calculated based on their height and weight. Data collection was carried out in collaboration with a research agency in November 2024 using the CAWI (Computer-Assisted Web Interviewing) method, ensuring the representativeness of the sample. The study reflected the socio-demographic structure of the Slovak Republic's population aged 18 and older and considered factors such as gender, age, region size, place of residence, and education.

The research was conducted in accordance with professional research management principles, specifically the ESOMAR standards (Jasinska et al., 2024). The research methodology ensured the reliability and validity of the data. Before data collection, a pilot phase was conducted to test the questionnaire on a small sample of respondents, identifying and resolving potential ambiguities or issues. Based on the preliminary research, respondent selection criteria were established to ensure the sample accurately reflected the structure of the Slovak Republic's population aged 18 and older. Data were then collected via an online platform, enabling effective reach across different regions and demographic groups. Each response was automatically checked for completeness and consistency, minimizing the risk of incomplete or contradictory data.

The statistical evaluation of the questionnaire was conducted using Statistica 12.0 software (StatSoft Inc. 2013). Responses related to the design of wooden seating furniture and respondents' preferences were analyzed using histograms and box plots. The graphs were categorized based on demographic factors, including gender, age, education, income group, and employment status. The box plots focus on median values, with the main range covering the 25th to 75th percentiles, while also highlighting extreme and outlier values. Additionally, basic descriptive statistics were calculated for a portion of the questionnaire responses.

In addition to descriptive statistics, selected relationships between socio-demographic characteristics and consumer attitudes were examined using Pearson's chi-square test of independence. The strength of statistically significant relationships was evaluated using Cramér's V coefficient. Statistical significance was assessed at the $\alpha = 0.05$ level.

3 Results

3.1 Evaluation of the results of bariatric patients

The average BMI of bariatric respondents was 48.8, with a maximum of 89.7. The highest recorded weight was 242 kg, with 99% of respondents falling within the 214 kg limit. The standard deviation for BMI was 8.17. The frequency distribution of waist circumference showed that the most common range was 120–140 cm, encompassing approximately half of all respondents. At extreme waist circumference values of 170 cm or more, the number of respondents dropped to fewer than 10. This parameter exhibited an approximately symmetric distribution with slight left skewness; however, the Shapiro-Wilk test indicated statistically significant departures from normality (Table 1).

Table 1 Kolmogorov-Smirnov and Shapiro-Wilk tests of normality

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
	0,078	319	0,050	0,964	319	0,000
Body height	0,073	319	0,100	0,987	319	0,007
Waist circumference	0,078	319	0,050z	0,971	319	0,000
Hip circumference	0,060	319	0,200	0,988	319	0,009

a. Lilliefors significance correction

Source: own, 2026

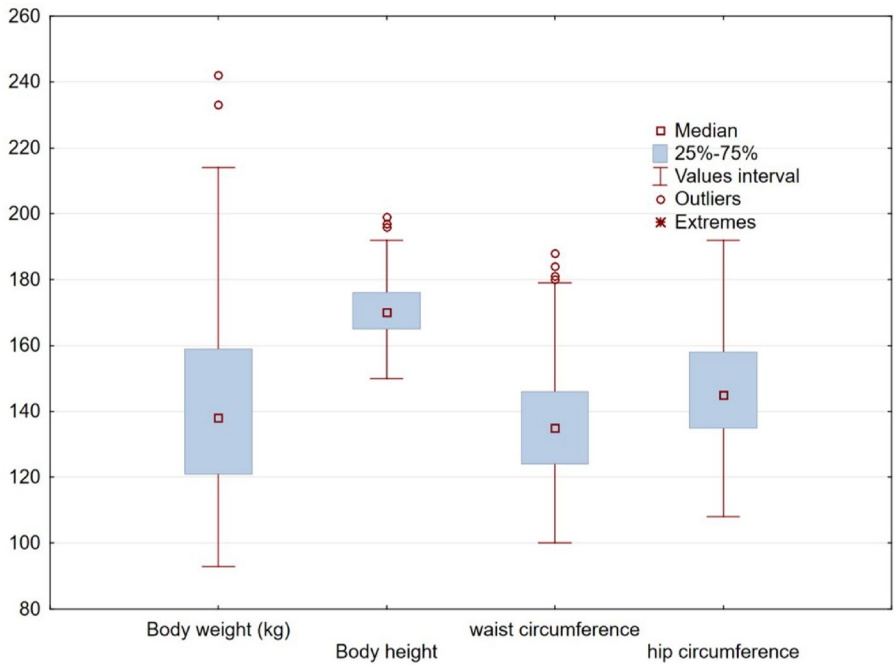


Fig. 2 Height, weight, waist circumference and hip circumference with median values of bariatric patients. Source: own, 2026

A similar distribution was observed for hip circumference, with the largest group of respondents falling within the 130–150 cm range, representing more than half of all survey participants. At the most extreme values, the frequencies were lower compared to waist circumference. The Shapiro-Wilk test indicated statistically significant departures from normality ($p < 0.05$) for all analysed anthropometric variables. Therefore, the null hypothesis of normal distribution was rejected. Given the relatively large sample size, the variables remained suitable for descriptive analysis; however, the results should not be interpreted as evidence of perfect normality.

Slight differences were observed in the distribution of body height among respondents, with the majority (202 cases, or 63.3%) falling within the 160 to 175 cm range. Only 8 respondents (2.5%) had a body height greater than 190 cm.

The distribution of values for height, weight, waist circumference, and hip circumference, along with their median values, is shown in Fig. 2. The distribution of these parameters indicates that the group as a whole was homogeneous, with measurements that were above average compared to the general population (i.e., bariatric respondents). Outliers were not significant extremes and were isolated cases within the analysed group. Overall, the population exhibited physical characteristics suitable for statistical analysis.

Partial deviations in individual parameters can be observed when considering gender or year of birth. Figure 3 presents the evaluation of the BMI parameter for men (1) and women (2).

The median BMI for women was 46.4, while for men it was 48.25. Overall, the BMI distribution for women was lower than for men. However, it is important to note that extreme values occurred more frequently in women. A more significant deviation was observed in the hip circumference parameter, which partly reflects the physiological differences in the female and male anatomical structures. The variability in waist circumference was virtually identical between the sexes. The statistics were also influenced by the fact that the number of women (213) was significantly higher than that of men (106).

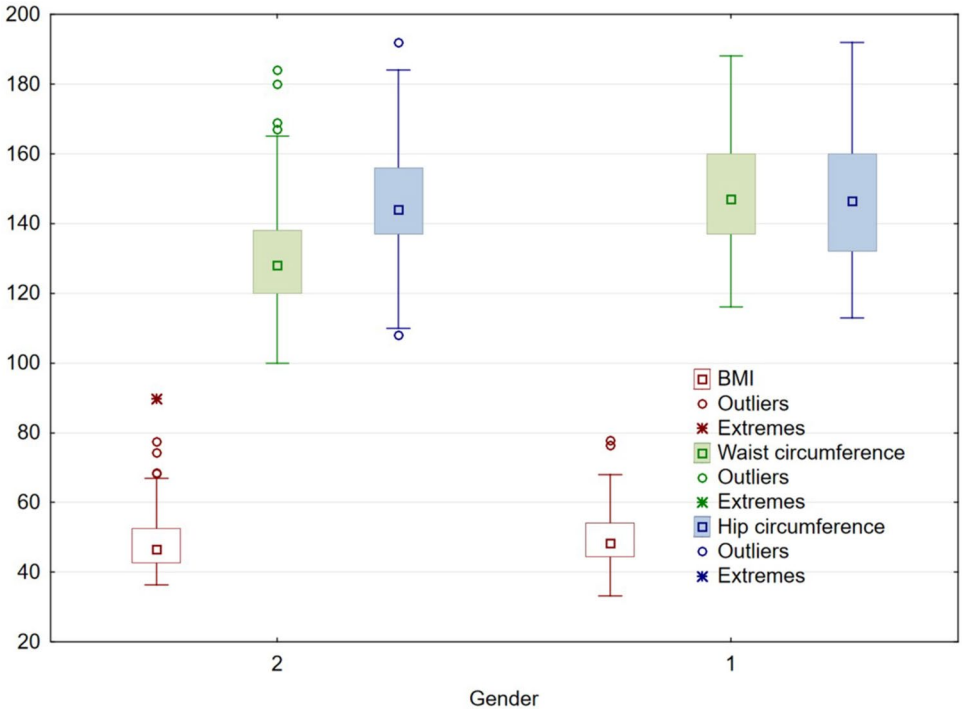


Fig. 3 BMI, Waist circumference, and Hip circumference of bariatric patients according to gender (Male – 1; Female – 2). Source: own, 2026

Table 2 Respondents sociodemography

Sociodemography		Count
Gender	Men	201
	Women	149
Age	18-29	28
	30-39	86
	40-49	99
	50-59	64
	60 and more	73
Education	Basic education	12
	Without graduation	75
	Graduation	164
	University	99
Self-governing region	Bratislava	50
	Trnava	38
	Nitra	48
	Trenčín	29
	Žilina	34
	Banská Bystrica	39
	Prešov	60
	Košice	52

Source: own, 2026

3.2 Evaluation of marketing research

As part of the consumer opinion research, we focused on questions related to wooden seating furniture and the respondents' opinions on the topic. All research participants had a BMI ≥ 30.0. The questionnaire used for data collection was divided into three main sections. The first section assessed the respondents' spontaneous knowledge of furniture manufacturers and sellers. The second section included 27 statements to which respondents provided their opinions using a Likert scale. These statements addressed consumer behaviour when purchasing furniture, their attitudes, and satisfaction with purchased furniture, with particular focus on the relationship between furniture and the respondents' weight characteristics. The questionnaire concluded with questions about the respondents' physical parameters, specifically their weight and height. In total, the questionnaire included 36 questions on respondents' behaviour and attitudes, along with seven questions on their sociodemographic characteristics, such as gender, age, education, place of residence, size of residence, employment status, and income. Data collection took place in the fall of 2024. The questionnaire was anonymous, and the entire research adhered to ethical standards for working with human participants. Due to the limited scope of the article, not all 36 questions were graphically evaluated—only the most relevant ones from the perspective of marketing research, in line with the aim and focus of the paper. General characteristics of the respondents based on identification variables are presented in Table 2.

More than half of the male respondents had a BMI between 30 and 35 (median 32.3), with one extreme case having a BMI over 65. Female respondents showed slightly higher values (median 33.3), with one extreme case having a BMI over 50 (Fig. 4).

Although most respondents expressed general satisfaction with currently available furniture, many also reported

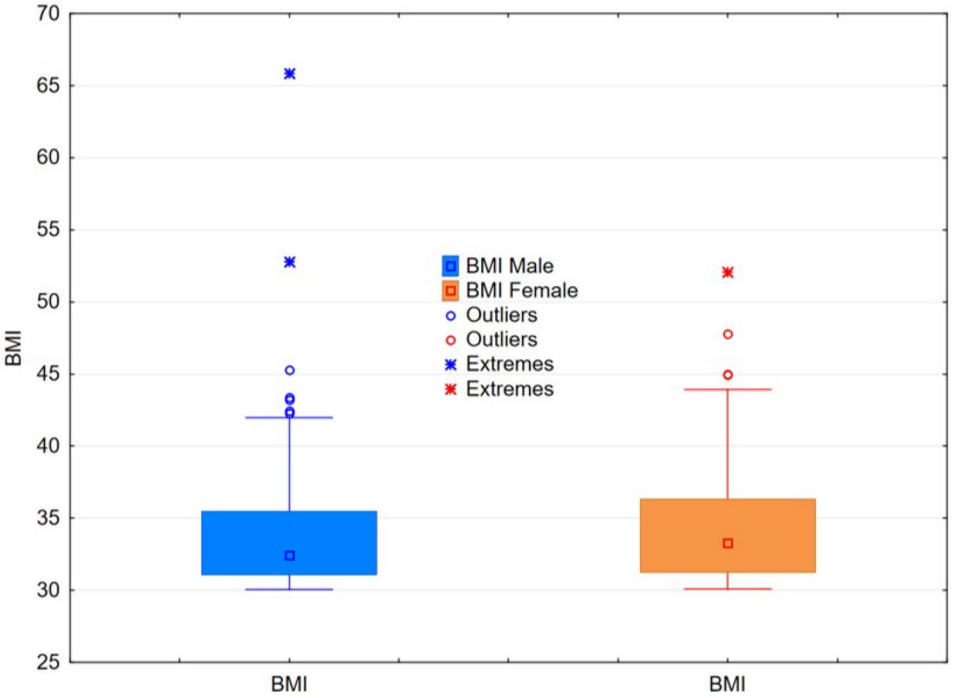


Fig. 4 BMI of surveyed respondents divided by gender. Source: own, 2026

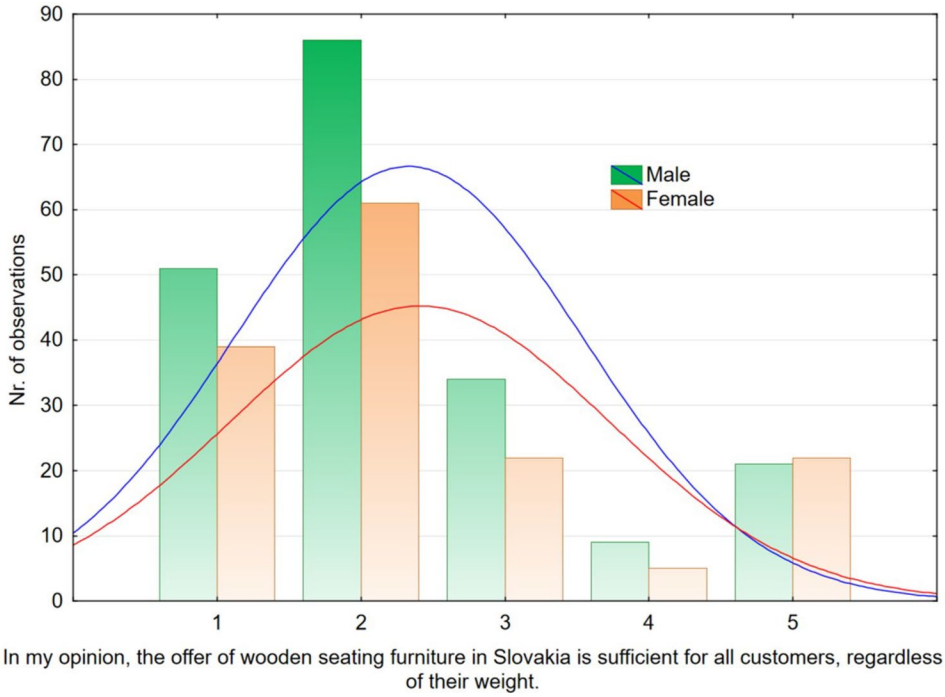


Fig. 5 Agreement with the statement of the sufficiency of the supply of wooden seating furniture regardless of weight 1- I definitely agree; 2- I tend to agree; 3-I tend to disagree; 4-I definitely disagree; 5-I don't know. Source: own, 2026

a need for higher load capacity, improved dimensions, and furniture adapted to above-average body weight (Fig. 5).

Most respondents also prefer the adjustability of wooden seating furniture and consider this an important factor (Fig. 6).

It is clear that most respondents spend their time sitting on upholstered furniture during working hours, with the exception of those in the 50-59 age range. A relatively large group of respondents in the 30-39 age range also spends most of their time sitting at home, which is an interesting finding given the general trends of unhealthy eating and the growing rates of obesity in both the child and adult populations (Fig. 7).

To verify whether satisfaction with current seating furniture differed between men and women, a Pearson chi-square test was conducted. The results did not reveal a statistically

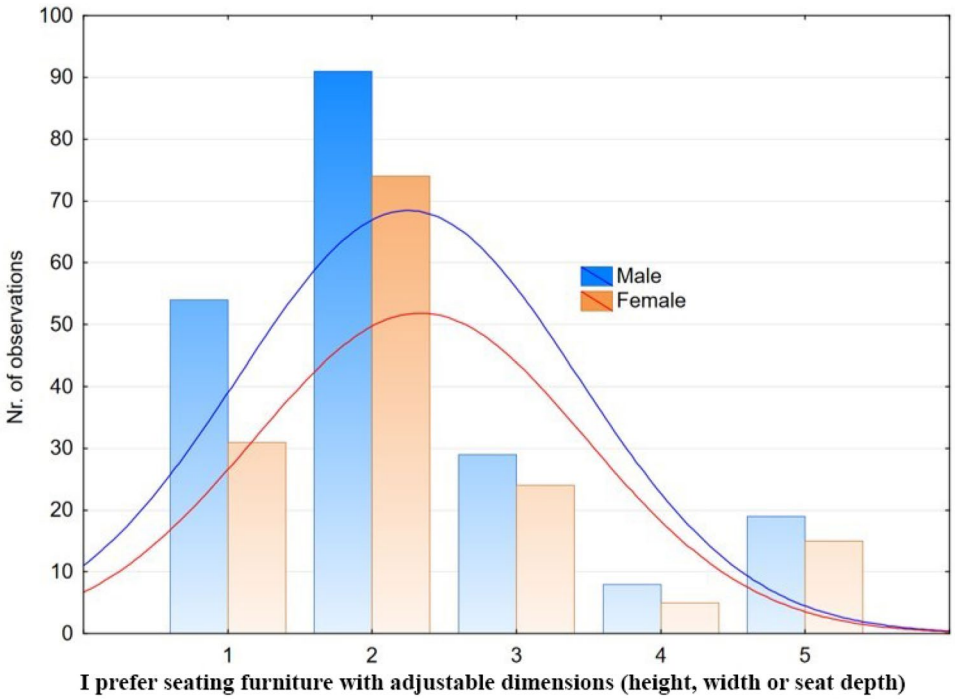


Fig. 6 Respondents' preferences for the adjustability of seating furniture parameters. Source: own, 2026

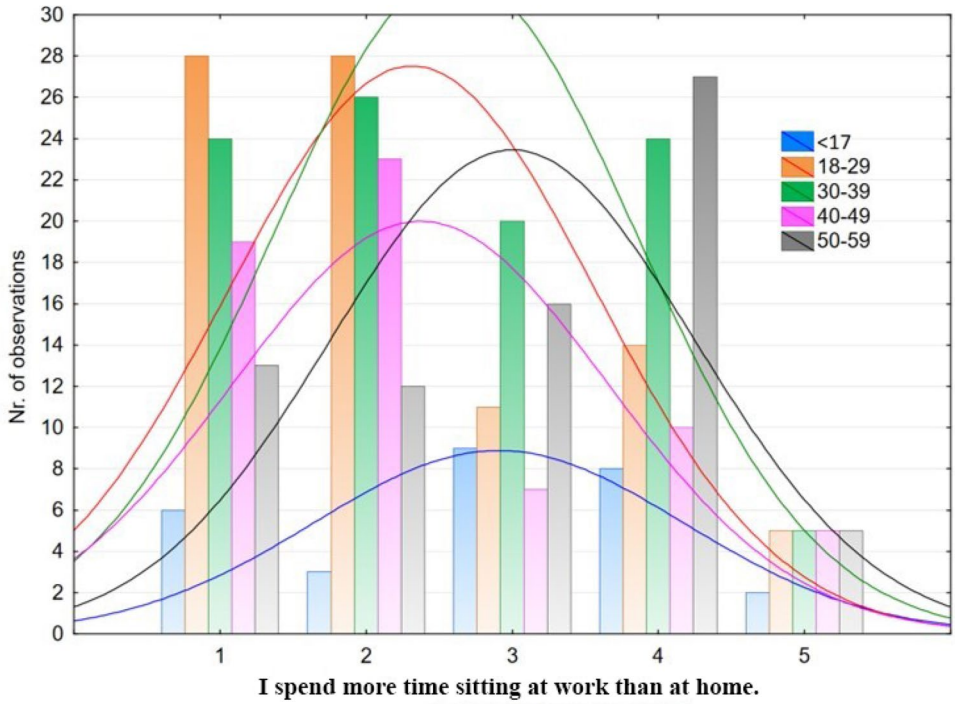


Fig. 7 Age composition of respondents regarding spending time on seating furniture. Source: own, 2026

significant relationship between gender and furniture satisfaction (χ^2 = 1.991, p = 0.370, Cramér's V = 0.075). This finding suggests that satisfaction levels are comparable across genders.

Satisfaction with current seating furniture was high across both genders. A total of 66.2% of men and 63.8% of women agreed that their current seating furniture did not require replacement. Although men reported slightly higher satisfaction levels, the difference between genders was relatively small, indicating that gender does not substantially affect overall satisfaction with current seating furniture (Fig. 8).

The relationship between employment status and satisfaction with current seating furniture was also examined. Although economically active respondents appeared to report slightly higher satisfaction levels, the association was

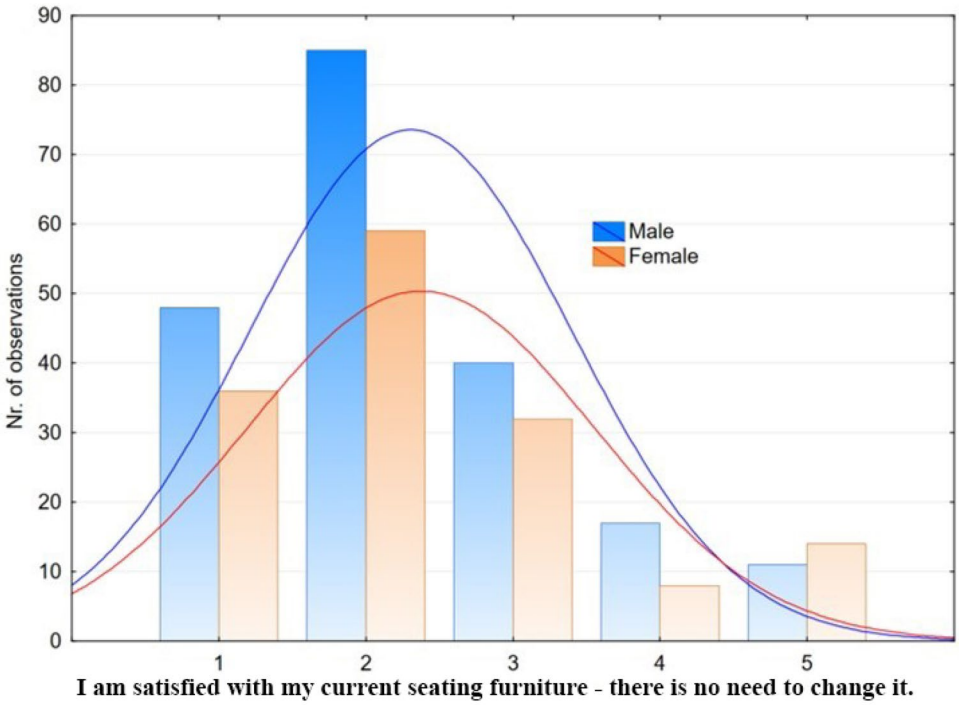


Fig. 8 Respondents' satisfaction with their current seating furniture by gender. Source: own, 2026

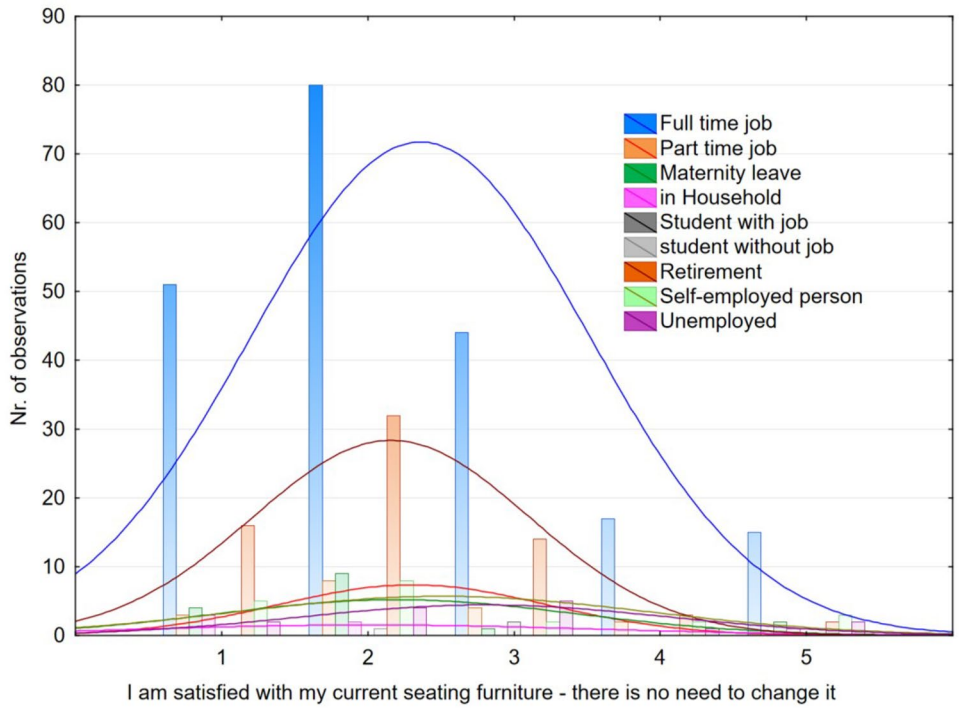


Fig. 9 Respondents' satisfaction with their current furniture in relation to their employment. Source: own, 2026

not statistically significant ($\chi^2 = 2.616$, $p = 0.270$, Cramér's $V = 0.094$).

Differences were also observed across employment categories. Full-time employees and self-employed respondents expressed higher levels of satisfaction with their current furniture, whereas unemployed respondents and students reported lower satisfaction. These differences may reflect disparities in purchasing power, furniture quality, and household investment behaviour (Fig. 9).

Both genders were identified as interested in replacing their seating furniture in the next five years. 55% of men and 55% of women plan to replace it. More than 10% of respondents in both genders were undecided on this question (Fig. 10).

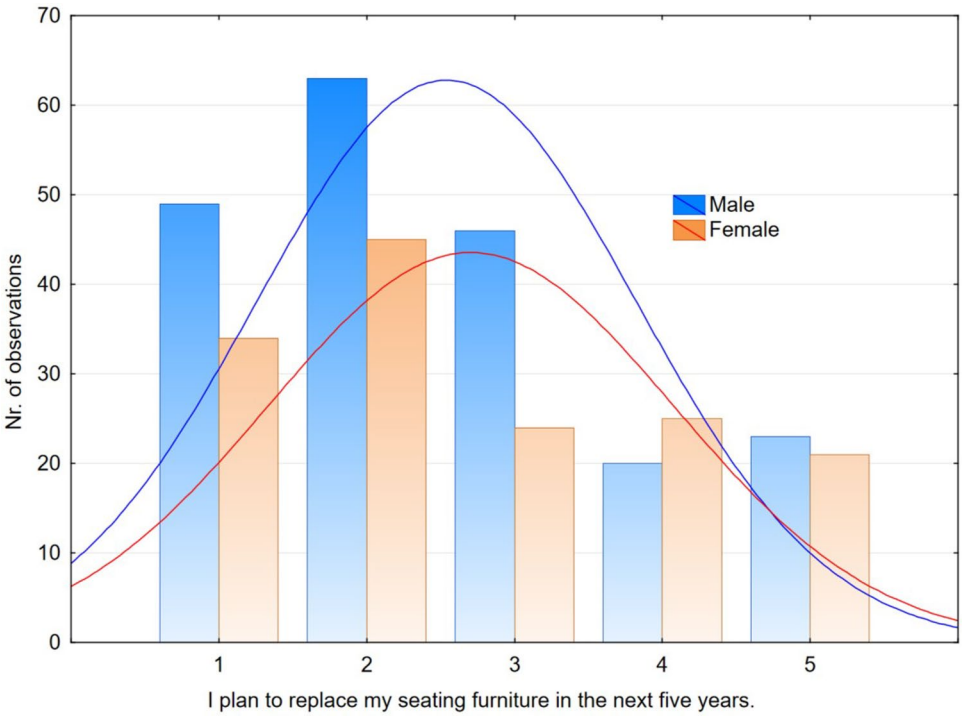


Fig. 10 Respondents' preferences for purchasing new seating furniture in the next 5 years. Source: own, 2026

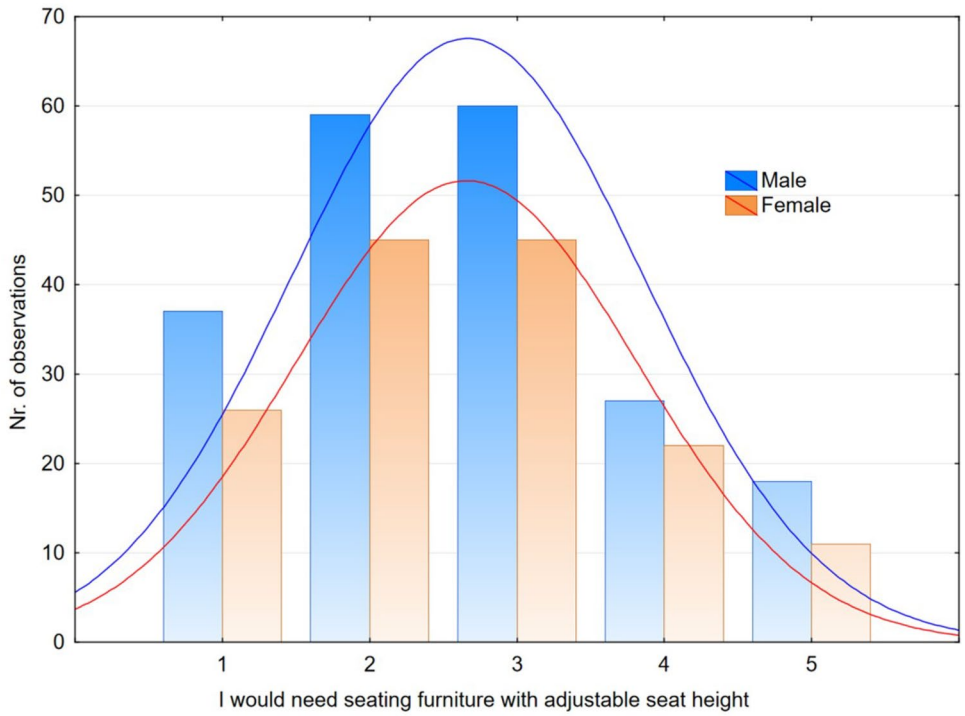


Fig. 11 Respondents' preferences for the need for height adjustability in seating furniture. Source: own, 2026

Figures 11 and 12 show the respondents' preferences for adjusting the current parameters of seating furniture. Both seat height adjustability and higher load capacity are preferred by fewer than half of both male and female respondents. Specifically, 47.7% of men and 46.2% of women prefer seat height adjustability, while 46.2% of men and 41.6% of women prefer a higher load capacity. The majority of respondents expressed satisfaction with the current parameters of seating furniture, particularly in terms of load capacity and seat height adjustability.

Although most respondents expressed satisfaction with the current load capacity and height-adjustable seating furniture, most also prefer the need to expand the range of

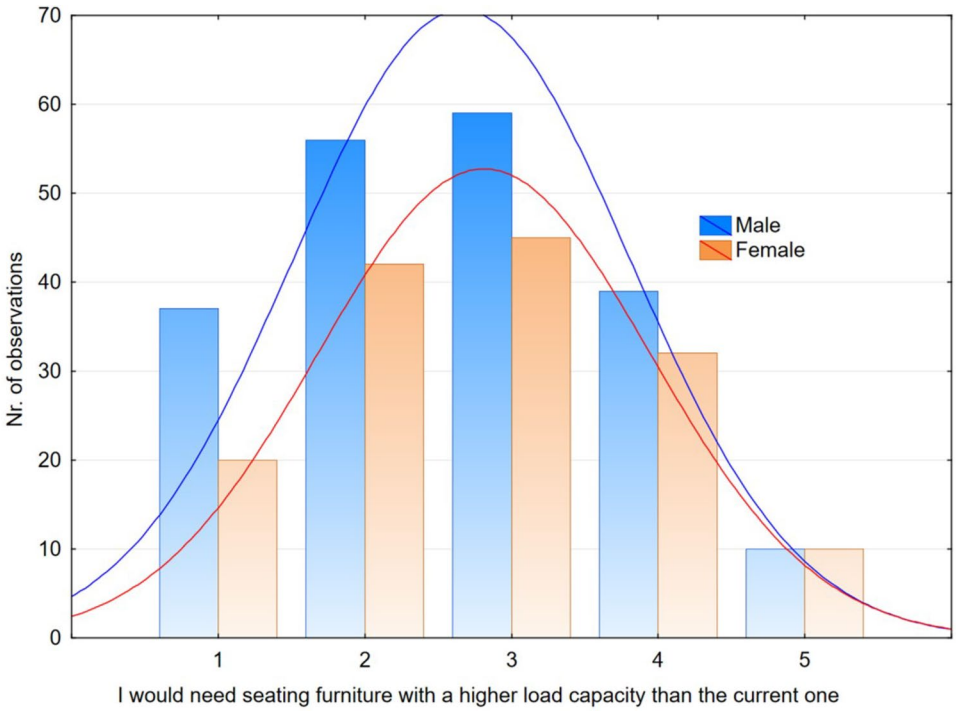


Fig. 12 Respondents' preferences for the need for higher load-bearing capacity of seating furniture. Source: own, 2026

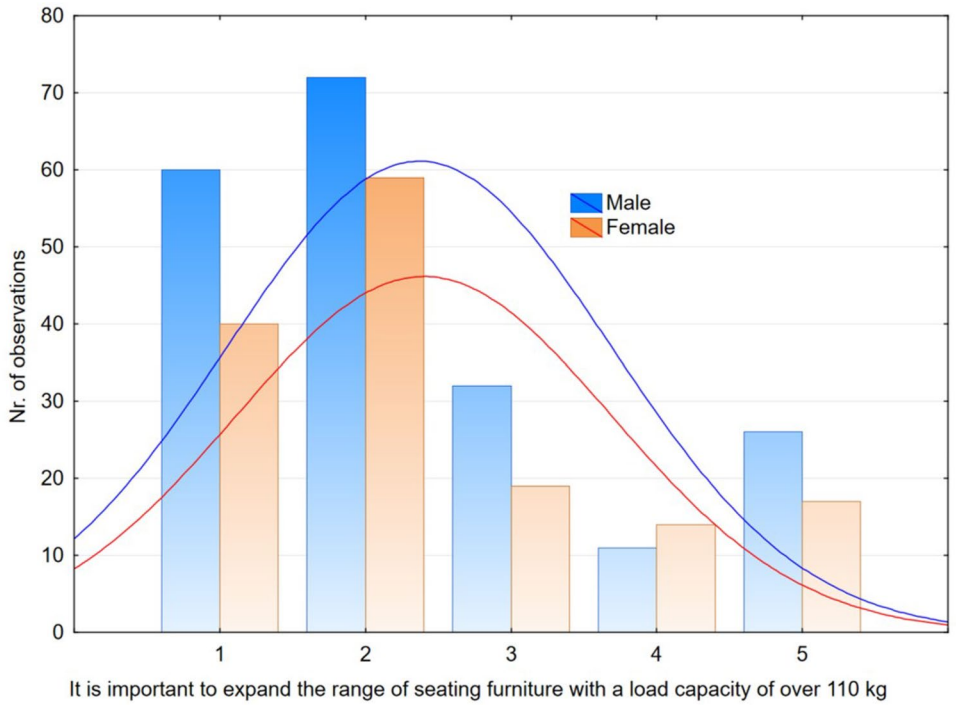


Fig. 13 Respondents' preferences on the need to expand the range of seating furniture with a load capacity of over 110 kg. Source: own, 2026

furniture with both higher load capacity and adjustable seating height, which is an interesting fact (Figs. 13 and 14).

Most respondents spend 1 to 3 hours a day sitting on a chair (median 2 for both genders). Women spend more time sitting, with one outlier among men (5 hours).

Gender differences in willingness to pay a premium price for seating furniture with increased load capacity were not statistically significant ($\chi^2 = 0.079$, $p = 0.779$, Cramér's V = 0.015). Both male and female respondents expressed a similar willingness to accept moderate price increases for furniture adapted to higher body weight.

Additional analyses demonstrated that socio-demographic characteristics exerted only a limited influence on most evaluated consumer attitudes. Gender was not significantly associated with either satisfaction with existing furniture or willingness to pay a premium price. In contrast,

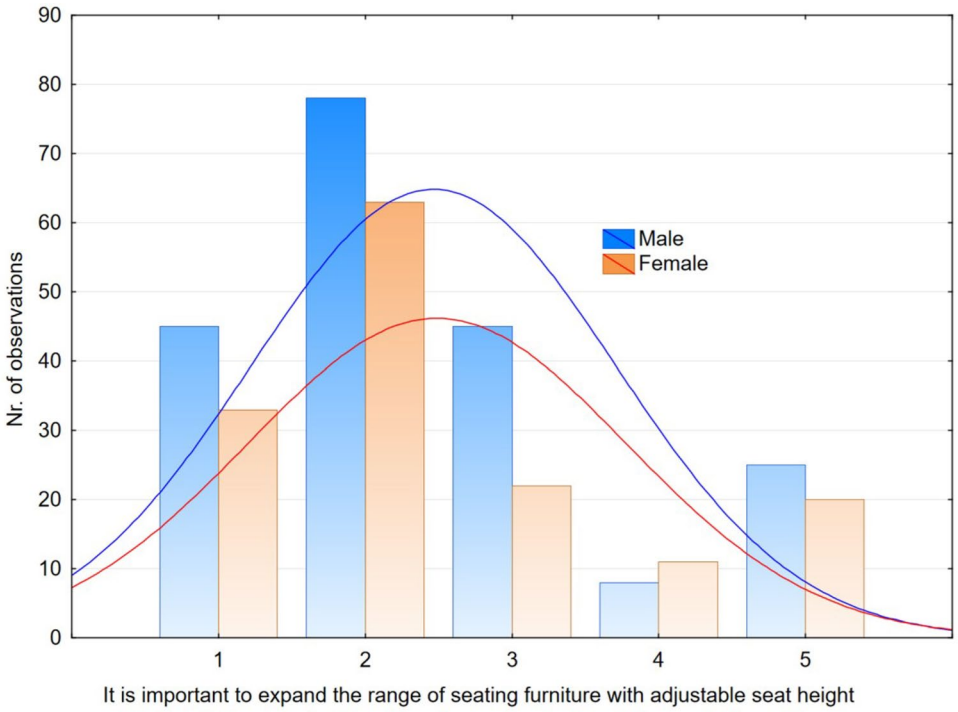


Fig. 14 Respondents' preferences for the need to expand the range of seating furniture with adjustable seat height. Source: own, 2026

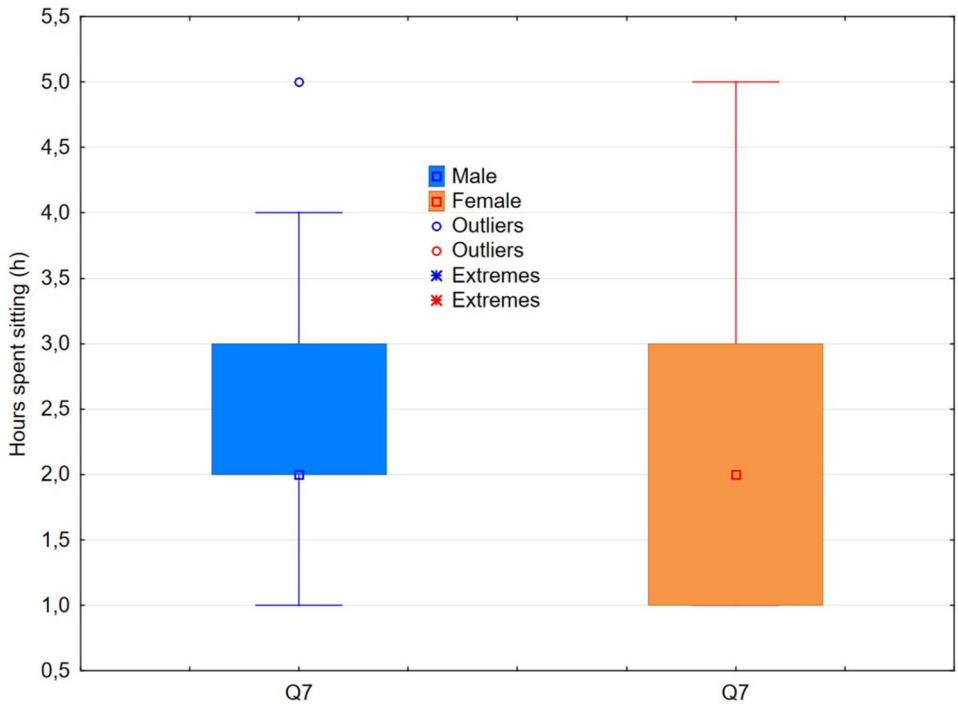


Fig. 15 Number of hours spent on average per day sitting on a chair by gender. Source: own, 2026

education level was significantly associated with awareness of standardized furniture load capacity. This finding indicates that educational attainment may play an important role in consumers' understanding of technical product characteristics and furniture safety standards (Fig. 15).

Respondents express their agreement with increasing the price of seating furniture in the event of increasing its load capacity above 110 kg, most often in intervals of 5-10%. A significant minority of survey respondents would accept a price increase of more than 15% (Fig. 16).

One of the most important managerial findings concerns respondents' willingness to pay a premium price for seating furniture adapted to higher body weight. More than 80% of respondents indicated that they would be willing to accept a price increase, with the most acceptable premium ranging

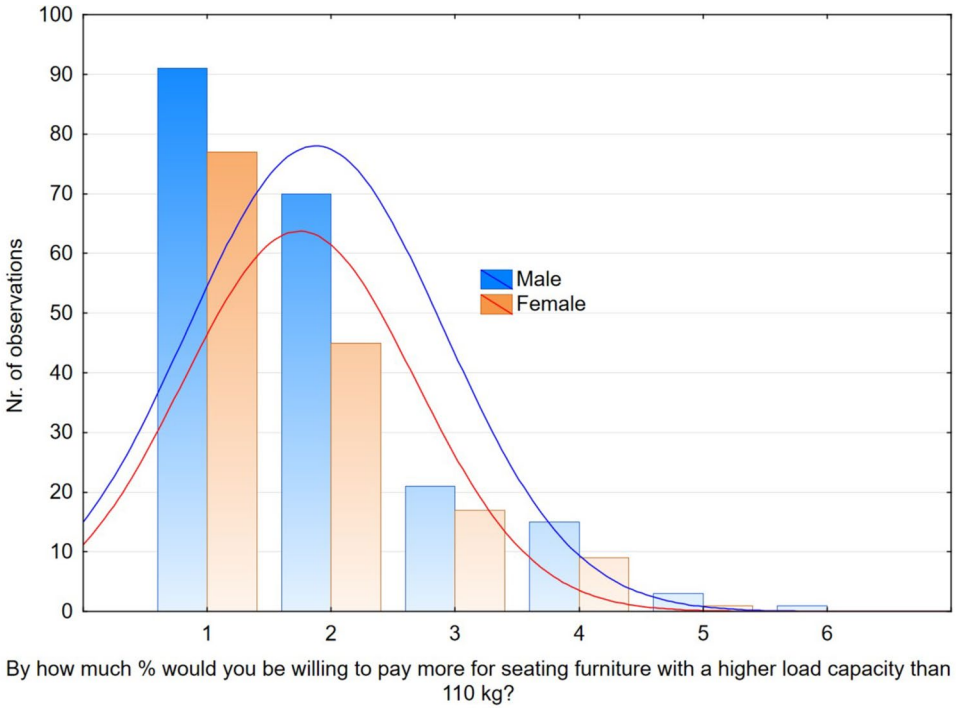


Fig. 16 Respondents' willingness to pay extra for furniture with a load capacity of more than 110 kg. 1 – up to 5%; 2 – 5-10%; 3- 10-15%; 4- 15-20%; 5- 20-25%; 6- more than 25%. Source: own, 2026

between 5% and 10%. Only a small proportion of respondents accepted premiums above 15%.

From a managerial perspective, this finding indicates the existence of a viable market niche for specialized bariatric seating furniture. Furniture manufacturers may therefore consider differentiated product portfolios and premium positioning strategies that emphasize improved load capacity, durability, safety, and ergonomic comfort. The results further suggest that part of the additional production costs associated with reinforced bariatric furniture may be compensated by consumers' willingness to pay a moderate premium.

A statistically significant relationship was identified between education level and knowledge of standardized furniture load capacity ($\chi^2 = 24.677$, $p < 0.001$, Cramér's V = 0.284). Respondents with higher educational attainment demonstrated greater awareness of furniture load standards, whereas lower educational groups more frequently reported insufficient knowledge or uncertainty regarding standardized load capacities.

Awareness of standardized furniture load capacity varied across educational groups. Respondents with secondary and university education demonstrated higher familiarity with standardized load limits, whereas uncertainty and lack of knowledge were more frequent among respondents with lower educational attainment. This finding suggests that education may influence awareness of technical product characteristics and furniture standards (Fig. 17).

To complement the descriptive analysis, selected relationships between socio-demographic characteristics and consumer attitudes were examined using Pearson's chi-square test of independence. The results are presented in Table 3.

The results revealed a statistically significant relationship only between education level and knowledge of standardized furniture load capacity ($p < 0.001$). The effect size reached a moderate level (Cramér's V = 0.284), indicating that respondents with higher educational attainment were more familiar with technical furniture standards. No statistically significant associations were identified for gender-related comparisons or employment status. These findings suggest that awareness of technical furniture characteristics is influenced more strongly by educational background than by gender or labour-market position.

Most respondents with a BMI of 30-35 have no experience with furniture damage due to insufficient load-bearing capacity. However, respondents with a higher BMI (35-45) report experiencing furniture damage due to insufficient load-bearing capacity and strength. The number of respondents with extremely high BMIs was too small in the survey to draw a relevant conclusion (Fig. 18).

The results indicate a trend suggesting that the incidence of furniture damage due to insufficient load-bearing capacity increases with increasing BMI category. While respondents with BMI between 30 and 35 generally reported no such experience, respondents in higher BMI categories more frequently reported furniture failures. Although the limited number of respondents in the highest BMI categories prevents formal statistical inference, the findings suggest a

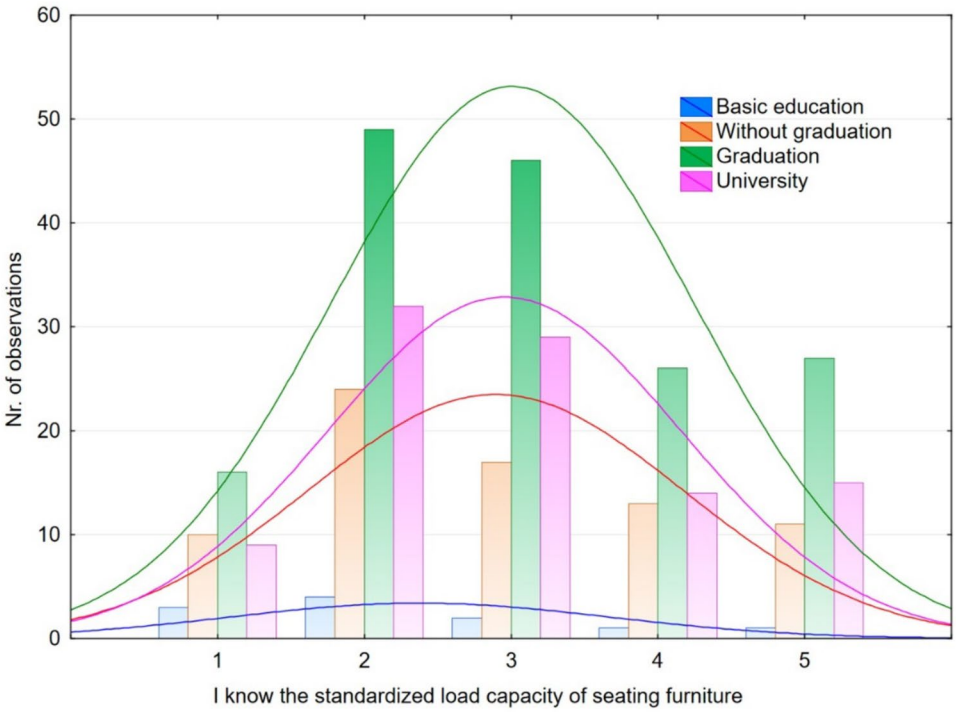


Fig. 17 Expression of knowledge of standardized load capacity of seating furniture by respondents depending on the level of education. Source: own, 2026

Table 3 Chi-square analysis of selected relationships between socio-demographic characteristics and consumer attitudes

Relationship	χ^2	df	p-value	Cramér's V
Gender × satisfaction with current furniture	1.991	2	0.370	0.075
Education × knowledge of standardized load capacity	24.677	3	<0.001	0.284
Employment status × satisfaction with furniture	2.616	2	0.270	0.094
Gender × willingness to pay additional price for higher load capacity	0.079	1	0.779	0.015

Source: own calculations based on survey data, 2026.

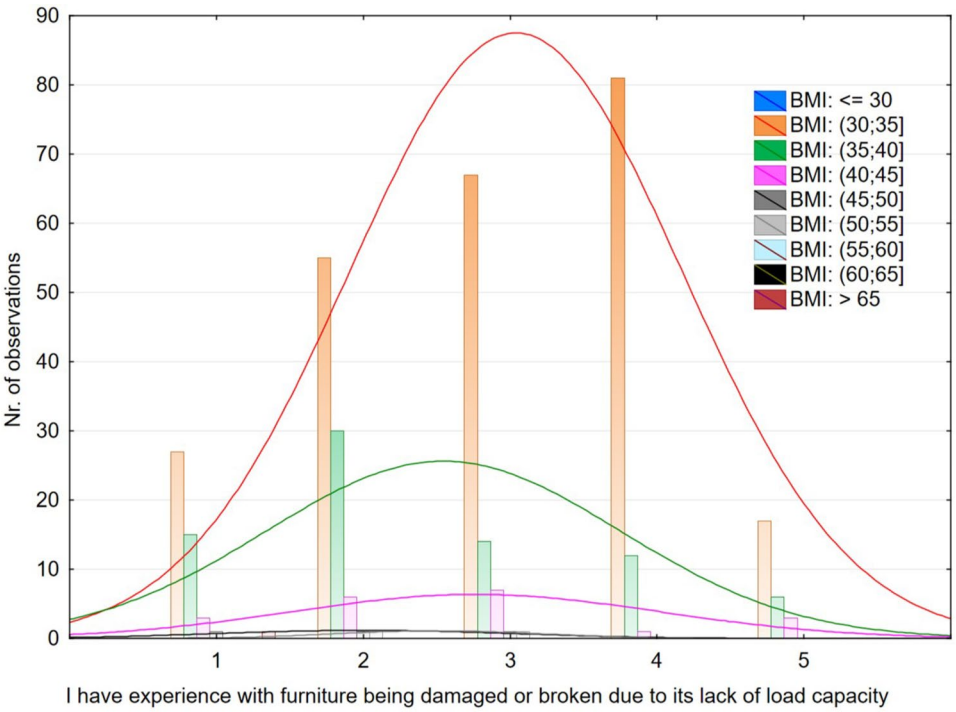


Fig. 18 Respondents' experiences with damage to seating furniture due to its insufficient weight depending on their BMI. Source: own, 2026

relationship between body weight and furniture durability requirements.

4 Discussion

With the growing number of bariatric respondents worldwide, there is an increasing demand for products that are functional, safe, and aesthetically pleasing. Wooden chairs, in particular, face unique challenges as they must balance load-bearing capacity with ergonomic requirements. Wood offers an aesthetic appeal that can blend better into both domestic and commercial environments compared to metal or plastic alternatives. It also has natural temperature-regulating properties, making it pleasant to the touch in various conditions. Consumers increasingly prefer eco-friendly materials and certified products, and they tend to favour furniture made from natural materials (Hyun et al., 2021). Many also prefer furniture with eco-certification (Wagner et al., 2019). Using certified wood from sustainable sources provides an advantage over materials that have a higher environmental impact and carbon footprint.

There is significant attention being paid to the research and development of natural, sustainable, biodegradable, or recycled and recyclable materials in furniture design (Branowski et al. 2020; Lee and Nguyen 2017). This trend reflects the ongoing effort to find locally available raw materials suitable for developing sustainable materials (Pipiska et al., 2024). Currently, many domestic companies producing wood products face growing foreign competition. To respond to customer preferences and overcome the pressure of the import market, it is necessary to develop and produce products aimed directly at consumers. This strategy enables companies to compete with global imports and lower-cost foreign products (Girma et al., 2024). With the rise of new technologies, retailers can also target smaller groups of consumers with innovative products (Erensoy et al., 2024). The furniture industry benefits from the aesthetic and functional properties of wood-based materials, offering environmentally friendly options without compromising on quality or design. The increasing use of additives combined with wood raw materials creates great potential for meeting environmental criteria in wood-plastic composite products (Osvaldová et al., 2023). In today's high-intensity work and life environment, people face numerous health problems, particularly from prolonged sitting (Bai et al., 2022).

In our study, we focused on wooden seating furniture for bariatric respondents, which must meet specific requirements to ensure ergonomic safety and strength. Additionally, it must fulfil functional criteria in terms of dimensions and have sufficient load-bearing capacity to withstand higher loads (Jasinska et al., 2024). This includes the seat's width, depth, and height (Hitka et al., 2022). Armrests are crucial for helping users stand up and also increase the strength of the chair. These requirements necessitate a stronger construction in the joints and other structural elements. The design and comfort aspects are also significant, as the furniture must be adjustable to meet the individual needs of the respondent. In line with reducing ecological impact, wooden agglomerates can also be used in the production of chairs for bariatric respondents.

Our research defines consumer preferences and behaviours of bariatric respondents. Despite overall satisfaction with the current furniture product portfolio, there is an increasing demand for chairs that better cater to the needs of the bariatric consumer group. Our findings also indicate that overweight consumers support changes in chair production to ensure safe seating.

The additional inferential analyses showed that demographic characteristics only partially explain differences in consumer attitudes. Education level was the only factor significantly associated with awareness of standardized furniture load capacity. In contrast, neither gender nor employment status significantly influenced furniture satisfaction or willingness to pay. These findings suggest that technical knowledge about furniture safety standards is driven more by educational background than by basic demographic attributes.

Our research has strong application potential for furniture manufacturers and designers. Introducing the production of chairs for bariatric respondents can be a competitive market advantage (Baranovski et al., 2020). Given the global increase in population weight, the issue of furniture design is highly relevant and necessary. Managers can use our data when planning and implementing new types and styles of seating furniture (Hitka et al., 2022). Specifically, the optimal dimensions of a wooden chair for bariatric individuals are based on the 95th percentile measurements of the current adult population (thigh length when seated with knee bent, popliteal height) and the 95th percentile measurements of bariatric respondents (seat width by hips, seat width by waist), as proposed in the works of Gric et al., 2017 and Hitka et al., 2023. A limitation of our study is its focus on the Slovak market, though we anticipate that bariatric respondents in other countries may share similar opinions. This presents a promising avenue for future research with a broader international scope.

4.1 Practical implications for stakeholders

The main contribution of this work is the identification of consumer preferences and unmet ergonomic needs of bariatric users regarding wooden chairs. Anthropometric

measurements are used as evidence to explain these preferences and to formulate recommendations for furniture manufacturers.

Because the findings are relevant to several stakeholder groups, the implications are presented separately for furniture manufacturers, furniture designers, retailers, healthcare institutions, policymakers, and standardization bodies.

The findings have implications for several stakeholder groups.

Furniture manufacturers should consider expanding their product portfolios to include seating furniture with higher load-bearing capacity and improved ergonomic characteristics.

Furniture designers should pay greater attention to seat width, seat depth, support elements, and adjustability features suitable for users with above-average body dimensions.

Retailers may use these findings to identify market segments interested in specialized seating products and premium-value propositions.

Policymakers and standardization bodies may use the results as supporting evidence for future discussions regarding furniture safety requirements and the adequacy of current load-capacity standards.

Healthcare institutions may benefit from considering furniture specifications that better reflect the anthropometric characteristics of patients with obesity.

4.2 Limitations

This study was based on two independent datasets. The anthropometric dataset consisted of adults with obesity measured in healthcare facilities between 2022 and 2024, whereas consumer preferences were obtained from an independent CAWI survey conducted in 2024.

Consequently, direct statistical relationships between anthropometric measurements (e.g. BMI, waist circumference, hip circumference) and consumer preferences could not be assessed at the individual respondent level. Future research should integrate anthropometric and consumer preference data within a single sample to enable more advanced analyses of the relationships between body dimensions, furniture requirements, and purchasing behaviour.

Another limitation is that the marketing survey data were available in aggregated form, which restricted the use of advanced multivariate statistical techniques. Consequently, reliability analyses (e.g. Cronbach's alpha), exploratory factor analysis, and respondent-level modelling of preferences were not possible.

5 Conclusions

Global population changes are not adequately reflected in the standardization or market availability of wooden chairs for individuals with increasing weight and height. The height and weight of populations are significantly rising in all countries, which highlights the need for further research to support market changes and manufacturer policies. Our findings confirm the importance of conducting studies focused on this issue and emphasize the relevance of our research. The furniture industry can leverage our results to shape production programs, product portfolios, and distribution strategies to target this specific market and meet consumer demand. In our study, we analysed 350 bariatric respondents and defined their characteristics, including height, weight, waist and hip circumference, and subsequently, BMI. While the height of bariatric respondents did not deviate from the normal population range, other characteristics, such as weight and circumference measurements, were well above average. Given that the current strength standards for wooden seating furniture are insufficient for bariatric respondents, it is crucial for manufacturers to update these standards and adapt their production accordingly. Additionally, we examined the opinions of respondents with a BMI ≥ 30.0. From their feedback, it is clear that there is a current need to expand the offering of wooden seating furniture for individuals with higher weight. Respondents are willing to pay a higher price for such furniture. Bariatric respondents often face stigmatization due to their size, and specialized products are essential for their integration into everyday life. Wooden chairs adapted to their needs can enhance their sense of inclusion and comfort. The results of our research, along with our previous studies, underscore the necessity of adjusting weight limits for this specific group of bariatric consumers. Given that the current standards for wooden chairs range from 110 to 130 kg, it is essential for companies producing wooden furniture to expand their production programs to include furniture suitable for bariatric users. Based on previous research, it can be concluded that the cost increase in manufacturing a chair for the bariatric population amounts to 11.6% compared to a standard chair (Hitka et al., 2024). Given the needs it is able to meet, this price can be considered competitive.

Adjusting the standard dimensions of chairs requires interdisciplinary cooperation between anthropologists, ergonomists, developers, designers, and healthcare professionals. A multidisciplinary approach can yield better results in the production of health-safe consumer products. Wooden furniture, with its functional properties, clearly meets these requirements and can be used by a broad user group. This can support cleaner production by reducing

material consumption, as individual stages of cleaner production focus on reducing waste and the carbon footprint.

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Data availability All data supporting the findings of this study are available within the paper and its Supplementary Information.

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