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Overweight /obesity, physical inactivity and multimorbidity among adults attended at primary health care in Sarajevo Canton, Bosnia and Herzegovina

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Abstract

Multimorbidity, defined as the occurrence of two or more chronic diseases within the same patient, is one of the most important public health problems in the world and in our country, which has a significant negative impact on individuals, families and the society. Obesity and physical inactivity are one of the most significant risk factors for multimorbidity. The aim of the study was to explore the association between body mass index, level of physical activity and multimorbidity among adults attended at primary health care in Sarajevo Canton, Bosnia and Herzegovina. This cross-sectional study evaluated 300 respondents in two groups of 150 each (i.e. normal weight and overweight/obese). The respondents were supposed to fill out a questionnaire that included questions about their age, gender, marital status, educational level, leisure-time physical activities and multimorbidity. Respondents were weighed and measured, and body mass index was calculated. Normal weight and physically inactive respondents (OR: 3.59; 95% CI: 1.56-8.23 p=0.003), overweight/obese and physically active respondents (OR: 3.99; 95% CI: 2.19-7.26 p=0.000), overweight/obese and physically inactive respondents (OR: 5.87; 95% CI: 3.04-11.31 p=0.000) were significantly more likely to report multimorbidity than normal weight and physically active respondents. Our findings underline the importance of maintaining a healthy weight and being physically active in order to reduce risk of multimorbidity.

Key words: Overweight; Obesity; Physical Inactivity; Multimorbidity; Adults

1. Introduction

The World Health Organization (WHO) defines overweight and obesity as abnormal or excessive fat accumulation that presents a risk to health [1]. Obesity is a serious public health problem that is growing alarmingly worldwide. Current global trends predict 38% of the world's adults will have overweight while 20% will be affected with obesity by 2030 [2].

The prevalence varies considerably between countries, and between regions within countries. Earlier studies have indicated that body weight is affected by sociodemographic factors such as age, gender, place of residence, level of education, marital status or financial situation [3,4].

The high prevalence of obesity is associated with physical inactivity [5]. Several observational studies performed on large samples and using objective physical activity assessment methods have shown decreased physical activity levels in persons with obesity compared to normal-weight counterparts [6]. According to a meta-analysis among 111 851 individuals with obesity, prevalence of physical inactivity was 43% [3%e 82%] [7].

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Overweight, obesity and physical inactivity result in impaired body systems functions and culminate in multimorbidity and increased incidence of non-communicable diseases, including cardiovascular diseases, diabetes and cancer [8,9]. There is an important body of research showing that obesity [10] or physical inactivity [11], as well as the combined effect of obesity and physical inactivity [12] are associated with the likelihood of multimorbidity. A study conducted in Canada on a population of 10 000 showed that people who were physically inactive or obese were 1.06 times and 1.37 times, respectively, more likely to have multimorbidity [13]. A study of Dhalwani and colleague provides evidence of a temporal association between combinations of different unhealthy lifestyle factors with multimorbidity. A study found that physical inactivity increased the risk of multimorbidity by 32%. When physical inactivity was combined with obesity, the risk increased to by two to three times [12].

No previous study has looked into the interactions between body mass index, physical activity and associated multimorbidity among adults in the Bosnia and Herzegovina context to the best of our knowledge.

Therefore, this study aimed to explore the association between body mass index, level of physical activity and multimorbidity among adults attended at primary health care in Sarajevo Canton, Bosnia and Herzegovina.

2. Methods

2.1. Design and Sample

This cross-sectional study was carried out in family medicine outpatient departments of the Public Institution Primary Health Care Center of Canton Sarajevo, Bosnia and Herzegovina (B&H) in period 1 March – 30 June 2018.

A total of 300 respondents (150 of normal weight and 150 overweight/obese) were selected from patients who used health care services at the Primary Health Care Centre during the study period.

The inclusion criteria were adults aged 18–64 years who have a medical record in the Primary Health Care Center of the Sarajevo Canton. The exclusion criteria were persons younger than 18 or older than 64 years, persons who do not have medical records at the Primary Health Care Center of the Sarajevo Canton, pregnant, postpartum women and underweight persons.

A verbal informed consent was obtained from all individual participants included in this study.

2.2. Data Collection

Socio-demographic data were collected using a questionnaire developed for the purpose of this study. Questions addressed personal characteristics, including age (years), gender (male or female), marital status and educational level. Marital status classified as single, divorced, living with a spouse and widowed. Educational level classified as incomplete elementary school/ completed elementary school, completed secondary school and completed high school /university.

Respondents were asked to complete the questionnaire containing questions related to leisure-time physical activities. Leisure-time physical activities (LTPA) were defined as exercise, sports, recreation, or hobbies that are not associated with regular job-, household-, or transportation-related activities [14]. Respondents reported the number of days and minutes spent in moderate recreational activities in a week by answering the questions “In a typical week, on how many days do you do moderate-intensity sports, fitness, or recreational activities?” and “Minutes moderate recreational activities.” We summarized the total number of minutes. Respondents were classified into three categories: physically active >60 minutes per week, physically active 60-149 minutes per week and physically active ≤150 minutes per week. Respondents who reported to spend at least 150 minutes per week in physical activity were classified as “active”, otherwise they were classified as “inactive” According to World Health Organization physical activity guidelines, a person who is physically active ≤150 minutes per week was considered as a complier to the WHO physical activity recommendations [15].

Multimorbidity was measured by a simple count of self-reported chronic diseases from a list of 14 conditions (hypertension, cholesterol elevated, asthma, chronic obstructive pulmonary disease, diabetes, thyroid disorder, osteoarthritis, rheumatoid arthritis, osteoporosis, colon problem, angina/coronary artery disease, stroke, congestive heart failure, and cancer) of the Disease Burden Morbidity Assessment [16]. We categorized individuals who reported having two or more of these aforementioned chronic conditions as having multimorbidity [17].

Respondents were weighed and measured, and body mass index (BMI) was calculated. Weight was measured with the respondent in light clothing, to the nearest 0.1 kg. Standing height was recorded without shoes to the nearest 0.1 cm. The BMI was calculated as weight (kg) divided by height in square meters (m^2). The BMI categories were defined according to the World Health Organization criteria: normal weight (18.5< BMI <24.9), overweight (BMI ≥25-29.9) and obese (BMI ≥30) [18]. Categories overweight and obese were combined into one category (BMI ≥ 25.0 kg/m^2).

2.3. Statistical Analysis

The collected data were analysed using IBM Statistics SPSS v 23.0 and MedCalc v12.3. Independent sample t test, Chi-square (x^2) and logistic regression analysis were used. The results of logistic regression analyses were reported as odds ratios (OR) and 95% confidence intervals. Results of the analysis were considered statistically significant with p-value less than 0.05.

3. Results

The study evaluated 300 respondents in two groups of 150 each (i.e., normal weight and overweight/obese).

Sociodemographic characteristics of normal weight and overweight obese group are presented in Table 1. As the results show, in the normal weight group, most of respondents were in the age group of 35-54 years, while in the overweight /obese group they were in the age group of 55 to 64 years. The percentage of overweight/obese individuals increased with age (p=0.002). In the overweight/obese group females were more represented than males, 53.3%:46.7%. Marital status in the normal weight group and overweight/obese group was significantly different (p=0.000). There were three and a half times as many widowed in the overweight/ obese group, 22 (14.7%), than in normal weight group 6 (4.0%). Formal education level in the normal weight group and overweight/obese group was significantly different (p=0.002). In the normal weight group, 40.0% of the respondents had completed college/university, while in the overweight/obese group 30.0% of the respondents had a college/university degree.

Table 1 Sociodemographic characteristics by body mass index categories

Characteristics	No (%) of respondents		p
	Normal weight	Overweight/obese	
Age group (years)			
18-34	53 (35.3%)	33 (22.0%)	0.002
35-54	59 (39.3%)	52 (34.7%)	
55-64	38 (25.3%)	65 (43.3%)	
Gender			
Male	66 (44.0%)	70 (46.7%)	0.728
Female	84 (56.0%)	80 (53.3%)	
Marital status			
Single	48 (32.0%)	25 (16.7%)	0.000
Divorced	8 (5.3%)	22 (14.7%)	
Living with a spouse	88 (58.7%)	81 (54.0%)	
Widowed	6 (4.0%)	22 (14.7%)	
Education level			
Incomplete elementary school/ completed elementary school	3 (2.0%)	18 (12.0%)	0.002
Completed secondary school	87 (58.0%)	87 (58.0%)	
Completed high school /university	60 (40.0%)	45 (30.0%)	

SD, standard deviation

According to the results obtained in Table 2, levels of physical activity during leisure-time in the normal weight group and overweight/obese group was significantly different (p=0.000). More respondents who reported ≥150 minutes of physical activity per week, was in the normal weight group 50 (33.3%), than in the overweight/obese group 23 (15.3%). The results show that multimorbidity was significantly more common in overweight/obese respondents (22.0 %) compared to normal weight (4.7%) (p = 0.000)

Table 2 Leisure-time physical activity and multimorbidity by body mass index categories

	No (%) of respondents				**p**
	Normal weight		**Overweight/obese**		
Leisure-time physical activity (min/week)					
≤150	50	33.3	23	15.3	0.000
60-149	70	46.7	61	40.7	
>60	30	20.0	66	44.0	
Chronic diseases					
No	103	68.7	60	40.0	0.000
One	40	26.7	57	38.0	
Two or more	7	4.7	33	22.0	

According to the results obtained in Table 3, normal weight and physically inactive respondents, overweight/obese respondents (regardless of the level of physical activity) had higher odds of multimorbidity compared to normal weight and physically active respondents. As presented, the highest OR values were found in the overweight/obese and physically inactive (OR: 5.87; 95% CI: 3.04-11.31 p=0.000). The lowest OR values were found in the normal weight and physically inactive (OR: 3.59; 95% CI: 1.56-8.23 p=0.003).

Table 3 Association between combinations of body mass index categories and level of physical activity with multimorbidity

	OR (95% CI)	**p**
Normal weight and physically active	1	
Normal weight and physically inactive	3.59 (1.56-8.23)	0.003
Overweight/obese and physically active	3.99 (2.19-7.26)	0.000
Overweight/obese and physically inactive	5.87 (3.04-11.31)	0.000

OR, Odds Ratio; CI, confidence interval

4. Discussion

This study intended to explore the association between body mass index, level of physical activity and multimorbidity among adults attended at primary health care in Sarajevo Canton, Bosnia and Herzegovina.

In this study, normal weight and physically inactive respondents, overweight/obese and physically active respondents, overweight/obese and physically inactive respondents were significantly more likely to report multimorbidity than normal weight and physically active respondents. Respondents who were overweight/obese and physically active had increased odds of suffering from multimorbidity compared with respondents who were normal weight and physically inactive. A review on the joint associations of physical activity and disease risks found that high BMI even with high physical activity increases the risk factors for diabetes and cardiovascular disease compared with normal weight and low physical activity [19]. Lindhom et al found that high physical activity at baseline may lead to better physical functioning at follow-up, both among those of normal weight and the overweight, whereas overweight contributes to poor physical functioning even among those who are highly active [20].

Dhalwani's study showed that any combination of two, three, and four or more unhealthy lifestyle factors significantly increased the multimorbidity hazard, compared with none, from 42% to 116%. Study found that obesity and smoking had the strongest association with incidence of multimorbidity in combination with other factors [12]. In this study, the highest odds of multimorbidity were found in the overweight/obese and physically inactive persons.

Consistent with previous studies, multimorbidity was reported more often by overweight/obese respondents [21]. Previous studies have indicated that obesity could considered an entrance port to multimorbidity and an important risk factor for future morbidity [22].

Physical activity is an important lifestyle behaviour that contributes to body weight regulation [23]. Overweight and obese persons show lower sport participation and have a less positive attitude toward physical activity [24]. Cooper et al found that obese participants were substantially less active than the non-obese, particularly when there was a free choice of activity or no activity [25]. In this study, more respondents who reported ≥150 minutes of physical activity per week, was in the normal weight group than in the overweight/obese group.

Socioeconomic status is also key to the development of overweight/obesity. Our study expressed this finding through the participants' age, gender, marital status and level of education.

Higher obesity prevalence at an older age has been described previously [26]. It may be explained by metabolic changes at the age of 40–69 years in both sexes and by menopause-related hormonal changes in women [27,28]. Hales et al found that prevalence of obesity increases cross-sectional across the lifespan: from 13.9%, in early childhood (2-5 years old) to 18.4% in childhood (6-11 years old), 20.6% in adolescence (12-19 years old), 35.7%, in young adulthood (20-39 years old), 42.8% in adulthood (40-59 years old), and 41.0% in older adulthood (≥60 years old) [29]. In this study, the percentage of overweight/obese individuals increased with age.

In this study, in the overweight/obese group females were more represented than males. However, the prevalence of overweight and obesity among men and women varies greatly within and between countries, and overall, more women are obese than men [30].

Several prior studies report that both sexes showed higher obesity prevalence when married or living with partner [31]. In this study, there were three and a half times as many widowed in the overweight/obese group, than in normal weight group. Similar to our finding, Kolahi et al found that obesity indexes were higher among alone people compared to others. Eating alone and living alone may affect the prevalence of obesity [32].

In this study, overweight/obesity was more prevalent in people with lower level of education. This is in agreement with the study by Kilicarslan et al, who found that university graduates were the 62% in the normal-weighing group and only the 31% in the obese group [33]. This could be due to the self-reinforcing effect, whereby having a higher educational qualification increases one's access to updated information, healthier food alternatives, and resources to maintain a healthy lifestyle [34]. On the other hand, the results of the study conducted by Tzotzas et al have shown no significant association between level of education and obesity status [35]. In a study on country–level data related to overweight prevalence in 192 countries from 2002, 2005, and 2010, higher education level was positively associated with overweight [36].

5. Conclusion

There are several limitations in our study. The cross-sectional design of the study does not allow us to make a causal inference, thus, results need to be interpreted with that in mind. The quality of measurement of overweight and obesity was likely to have been higher than for LTPA. Self-reported physical activity is difficult to measure, implying a risk for under-and overestimation of the level of LTPA. Use of objective measures of LTPA in future studies will improve these limitations. Regarding the measurement of multimorbidity, we considered 14 frequent chronic conditions. We had to rely on the self-reported presence of chronic conditions to measure multimorbidity. Finally, the results of this study are generalizable to the population of the Sarajevo Canton where the study was conducted. Additional studies will be needed to evaluate the association of BMI, level of physical activity and multimorbidity in other locations or populations.

This study emphasize the role of overweight/obesity as a contributing factor to the burden of multimorbidity. The study findings underscore the importance of socioeconomic and demographic factors of obesity. Older adults, females, alone people and those with lower levels of education were most at risk for obesity.

Combination of overweight/obesity and physical inactivity significantly increased the multimorbidity hazard compared with none. These results underline the importance of maintaining a healthy weight and being physically active in order to reduce risk of multimorbidity.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that they have no competing interests.

Statement of informed consent

Informed consent was obtaıned from all ındıvıdual participants ıncluded ın thıs study.

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