ORIGINAL ARTICLE

Socioeconomic and demographic factors associated with abdominal obesity in women of childbearing age

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ABSTRACT

Aim To determine socioeconomic and demographic factors associated with abdominal obesity in women of childbearing age.

Methods This cross-sectional study was carried out in family medicine outpatient departments of the Primary Health Care Centre of Canton Sarajevo, Bosnia and Herzegovina. The study included 300 respondents who were divided into two groups: non-abdominal obesity (n=150) and abdominal obesity (n=150). Abdominal obesity was estimated measuring waist circumference. Data concerning socioeconomic and demographic factors (age, marital status, "live alone", place of residence, formal education level, self-perceived financial status) were collected using a designed questionnaire. Logistic regression analysis was used to estimate the association between socioeconomic, demographic factors and abdominal obesity.

Results Abdominal obesity was significantly associated with the life in the urban area (OR=2.174, 95%CI=1.362-3.471), university education (OR=9.881, 95%CI=3.222-30.301) and slightly better financial status than average (OR=2.412, 95%CI=1.302-4.470). Marital status (OR=0.190, 95%CI=0.104-0.347) and no living alone (OR=0.357, 95%CI=0.165-0.773) protect from abdominal obesity. Respondents aged between 20-29 years represent a particularly vulnerable group in terms of abdominal obesity (OR=1.030, 95%CI=0.097-10.946).

Conclusion The strongest associations have been found between abdominal obesity and education. Public health programs that aim to reduce abdominal obesity in women of childbearing age should mainly focus on women with university education.

Key words: abdomen, adipose tissue, female, social-class

INTRODUCTION

Due to the epidemiological and nutrition transition, low and middle-income countries have experienced increase in the prevalence of abdominal and overall obesity (1). Especially, abdominal obesity among women of childbearing age has become one of the main public health problems, which needs an instant action to prevent and control (2).

Untreated abdominal obesity negatively impacts the reproductive health of women in many ways (3). Abdominal obesity negatively affects both contraception and fertility as well (4,5). Maternal obesity is linked with higher rates of cesarean section as well as higher rates of high risk obstetrical conditions such as diabetes and hypertension (6,7). Visceral fat appears to be associated with insulin resistance which leads to type 2 diabetes (8,9). Visceral fat is also associated with adverse lipid profiles which in turn predispose to cardiovascular disease (10,11).

There are various risk factors, which are responsible for abdominal obesity (12). Some studies showed a significant correlation between socioeconomic, demographic factors and abdominal obesity (13,14). Previous studies have shown that educational level (15,16), occupational status (17), and income level (18) are associated with abdominal obesity, especially among women. Musaiger carried out a systematic review of published papers which discuss possible factors that are associated with obesity in the Eastern Mediterranean region between 1990 and 2011. The review has shown that abdominal obesity in women in this region was significantly associated with socioeconomic and demographic factors such as marital status and urbanization (19).

In Bosnia and Herzegovina risk factors for abdominal obesity have been poorly explored, particularly with regard to women of childbearing age.

The aim of this study was to determine socioeconomic and demographic factors associated with abdominal obesity in women of childbearing age in the area of Sarajevo Canton.

EXAMINEES AND METHODS

Study design

This cross-sectional study was carried out in family medicine outpatient departments of the Public Institution Primary Health Care Centre of Canton Sarajevo, Bosnia and Herzegovina (B&H) in the period 15 February– 31 March 2015.

The study was approved by the Ethics Committee of the School of Medicine, University of Sarajevo. For this investigation a written consent of the General Director of the Primary Health Care Centre of the Sarajevo Canton was obtained. An informed consent for participation in the study was taken from all respondents.

The respondents were patients who used health care services at the Primary Health Care Centre during the course of the study period. The study included 300 respondents on the principle of systematic random sampling. The respondents were divided into two groups: non- abdominal obesity (n=150) and abdominal obesity (n=150). The inclusion criteria were females aged 18-49 years who had a medical record in the Primary Health Care Centre of the Sarajevo Canton. The exclusion criteria were male gender, persons younger than 18 or older than 49 years, persons who did not have medical records at the Primary Health Care Centre of the Sarajevo Canton, pregnant women and women who had given birth within twelve months before the date of inclusion in the study.

Methods

The study used a specially designed and structured questionnaire which was first piloted on a small intentional sample of respondents selected from the sampling population. The questionnaire consisted of two parts: the part that was completed by a nurse and a part that was completed by a respondent.

The part that was completed by nurse contained: general information about the respondent (initials, date of birth) and data on anthropometric measurement (waist circumference).

Waist circumference was measured at midpoint between the lower rib and the iliac crest using a flexible tape measure. During the measurement, participants stood in an upright position, with arms relaxed at the side, feet evenly spread apart, and body weight evenly distributed in accordance with the World Health Organization (WHO) expert consultation report on waist circumference and waist-to-hip ratio (20).

The part that was completed by the respondent contained information on marital status, "live

alone", place of residence, formal education level and self-perceived financial status. Marital status was categorized as living with a spouse (including married and co-habiting subject), single, divorced and widowed. The respondents were supposed to respond with "yes" or "no" to the question whether she lives alone. Place of residence was categorized as urban and suburban. Formal education level was categorized as incomplete elementary school, completed elementary school, completed secondary school, high school diploma and completed high school/college. Self- perceived financial status was categorized as a lot worse than average, slightly worse than average, average, slightly better than average and much better than average.

Abdominal obesity was defined as waist circumference ≥80 cm (the criteria of abdominal obesity given by the International Diabetes Federation) (21). Respondents with measured waist circumference less than 80 cm were considered as those with no abdominal obesity. Respondents with measured waist circumference ≥80 cm were considered as those with abdominal obesity.

Statistical analysis

Testing of differences in the age distribution of respondents between non-abdominal obesity group and abdominal obesity group was performed by Mann-Whitney test. Testing of the difference in socioeconomic and demographic characteristics between non-abdominal obesity group and abdominal obesity group was performed by χ^2 test. The individual effects of categorical predictors variables, socioeconomic and demographic characteristics of the respondents, on the presence of abdominal obesity were obtained by logistic univariate regression analysis through the calculation of the odds ratio (OR). The level of significance was set at $p<0.05$, and the confidence level of 95%.

RESULTS

The study evaluated 300 respondents in two groups of 150 each (i.e., non-abdominal obesity and abdominal obesity).

Age of the respondents in the abdominal obesity group and non-abdominal obesity group was significantly different (p=0.000). As many as three times more respondents aged 20-29 were in the abdominal obesity group, 34 (22.7%), than in

non-abdominal obesity group, 11 (7.3%) (Table 1). Respondents aged between 20-29 years were represented a particularly vulnerable group in terms of abdominal obesity (OR=1.030, 95%CI=0.097-10.946; 0.000).

Table 1. Socioeconomic and demographic characteristics of the respondents according to the presence of abdominal obesity

Socioeconomic and demographic characteristics	No (%) of respondents		p
	Abdominal obesity	**Non-abdominal obesity**	
Age group (years)			
<20	3 (2.0)	1 (0.7)	
20-29	34 (22.7)	11 (7.3)	0.000
30-39	68 (45.3)	53 (35.3)	
40-49	45 (30,0)	85 (56.7)	
Marital status			
Single	63 (42.0)	18 (12.0)	
Divorced	10 (6.7)	14 (9.3)	0.000
Living with a spouse	74 (49.3)	111 (74.0)	
Widowed	3 (2.0)	7 (4.7)	
Lives alone			
Yes	25 (16.7)	10 (6.7)	0.007
No	125 (83.3)	140 (93.3)	
Place of residence			
Urban	101 (67.3)	73 (48.6)	0.001
Suburban	49 (32.7)	77 (51.4)	
Formal education level			
Incomplete elementary school	0 (0.0)	7 (4.7)	
Completed elementary school	4 (2.7)	24 (16.0)	0.000
Completed secondary school	80 (53.3)	64 (42.6)	
Completed high school/college	15 (10.0)	15 (10.0)	
High school diploma	51 (34.0)	40 (26.7)	
Self-perceived financial status			
Lot worse than average	4 (2.7)	16 (10.7)	
Slightly worse than average	13 (8.7)	17 (11.3)	0.000
Average	74 (49.3)	85 (56.7)	
Slightly better than average	42 (28.0)	20 (13.3)	
Much better than average vs average	17 (11.3)	12 (8.0)	

Marital status in the abdominal obesity group and non-abdominal obesity group was significantly different (p=0.000). There were three and a half times as many unmarried respondents in the abdominal obesity group, 63 (42.0%), than in non-abdominal obesity group, 18 (12.0%) (Table 1). There was interdependence that existed between abdominal obesity and marital status, e.g. marital status in total protects from abdominal obesity (OR=0.190, 95%CI=0.104-0.347; 0.000) (Table 2).

The abdominal obesity group and non-abdominal obesity group had significant difference regarding the variables whether respondents were living or not living alone (p=0.007). Even two and a half times more respondents who lived alone were in the abdominal obesity group, 25 (16.7%), than in the non-abdominal obesity group 10 (6.7%) (Table 1). There was an interdependence between abdomi-

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Table 2. Individual effects of categorical predictor variables for the presence of abdominal obesity obtained by logistic regression analysis

Categorical predictor	p	OR (95% CI)
Age group (years)		
20-29 vs <20	0.000	1.030 (0.097-10.946)
30-39 vs <20		0.428 (0.043-4.230)
40-49 vs <20		0.176 (0.018-1.746)
Marital status		
Divorced vs single	0.000	0.204 (0.078-0.536)
Living with a spouse vs single		0.190 (0.104-0.347)
Widowed vs single		0.122 (0.029-0.522)
Lives alone	0.006	
No vs Yes		0.357 (0.165-0.773)
Place of residence	0.001	
Urban vs suburban		2.174 (1.362-3.471)
Formal education level		
Completed high school/college vs incomplete/ completed elementary school	0.000	9.881 (3.222-30.301)
Completed secondary school / high school diploma vs incomplete/ completed elementary school		9.320 (3.155-27.532)
Self-perceived financial status		
Much better than average vs average		1.627 (0.730-3.629)
Slightly better than average vs average	0.001	2.412 (1.302-4.470)
Lot worse than average vs average		0.287 (0.092-0.897)
Slightly worse than average vs average		0.878 (0.400-1.929)

OR, Odds Ratio; CI, confidence interval

nal obesity and the variables whether respondents were living or not living alone. Not living alone in total protect from abdominal obesity (OR=0.357, 95%CI=0.165-0.773; p=0.006) (Table 2).

Place of residence in the abdominal obesity group and non-abdominal obesity group was significantly different (p=0.001). More respondents with the residence in urban areas were in the abdominal obesity group than in the non- abdominal obesity, 101 (67.3%) and 73 (48.6%) (Table 1). There was an interdependence that existed between abdominal obesity and the place of residence, e.g. living in an urban area was a risk for abdominal obesity (2.174, 95%CI=1.362-3.471; p=0.001) (Table 2).

Formal education level in the abdominal obesity group and non-abdominal obesity group was significantly different (p=0.000). A slightly larger number of respondents with the university degree were in the abdominal obesity group, 51 (34%), than in the non-abdominal obesity group, 40 (26.7%). In the same group, there were no respondents with incomplete primary education, while those respondents were present in the non-abdominal obesity group in 4.7% (Table 1). There was an interdependence that existed between abdominal obesity and formal education level, e.g. university degree has a risk for abdominal obesity (9.320, 95%CI=3.155-27.532; p=0.000) (Table 2).

Self-perceived financial status in the abdominal obesity group and non-abdominal obesity group was significantly different (p=0.000). Twice as many respondents with the financial status, which was slightly better than average, was in the abdominal obesity group, 13 (8.7%), than in the non-abdominal obesity group, 17 (11.3%) (Table 1). There was an interdependence between abdominal obesity and self-perceived financial status. Financial status better than an average was a risk for abdominal obesity (OR=2.412, 95%CI=1.302-4.470; p=0.001) (Table 2).

DISCUSSION

This study evaluated socioeconomic and demographic factors associated with abdominal obesity in women of childbearing age. The results revealed that university education, slightly better financial status than the average and life in the urban area are positively associated with abdominal obesity.

The respondents with a university degree compared to those with complete or incomplete primary education had almost ten times higher risk of having abdominal obesity. Respondents who evaluated their financial status as somewhat better-than average compared to those who evaluated their financial status as average had two and a half times higher risk of having abdominal obesity. These findings are consistent with the results of studies conducted in the middle-income and developing countries where abdominal obesity was mainly prevalent among women of higher economic status and women with higher education (22,23). In highly developed countries greater economic, educational status was generally negatively associated with abdominal obesity (24). Studies carried out in countries with the GDP (gross domestic product) of more than 12 275 US$ per capita demonstrated that the GDP increase leads to abdominal obesity as a growing problem of the poor, population with lower education, especially poor women (25).

In this study marital status and not living alone protect from abdominal obesity. This finding is the opposite to the results of a study conducted by Veghari et al. They found that abdominal obesity was approximately four times more prevalent in married subjects than in single ones. According to them it is possible that marriage increases cues and opportunities for eating because they tend to

eat together and thus reinforce each other's increased intake (26).

In the majority of studies abdominal obesity is more often prevalent in urban than in rural areas (27). In this study, respondents with residence in an urban area were twice more likely to have abdominal obesity than respondents who lived in a suburban area. In a research conducted in Iran urban area was the main determinant of abdominal obesity. Logistic regression analysis also included other socioeconomic and demographic factors (28). Even in developing countries obesity is significantly more common among the urban population than rural (29). Urbanization means decreased levels of physical activity and increased availability of food, as well as exposure to fast foods (27).

In this study, younger respondents represent a particularly vulnerable group in terms of abdominal obesity. Several recent studies reported that respondents aged between 20-29 years had highest increase rates of abdominal obesity (30). This high increase in prevalence of abdominal obesity among young people may be due to changes in lifestyle and a shift in nutritional patterns. Research conducted in the area of Sarajevo Canton, in the period 2011-2012 has shown greater representation of inadequate nutrition among young people

aged 15-27 years than people over 27 years (32).

Therefore, the future studies are needed to explore lifestyle factors that are influenced or modified by socioeconomic and demographic factors in women of childbearing age.

In conclusion, the study findings underscore the importance of socioeconomic and demographic factors of abdominal obesity among the women of childbearing age. Identification of socioeconomic and demographic factors that are associated with abdominal obesity is critical for the development of effective public health programs. Recommended programs may include improvement of socioeconomic standard as well as public health measures aimed at reducing the prevalence of sedentary lifestyle, regulation of the food industry, the media and parenting courses. The implementation of programs designed in this manner can contribute to the prevention and control of abdominal obesity in women of childbearing age.

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Socioekonomski i demografski faktori povezani s abdominalnom pretilošću u žena fertilne dobi

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SAŽETAK

Cilj Utvrditi socioekonomske i demografske faktore povezane s abdominalnom pretilošću u žena fertilne dobi.

Metode Rad predstavlja studiju presjeka provedenu u ambulantama porodične medicine javne ustanove Dom zdravlja Kantona Sarajevo, Bosna i Hercegovina. U istraživanje je bilo uključeno 300 ispitanika koji su bili podijeljeni u dvije grupe: bez abdominalne pretilosti (n=150) i s abdominalnom pretilošću (n=150). Mjerenje obima struka je korišteno za određivanje prisustva abdominalne pretilosti. Podaci o socioekonomskim i demografskim karakteristikama ispitanika (starost, bračni status, „živi sama", mjesto stanovanja, formalno obrazovanje, samoprocijenjeni materijalni status) dobiveni su korištenjem posebno dizajniranog anketnog upitnika. Logistička regresiona analiza je korištena za određivanje postojanja povezanosti između socioekonomskih, demografskih faktora i abdominalne pretilosti.

Rezultati Abdominalna pretilost je statistički značajno povezana sa životom u gradu (OR=2.174, 95%CI=1.362-3.471), fakultetskim obrazovanjem (OR=9.881, 95%CI= 3.222-30.301) i materijalnim statusom koji je nešto bolji od prosječnog (OR=2.412, 95%CI=1.302-4.470). Brak (OR=0.190, 95%CI=0.104-0.347) i život u zajednici (OR=0.357, 95%CI=0.165-0.773) štite od nastanka abdominalne pretilosti. Posebno osjetljiva grupa za nastanak abdominalne pretilosti su ispitanice u dobi od 20 do 29 godina (OR=1.030, 95%CI=0.097-10.946).

Zaključak Utvrđeno je postojanje najjače povezanosti abdominalne pretilosti s obrazovanjem. Javnozdravstveni programi koji imaju za cilj smanjenje broja abdominalno pretilih žena fertilne dobi trebali bi se fokusirati na univerzitetski obrazovane žene.

Ključne riječi: abdomen, masno tkivo, žena, društvena klasa