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Evaluation of selected indicators of overweight and obesity of Roma minority in the region of South Bohemia

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Abstract

OBJECTIVES: The objective of our correlation study was to compare selected indicators of overweight and obesity of Roma and non-Roma (majority) populations in the South Bohemia Region or the Czech Republic.

METHODS: The following indicators were chosen for evaluation of overweight and obesity: body height and weight, waistline measurement, waist/height index, waist/hips index, BMI, total fat and blood pressure. 600 participants were examined and interviewed in total, including 302 Roma and 298 non-Roma participants. Each of the participants had a personal examination performed by a general nurse, under hygienic-epidemiological conditions. The criteria for inclusion of participants into the study were consent with examination and age greater than 18 years.

RESULTS: The statistical analysis showed that, at a level of significance of $p < 0.001$, the following values differed between the Roma and non-Roma population of the South Bohemia Region: waist/height index, waistline, total fat, body mass index (BMI), systolic and diastolic blood pressure. Differences in the incidence of the waist/hips index were significant at $p < 0.01$. Correlations of incidence with indicators of overweight and obesity in Roma were registered in relation to both age and gender of participants. The results show that overweight and obesity indicators were recorded more frequently in Roma female respondents. Although the results are unique, the conclusions cannot be generalized for Roma throughout the Czech Republic.

CONCLUSION: The conclusions of the above findings will be implemented in strategic materials for community planning in the South Bohemia Region. The goal will be to offer services aimed at supporting a healthy life style for Roma living in the South Bohemia Region of the Czech Republic.

ORIGINAL ARTICLE

INTRODUCTION

In present day society, overweight and obesity constitute the most widespread metabolic disease (Kunešová 2011). Hainer *et al.* (2011) and Svačina (2013) state that the disease is characterized by excessive fat storage in the organism. The World Health Organization (WHO) has declared obesity a global epidemic and one of today's most serious health problems (World Health Statistics 2015).

The incidence of obesity is quickly growing and it represents a still underestimated health threat for the general population (Kunešová 2011). According to data from the World Health Organization, 21.5% of men and 27.5% of women suffer from obesity in Europe; the average is slightly higher in the Czech Republic (27.3% of men and 26.2% of women) (World Health Statistics 2015). The Report on the health of inhabitants in the Czech Republic (Zpráva o zdraví obyvatel České republiky 2014) states that more than half of the population is overweight.

A practical evaluation of obesity can be done using the Body Mass Index (BMI) (Kunešová 2011; Svačina 2013). The index is determined as a proportion of body weight in kilograms and the square of body height in meters. An adult BMI between 25–29.9 kg/m^2 indicates overweight (pre-obesity) and a BMI ≥ 30 kg/m^2 indicates obesity (Adámková *et al.* 2010; Kunešová 2011; Svačina 2013).

Waistline is another indicator of overweight and obesity. A person's waistline closely correlates with the amount of abdominal fat (Svačina 2013). Svačina (2013) mentions that central obesity is closely related to metabolic and cardio-vascular diseases.

Waistline measures have been specified by the International Diabetes Federation. It defines central or visceral (android) obesity for the European as a waistline ≥ 94 cm for men and ≥80 cm for non-pregnant women (Alberti *et al.* 2005). The authors of the "Suggestions for clinical practice in obesity therapy" (Tsigos *et al.* 2008) mention that ethnicity plays a role in waistline measurements; therefore lower waistline values were specified for men from South Asia (90 cm), China (90 cm) and Japan (85 cm), while higher values were specified for Japanese women (90 cm).

Many authors (Tsigos *et al.* 2008; Adámková *et al.* 2010; Hainer *et al.* 2011) state that obesity is a multifactorial disease. The disease originates through a chronic energy imbalance and complex interactions among biological, behavioral, social, and environmental factors (Hainer *et al.* 2011).

Evidence of the relationships between health and socio-economic status (SES) are shown in a Report on health inequalities in the European Union (2013). As Kebza (2005) states, there are a number of inequalities in connection with health; but those inequalities are associated with economic, social, behavioral, and psychological conditions not chosen or not under the influence of the individual. The concept of social determinants searches primarily for the causes of inequality in relation to socio-economic conditions of those within the society (Wilkinson and Marmot 2003).

In a study on obesity and inequality, Loring and Robertson (2014) noted that people with SES differ relative to financial income. Income discrimination negatively impacts the incidence of overweight and obesity in low-income groups. The price and affordability of foods and knowledge of nutritional information in low-income groups are crucial factors with regard to both the quantity and the quality of foods consumed (Ball 2015).

The Eurothine (2007) study shows that socio-economic status (SES) has a significant impact on the incidence of overweight and obesity. The results of this study confirmed this when they showed that 26% of male obesity and 44% of female obesity can be ascribed to SES differences (Loring and Robertson 2014).

In the Czech Republic (CZ), the Roma constitute the largest culturally and ethnically distinctive population (Davidová *et al.* 2010). The Roma typically have poorer health profiles and lower education levels, which is reflected in higher degrees of undesirable behaviours in connection with health choices (Parekh and Rose 2011; Cook *et al.* 2013). The health level of the Roma has been examined from different perspectives in both national and international studies (Nesvadbová and Elichová 2010; Babinská *et al.* 2014; Roma Health Report Health Status of the Roma Population 2014). Health indicators traditionally include an evaluation of population structure, population processes like birth rate, death rate, disease quantification, and quality of life (Holčík 2010). Comprehensive population and demographic data on the Roma are largely missing. According to the Roma Health Report, the Health Status of the Roma Population (2014), the Roma have lifespans that are 10 and more years shorter, compared to non-Roma populations. For example in Austria, the death rate of the Roma is estimated to be 14% higher compared to the non-Roma population. Authors from Slovakia have demonstrated that in segregated and remote regions, the Roma population is characterized by higher death rates. The mortality rate among the Roma is often associated with life style and in particular, with the higher prevalence of risk factors connected with lifestyle diseases (Sedláková 2014).

Lifestyle in the context of cultural differences constitutes the base for development of attitudes toward lifestyle related diseases (Olišarová *et al.* 2014).

A number of studies have shown that the Roma suffer from higher incidences of hypertension, diabetes, and cardiovascular diseases (CV), i.e. lifestyle diseases (Hajduchová and Urban 2014). We can quote for example the Health determinants of Roma population in the Czech Republic 1999–2001, Quality of life, mean and healthy lifespan from the aspect of health determinants in Roma population in the Czech and Slovak Republic (2007–2009, GAČR), as well as an international study

called Health and the Roma Population. Most of the above stated studies also observed higher incidences of overweight and obesity, as measured by Body Mass Index (BMI).

It can be stated, in general, that in lower socio-economic groups, the women are at higher risk of being overweight and obese than men. This appears to be related to unequal distribution of financial income, the role of the woman within the family, less physical activity, lower self-confidence, and pregnancy rates (Loring and Robertson 2014).

Available epidemiological data for the Roma population suggest the wisdom of a shift from preventive interventions for infectious diseases to preventive interventions for chronic and lifestyle diseases. The efficiency of preventive measures is particularly linked to implementation of competent health care (Foldes and Covaci 2012). With the help of culturally sensitive competencies, health care workers can optimally collect culturally specific information needed for health care (Tóthová *et al.* 2010). Efficient health education constitutes one of the key tools needed to influence health literacy among the Roma. Health education cannot be separated from high-quality health care, and often needs to be tailored to the specific needs of minority groups (Peréz and Luquis 2014).

As Šedová *et al.* (2014) states, the opportunity for efficient implementation of cultural competencies into health care consists of introducing multicultural health consulting, which could be included in health care programs. Interventions to improve health literacy could take place in health care programs, by teaching respect for cultural differences including differences in learning styles that might be specific for a given minority (Baum and Fisher 2014).

This article describes and evaluates the objective indicators of overweight and obesity in the non-Roma (majority) and Roma populations of the South Bohemia Region of the Czech Republic. So far, there is no relevant data that summarizes the issue of overweight and obesity in the Roma minority.

Goals

The study goals are to compare objective indicators of overweight and obesity in the non-Roma and Roma populations in the South Bohemia Region. The following hypothesis was the basis for the study: ***The anthropometric indicators of Roma minority respondents will differ from the indicators of the majority non-Roma population.***

MATERIALS AND METHODS

We used the following objective indicators of overweight and obesity: body height (Seca 213 height meter), body weight (Seca 769), BMI, total fat (based on the principle of bioelectrical impedance bimanual (Omron BF 360 device)), waistline and hip line measurements, and blood pressure (Fazzini aneroid blood pressure monitor).

The somatometric measurements were done in parallel with a structured interview with respondents. We calculated the Body Mass Index (BMI) based on height and body weight. The weighing and measuring took place in minimal clothing (i.e., no coats, sweaters, etc.) and without shoes. When categorizing and evaluating the BMI, we observed the recommendations for obesity classification according to WHO (1997) (Kunešová 2011). Values from 25–29.9 kg/m^2 were considered overweight, and values ≥30 kg/m^2, indicated obesity.

The following anthropometric methods were used for the purpose of our research: waistline/height, waistline/hips, and waistline. We measured and evaluated the waistline and waistline and hips indexes according to the WHO (1997) classification (Kunešová 2011). We measured the waistline at half the distance between the lower edge of the lower ribs and the iliac crests of the pelvis. We respected the given recommendations, and men with waistlines > 102 cm and women with waistlines >88 cm were considered to be at potential risk of metabolic and CV complications. Values of waist/hip index (WHR) above 0.85 cm for women and 1 cm for men were set according to the methodology. The waist and height index is another index that can be used to determine overweight and obesity and related risks (Kunešová 2011). When performing the evaluation, values up to 0.6 cm were considered normal, while values >0.6 cm indicated increased risk of CV complications (McCarthy and Ashwell 2006). The measurement took place while participant was standing, wearing minimal clothing and without shoes.

When measuring and evaluating blood pressure (BP), we observed the recommendations of the Czech Hypertension Society from 2012 (Filipovský *et al.* 2012). Blood pressures were measured with participants in a sitting position, after a short period of relaxation. Measurements were usually taken in the right arm. BP values of 130–139 mm Hg systolic and 80–89 mm Hg diastolic were categorized as high normal blood pressure; values above 140 mm Hg systolic and above 90 mm Hg diastolic were categorized as hypertension (Filipovský *et al.* 2012).

Before taking part, each participant signed an informed consent regarding all aspects of the study and subsequent use of data. Selection criteria consisted of voluntary consent and age above 18 years. Each respondent received information regarding the values measured and the significance of the values relative to good health. Participants with pathological findings were informed about the findings and the implications for their health and encouraged to visit their general practitioner for follow-up care. The anthropometric data were measured during direct examination of the participants by nurses who were members of the study team.

The results were analyzed using the SADS statistics program. The statistical connections between the characteristics observed were tested using Pearson Chi-Square test – χ^2. Testing was performed at significance levels of $\alpha < 0.05$, $\alpha < 0.01$, and $\alpha < 0.001$.

Participants

To meet the study goals, the selection process had been planned to include representation from both the Roma minority and the majority non-Roma populations. From the perspective of the number of participants, virtually the same numbers of participants were from each group, i.e. the Roma (302; 50.3%) and the majority non-Roma population (298; 49.7%). The South Bohemia Region was determined as the basic framework of selection from the perspective of territorial demarcation.

Snowball Sampling was used to perform selection in the Roma population; the method is used for so called "hidden groups," when the structure and distribution of the basic group, in this case the Roma population in the South Bohemia Region, is unknown. The method serves to find new cases, based on the process of gradual nomination of further persons, through previously known cases. Its gender structure was derived from the general population, as it was assumed that the Roma population has an approximately 50:50 representation of men and women, which is similar to the majority non-Roma population. Therefore, that indicator can be considered representative. In other words – the group used to represent the Roma minority can be considered gender-representative. As for gender, the group consisted of 152 men (50.3%) and 150 women (49.7%).

The majority population was subject to quota selection, where gender was specified as a quota (50:50). The majority non-Roma population of the South Bohemia Region is gender-representative. Age was not used as a feature of representativeness, and the structure of the majority non-Roma population does not match the population structure in the South Bohemia Region from the perspective of age. The majority sample included 148 (49.7%) men and 150 (50.3) women (Table 1).

The distribution of age categories in both groups was unequal – Table 1. The Roma group included greater numbers of younger participants i.e., age categories – 18–29 years 43.8% (132), while that age category was represented by 28.2% (84) participants from the majority non-Roma population. Both groups included relatively few respondents older than 60 years of age.

RESULTS

Our correlation study shows that the indicators of overweight and obesity were found more frequently in the Roma population.

To evaluate overweight and obesity, we chose Body Mass Index (BMI), waistline, the waist/hips index, the waist/height index, as well as measurement of total body fat (using the principle of bioelectric impedance with the help of bimanual Omron device).

A statistically significant relationship was identified between waistline of Roma and non-Roma ($p < 0.001$) – Table 2. The analysis showed that, regardless of gender, Roma participants had waistlines above 103 cm (31.9%, $n = 96$) more frequently – Table 2. A more detailed analysis of waistline by gender shows that 63.3% of Roma women had waistlines in the range suggestive of considerable risk, i.e. waistline ≥89 cm (Table 3). As for the non-Roma population, waistlines ≥89 cm were found in 41.3% of women. For further evaluation, the dependence between waistline and age was tested in the Roma population. The results showed that waistline measurements increased with increasing age ($p < 0.001$). Waistlines ≥103 cm were found more frequently among those over 40 years of age (52.5%, $n = 63$). As for the non-Roma population, waistline values ≥103 cm were found in 28.7% ($n = 39$) of those over 40 years of age.

With regard to the waist/height index, the index was within standard range for both groups, i.e. up to 0.6 cm in 54.6% (165) of Roma participants, and 78.5% (233) of the non-Roma participants. Greater values for the waist/height index were found more frequently among Roma participants (45.4%) ($p = 0$) (Table 2).

Further statistical differences were found regarding comparisons of the waist/hips index (WHR) (Table 2). The results shows that an index >0.86 cm was found more frequently in the Roma participants than in the

Tab. 1. Age structure of selection set.

	ROMA		MAJORITY		TOTAL	
	N	%	*N*	%	*N*	%
18–29 years	132	43.8	84	28.2	216	36.1
30–39 years	49	16.3	78	26.2	127	21.2
40–49 years	56	18.6	47	15.8	103	17.2
50–59 years	39	13.0	37	12.4	76	12.7
60–69 years	20	6.6	31	10.4	51	8.5
70 and more years	5	1.7	21	7.0	26	4.3
Total	301	100.0	298	100.0	599	100.0

Tab. 2. Anthropometric measurements, total fat, and group membership.

	ROMA PEOPLE (% / *N*)	MAJORITY (% / *N*)	*p* value
Waistline/height ≥0.6 cm	45.4% / 137	21.5% / 64	**$p = 0$**
Waistline ≥103 cm	31.9% / 96	17.8% / 53	**$p < 0.001$**
Waistline/hips ≥0.86 cm	69.7% / 209	56.1% / 166	**$p < 0.01$**
BMI ≥30 kg/m^2	31.9% / 96	17.1% / 51	**$p < 0.001$**
Total fat ≥25%	69.4% / 204	61.7% / 182	**$p < 0.001$**

Tab. 3. Waistline, BMI, and gender.

	ROMA PEOPLE			MAJORITY			Result χ^2
	Women *N* / %	Men *N* / %	Total *N* / %	Women *N* / %	Men *N* / %	Total *N* / %	
WAISTLINE BY GENDER							
89–102 cm	45/30%	38/25%	83/27.4%	38/25.3%	64/43.2%	102/34.2%	$p < 0.001$
≥103 cm	50/33,3%	46/30.3%	96/31.8%	24/16%	29/19.6%	53/17.8%	
BMI BY GENDER							
≤24.9 kg/m²	43/28.8%	72/47.4%	115/38.2%	77/51.4%	50/33.8%	127/42.6%	$p < 0.01$
25–29.9 kg/m²	53/35.6%	37/24.3%	90/29.9%	50/33.3%	70/47.3%	120/40.3%	
≥30 kg/m²	53/35.6%	43/28.3%	96/31.9%	23/15.3%	28/18.9%	51/17.1%	

non-Roma participants ($p < 0.01$) – Table 2. Out of the 209 Roma with a WHR index >0.86 cm, 19 had an index > 1 cm. The comparison of both groups shows that the non-Roma population had considerably lower WHR indexes (<0.86 cm). Roma participants had considerably higher WHR indexes (0.86–1.00 cm). Standard WHR indexes (below 0.86 cm) were recorded in 30.3% (91) of Roma participants and in 43.9% (130) of non-Roma participants. Indexes above 1.0 cm were also more common among the Roma participants.

Another section of the study dealt with the Body Mass Index (BMI). Analysis showed that optimal weight according to BMI (18.9–24.9 kg/m²) was found in 38.2% (116) of the Roma and in 42.6% (127) of the non-Roma (Table 3). The BMI value for obesity was found in 31.9% (96) of the Roma and in 17.1% (51) of the non-Roma. The relationship was found to be significant ($p < 0.001$) – Table 3. Further testing concerned the relationship between BMI and gender. The results ($p < 0.01$) showed that there were differences between gender and BMI values between the female Roma and female non-Roma participants. BMI values ranging from 25–30 kg/m² were seen in 35.6%, $n = 53$ of Roma participants and 33.3%, $n = 50$ of non-Roma participants; for values >30 kg/m² we found 35.6%, $n = 53$ for Roma female participants and 15.3%, $n = 23$ for non-Roma females (Table 2). Interesting information can be derived from a comparison of BMI by age, since it can be shown that BMI increases with age. BMI indexes above 25 were found in 49.7% ($n = 90$) Roma participants below 40 years and 79.8% ($n = 85$) Roma participants above 40 years of age. As for the non-Roma population, BMI index above 25 was seen in 66.3% ($n = 75$) participants below 40 years and 70.6% ($n = 96$) participants above 40 years.

The results suggest that obesity based on waistline and BMI index occurs more frequently in Roma women, compared to non-Roma women.

Total body fat was another parameter under evaluation. The results show that, regardless of gender and age, higher values of total body fat (≥25%) were found in participants from the Roma population (69.4%, $n = 204$). The difference was significant ($p < 0.001$) – Table 2.

Tab. 4. Other measurements – blood pressure and group membership.

	Roma people (% / *N*)	Majority (% / *N*)	*p* value
Systolic blood pressure ≥140 mm Hg	24.3% / 73	17.8% / 53	***p* < 0.001**
Diastolic blood pressure ≥90 mm Hg	23.9% / 72	16.1% / 48	***p* < 0.001**

Another part of the study describes blood pressure evaluations. Interestingly, the results showed that optimal systolic blood pressure (below 119 mm Hg) was found in 38.8% (117) of the Roma participants and 27.5% (82) of the non-Roma population. Systolic values >140 mm Hg were found in 24.3% (73) of Roma participants and 17.8% (53) of the non-Roma participants – Table 4.

Normal systolic blood pressure was found in 16.3% (49) of Roma participants and 28.5% (85) of non-Roma participants. Diastolic blood pressure >90 mm Hg was found in 23.9% (72) of Roma participants and 16.1% (48) of non-Roma participants. Dependence tests for both systolic and diastolic blood pressure indicate a statistical significance between groups ($p < 0.001$) – Table 4.

DISCUSSION

Overweight and obesity are heavily linked to lifestyle diseases (Adámková *et al.* 2010). The statistics issued by the WHO show that the incidence of overweight and obesity has been increasing (World Health Statistics 2015). As some authors (Hainer *et al.* 2011; Rosolová *et al.* 2013; Svačina 2013) state, the incidence of overweight and obesity closely correlates with the incidence of some lifestyle diseases like diabetes type 2, as well as dyslipidemia and hypertension.

The values of systolic and diastolic blood pressure from our study participants are shown in Table 4. In

our research, 9.4% (n = 36) of Roma participants and 10.5% (n = 37) of non-Roma participants were being treated for high blood pressure at the time of study. Dependence tests in case of both systolic and diastolic blood pressure suggest a significance difference between groups ($p < 0.001$) – Table 4. The higher incidence of high blood pressure in the Roma population may constitute a health problem from the perspective of its appearance at relatively younger ages. Relationships between race and the incidence of high blood pressure have been shown by the American REGARDS study (REasons for Geographic and Racial Differences in Stroke). The results of the study show that prevalence of pre-hypertension has been increasing in the US African-American population (Rosolová *et al.* 2013).

Other anthropometric measurements focused on BMI, total fat, waist/hips index and waist/height index, as well as waistline.

Comparisons between groups showed that the Roma and the non-Roma participants were statistically different with regard to the BMI index. The analysis showed that the optimal weight according to BMI (18.9–24.9 kg/m^2) was found in 35.2% (106) of the Roma participants and 40.6% (121) of the non-Roma participants. The test result ($p < 0.001$) points out the significant differences between the compared groups.

Our study reveals interesting results with regard to the comparison of BMI to gender and age. The comparison of BMI to gender was also interesting, in as much as it showed that BMI increases with age. The authors of the HepaMeta (SK) study found similar results, in that the average BMI for Roma men was 26.44 kg/m^2 and for Roma women it was 26.79 kg/m^2. A significant relationship was found when comparing BMI of Roma women (26.79 kg/m^2) and non-Roma women (24.07 kg/m^2) (Babinská 2014). Within the Roma population, Roma females were more likely to have BMIs in the overweight and obesity category (Table 3).

The conclusions of the Czech post-MONICA study and the BMI data on the Czech population suggested a significant increase in the BMI of men. In women, the changes were at the threshold of significance (Cífková *et al.* 2010). A Report on health of the inhabitants of the Czech Republic (2014) showed that overweight and obesity affects more than a half of the population (57%). The comparison between genders clearly shows that men suffer from obesity more than women do. By age categories, a higher frequency was recorded in older people; further data, however, indicate an increasing trend of overweight and obesity in children and adolescents (Report on health of the inhabitants of the Czech Republic 2014).

A statistically significant relationship was identified between waistline data from Roma and non-Roma participants ($p < 0.001$) – Table 2. The analysis showed that, regardless of gender, Roma participants had waistlines >103 cm (31.8%, n = 96) more frequently – Table 3. A more detailed analysis of waistline by gender showed that 63.3% of Roma women had waistlines in the range suggestive of considerable risk, i.e. waistline ≥89 cm (Table 3). As for the non-Roma, waistlines above 89 cm were found in 39.3% of women. The dependence of waistline on age was also tested in the Roma participants. The results show that the waistline increased with increasing age ($p < 0.001$). A waistline ≥ 103 cm was found more frequently in those over 40 years (52.5%, n = 63) in the Roma group. As for the non-Roma group, waistlines >103 cm were found in 28.7% (n = 39) of those over 40 years of age. Ostrihoňová and Bérešová (2010) came to similar conclusions during their research at Rimavská Sobota in 2007–2008. With regard to gender, they found that out of the 201 Roma participants 50% of males had waistlines >103 cm, while 64.1% of Roma females exceeded the value.

The WHR index data, calculated from the measurement of waistline and hips, are shown in Table 2. The comparison of both groups suggests that the non-Roma are significantly more likely to have lower WHR indexes (<0.86 cm), while Roma were significantly more likely to have higher WHR indexes (0.86–1.00 cm). Standard WHR indexes were (<0.86 cm) recorded in 30.3% (91) of the Roma and in 43.9% (130) of the non-Roma; after independence test (χ^2), a significant difference was observed between groups ($p < 0.01$). The WHR index was also used in the Slovak HepaMeta study. Significant differences in average WHR values of females were recorded – Roma women had an average WHR value of 0.85 cm and non-Roma women had a value of 0.79 cm (Babinská 2011).

We identified statistically significant deviations in the amount of total fat in Roma and non-Roma participants ($p < 0.001$; Table 2). The Roma minority includes considerably more respondents with body fat between 25% and 34.9%, and particularly above 35.0%, i.e. the group at greatest risk. With regard to non-Roma participants, body fat from 15.0% to 24.9% was found to be more common.

The study objectives were met and statistical testing show that, at the level of significance $p < 0.001$, the following values differ between Roma and non-Roma participants of the South Bohemia Region: waist/height index, total fat, BMI, systolic and diastolic blood pressure. Differences in incidence of the WHR values were recorded at a significance level of $p < 0.01$.

Waistline and BMI indicators were also tested in relation to participant gender and age. The results show that overweight and obesity indicators were recorded more frequently in Roma female compared to Roma male respondents, which may be caused by gender discrimination mentioned by Loring and Robertson (2014). It can be stated, in general, that in lower socio-economic groups, women are more at risk of being overweight and obese than men. This can be related to discrimination of financial income, role of the woman within the family, less physical activity, lower self-confidence, and birthrates (Loring and Robertson 2014).

The results constitute a challenge for health care workers active in community care. Another challenge is that the Roma population is considerably younger than the non-Roma population (Table 1). It can be assumed that the incidence of overweight- and obesity-related diseases will manifest considerably sooner in the Roma population than in the non-Roma population. The conclusions of a Czech study (Tóthová *et al.* 2014) demonstrated that nurses are prepared to implement health-education interventions; only the conditions for implementation of such activities in the Czech Republic are missing.

CONCLUSION

The objectives of this correlation study were met and the data from the selected indicators of overweight and obesity demonstrate that the Roma participants from the South Bohemia Region had a higher incidence pathological examination results indicating overweight and obesity compared to non-Roma participants. It is one of the first studies using detailed measures of overweight and obesity, but its results cannot be generalized to the whole Czech Republic. We are aware of the limitations of this study, particularly as it relates to the size and selection of the research sample population and its restriction to the South Bohemia Region. In spite of such limits, the study brings cardinal findings. The results indicate that Roma females present more often with indicators of overweight and obesity compared to Roma males. In the long term, it would be interesting to focus further studies on the gender aspect as it relates to the incidence of obesity in the Roma population.

The next step will consist of implementing the results of our study into strategic materials used for community planning for the South Bohemia Region. The goal will be to offer services that specifically support healthy life styles in the Roma population while respecting cultural differences.

Conflict of interest

The authors report no conflicts of interest.

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