

THE RELATIONSHIP BETWEEN BODY MASS INDEX AND THE QUALITY OF LIFE OF THE URBAN ADULT POPULATION OF THE CITY OF BELGRADE

Veroslava Stanković

Overweight has got a negative influence on the health but data about influence of overweight on the Health-Related Quality of Life (HRQOL) are contradict. The cross-sectional study included 105 men and women from the Health Center Clinicanova in Belgrade. The study was conducted from 1st February to 31st March 2018. Body height and body weight were measured by standard anthropometric methods. Body Mass Index (BMI) was calculated and correlation analysis was done. The questionnaire Obesity Related Well-Being 97 (ORWELL97) was applied. The response rate was 91 % (105 of 115). Men represented 43 % of all persons and women accounted for 57%. The average age was 29.5 ± 3.2 . The average BMI was 25.4 ± 4.0 kg/m². There was strong positive correlation between BMI = 25-26.9 kg/m² and total scores in ORWELL97 questionnaire ($r = 0.96$), subquestion O ($r = 0.98$) and subquestion R ($r = 0.97$). Strong positive correlation was found between ITM = 27-29.9 kg/m² and total ORWELL97 score ($r = 0.95$), as well as with total scores on subquestion O ($r = 0.95$) and subquestion R ($r = 0.98$). Lower HRQOL had participants with BMI = 27-29.9 kg/m² ($t = 6.866$; $p < 0.001$) than participants with BMI = 25-26.9 kg/m². The difference between total scores in ORWELL97 questionnaire in participants who had BMI < 25 kg/m² and those with BMI > 25 kg/m² was not significant ($t = 1.143$, $p > 0.05$). The strong positive correlation between BMI higher than 25 kg/m² and the total ORWELL97 scores was determined. BMI higher than 25 kg/m² strongly correlates with lower quality of life.

Acta Medica Mediana 2019;58(2):44-50.

Key words: Body Mass Index, quality of life, urban population

Higher Education School of Profesional Health Studies Belgrade,
Belgrade, Serbia

Contact: Veroslava Stanković
Pedje Milosavljevića St 10/14, 11077 New Belgrade, Serbia
E-mail: stankovicveroslava@gmail.com

Nearly one third or 33% of the USA adults are overweight and 36% are obese (5), and in Europe overweight ranges from 32 to 79% in men and in women from 28 to 78%, respectively. Prevalence of obesity varies from 5 up to 23% in men and from 7 to 36% in women (6). According to the data from the National Survey about the health of the population in Serbia in 2013, there were 35.1% of adults who were older than 20 who were overweight and there were 21.2% of adults who were obese (7).

The overall quality of life is the overall quality of life which makes the union of all the factors which influence the life of an individual (8). The quality of life is a harmony inside a person and a harmony between a person and his world (9). Health-Related Quality of Life (HRQOL) makes union only of those factors which are part of someone's health (10). The HRQOL is a subjective assessment of health as well as the capability of a person to lead a life which fulfills him or her (11).

Overweight and obesity present the excess body weight which can damage health (12). Adults with higher than normal body mass index have significantly reduced physical quality of life (13).

Introduction

According to the World Health Organization (WHO) from 2016 there were 1.6 billions of adults who were overweight and at least 650 million obese persons worldwide (1). The number of adults who are overweight is constantly increasing, and the assessment of WHO is that up to 2020 overweight will be the most common cause of death (2). Majority of adults in the United States of America (USA), Australia and in most countries of West and East Europe are overweight (3, 4).

The aim of the paper was to determine the correlation between body mass index and the Health-Related Quality of Life of adults.

Material and methods

The cross-sectional study involved 105 men and women from the Health Center Clinicanova in Belgrade. The study was conducted from 1st Febru-

ary to 31st March 2018. Body height and body weight were measured by standard anthropometric methods. Body Mass Index (BMI) was calculated and correlation analysis was done. BMI was calculated according to the formula: Body weight (kg)/Body height (m^2). The questionnaire Obesity Related Well-Being 97 (ORWELL97) was applied.

Table 1. Classification of nutritional status according to body mass index

| | |
|------------------------------|---|
| Underweight | BMI < 18.5 kg/m ² |
| Normal weight | BMI from 18.5 to 24.9 kg/m ² |
| Overweight | BMI from 25 to 29.9 kg/m ² |
| Obesity of the first degree | BMI from 30 to 34.9 kg/m ² |
| Obesity of the second degree | BMI from 35 to 39.9 kg/m ² |
| Obesity of the third degree | BMI > 40 kg/m ² |

Source: WHO Physical Status; The Use and Interpretation of Anthropometrics.
WHO Technical Report 1993; Series No854, Geneva

The criteria for inclusion of participants in the study were: the participant older than 18 years of age from the territory of the City of Belgrade, and informed consent to participate in the study given by the participant.

The criteria for exclusion of participants from the study: obesity, pregnancy, the established diagnosis of some chronic disease such as diabetes mellitus, metabolic disorders, hypertension; insufficient cooperation of participants; refusal to give informed consent.

Permission to conduct this study was given by the Head of the Health Center Clinicanova in the City of Belgrade.

Questionnaires

Descriptive data and data on risk factors and comorbidities were collected by epidemiological questionnaire.

The questionnaire Obesity Related Well-Being 97 (ORWELL97) was applied in all examined adults. The questionnaire ORWELL97 consists of 18 questions divided into three groups. There are five questions in the first group and they refer to the presence of physical and mental disorders.

There are seven questions in the second group and they refer to the influence of the overweight and obesity on the emotional status. In the third group there are six questions which refer to the family and social relationships. Each question has two subquestions.

The first subquestion refers to the presence of the symptoms of the overweight and obesity and it is marked with Occurrence (O). The second subque-

tion refers to the personal experience of the symptoms of overweight and obesity and it is marked with Relevance (R).

A total score of points was obtained by adding points from each given answer. The higher number of points in the questionnaire shows a lower quality of life in the examined participants. The total score on each subquestion was calculated. The respondents filled in the questionnaire by circling one of the given answers. The exact number of points for each question on the Linerts scale was determined (from 0 to 3).

The validity of ORWELL97 ($r = 0.92$, $p < 0.01$) questionnaire was examined in different studies worldwide (14).

Statistical analysis

Correlation analysis was done and Pearson's coefficient of correlation (r) was calculated. The estimation error of $p < 0.05$ was taken into account as the limit of statistical significance. The results are presented in tables and charts.

Results

Of 115 examined adults, 105 of them completed ORWELL97 questionnaire. Six (5.2 %) participants refused to complete the questionnaire (one man and four women) and four questionnaires were not completed. Finally, 105 ORWELL97 questionnaires were analyzed. There were 45 men and 60 women (43 %:57 %) (Figure 1).

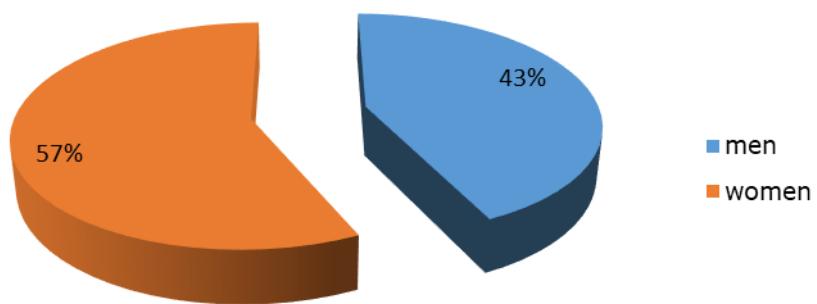
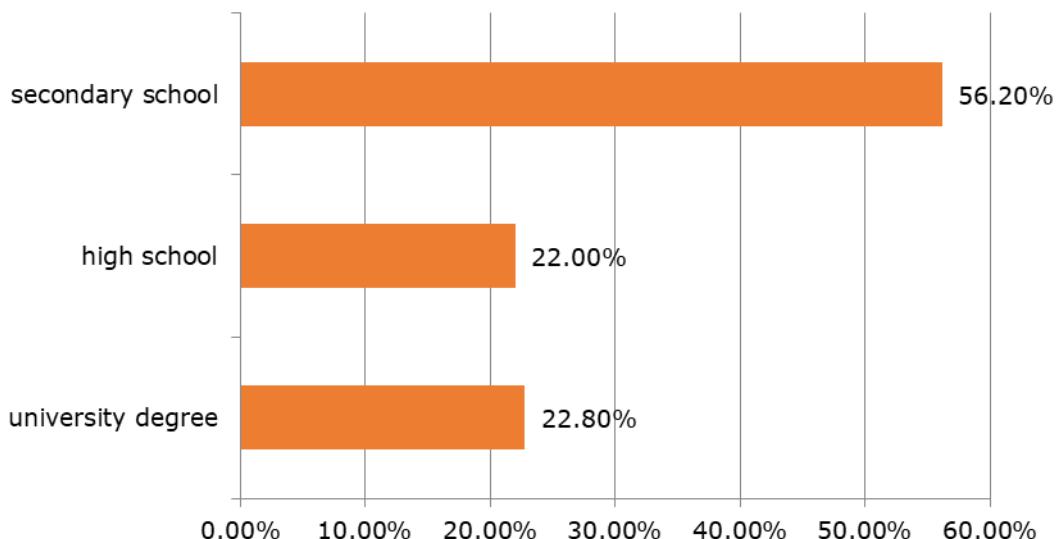
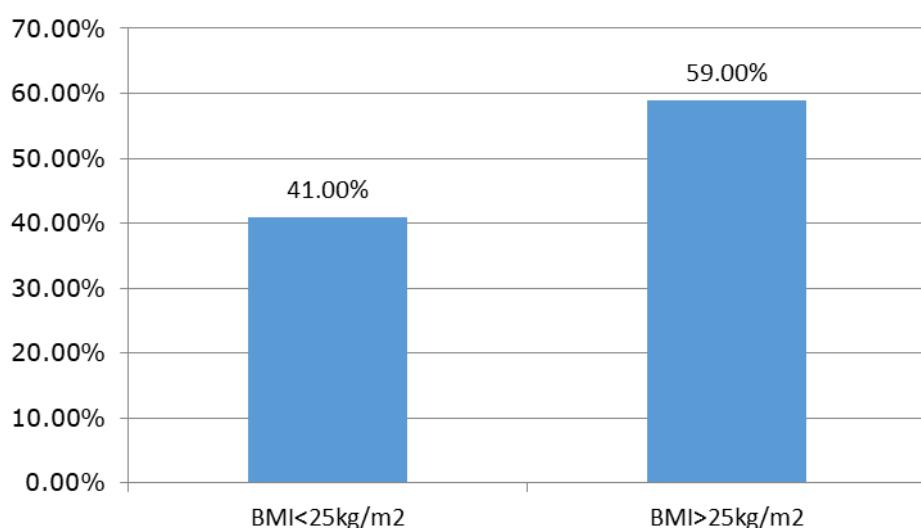


Figure 1. Distribution by gender



Graph 1. Disrtibution by level of education



Graph 2. Distribution by value of BMI

There were 24 (22.80 %) participants with university degree, 22 (21.00 %) with college degree, and 59 (56.20 %) of them who finished secondary school (Graph 1).

Fifty nine percent were from the City of Belgrade and 41% were from the surrounding regions of the city (Graph 2).

The average value of BMI of all examined participants was $25.60 \pm 4.0 \text{ kg/m}^2$. According to the values of BMI there were 43 (41.00 %) participants with normal weight and 62 (59.00 %) were considered overweight.

The participants who had BMI lower than 25 kg/m^2 had lower total scores relating to all questions in the ORWELL97 questionnaire, as well as to the subquestion O compared with the participants who had BMI higher than 25 kg/m^2 . The difference was not statistically significant ($t = 1.143, p > 0.05$).

Participants who had BMI $25-26.9 \text{ kg/m}^2$ had higher scores in ORWELL97 questionnaire than participants who had BMI $= 27-29.9 \text{ kg/m}^2$ (Table 2). The difference was statistically significant ($t = 6.866, p < 0.001$).

Table 2. Correlation of Body Mass Index and scores in ORWELL 97 questionnaire

| ORWELL 97 questionnaire | BMI = 25-26.9 kg/m ² | BMI = 27-29.9 kg/m ² |
|----------------------------|--|---------------------------------|
| | Pearson's coefficient of correlation (r) | |
| All questions | 0.98 | 0.95 |
| Subquestion O | 0.96 | 0.95 |
| Subquestion R | 0.97 | 0.98 |

Discussion

On the basis of the definition of health provided by WHO in 1946 (1) the interest about investigations of the quality of life of population began to grow. The research on the influence of overweight on the quality of life of adults is one of the frequent topics in the medical literature but findings of the association of overweight and lower HRQOL are still missing (12, 13, 14). The study of Zeller et al. found that depression, social support, the degree of overweight, and socio-economic status were significantly associated with HRQOL (15).

According to the presented results, participants who were overweight had higher scores in the ORWELL97 questionnaire compared with the participants who had a normal weight but the difference was not significant.

Similar to our results, researchers found that higher BMI was associated with physical, mental and emotional disorders (16).

Finkelstein et al. showed that quality of life was rapidly decreasing in persons with BMI higher than 25 kg/m^2 (17). Le Pen et al. did not find the association between the persons with BMI higher than 30 kg/m^2 and the quality of life (18). Persons with BMI $< 27 \text{ kg/m}^2$ and $< 30 \text{ kg/m}^2$, had lower HRQOL than persons with normal weight (19). Recent investigations showed that overweight had no impact on the HRQOL (13, 20).

Obesity is a major public health problem and most researches investigate the HRQOL of persons with $\text{BMI} > 30 \text{ kg/m}^2$ (11, 21). It has not been elucidated yet whether overweight according to actual BMI classification (from 25 to 29,9 kg/m^2) affects the HRQOL (20-23).

Some authors show that in their investigations there were no statistically significant difference between the HRQOL among persons who had BMI lower than 25 kg/m^2 and those whose BMI was equal or higher than 25 kg/m^2 (13). Overweight persons with $\text{BMI} < 27 \text{ kg/m}^2$ and $\text{BMI} < 30 \text{ kg/m}^2$ didn't have significantly lower HRQOL compared with persons who had normal weight (22).

BMI is considered as a good indicator of nutritional status in the persons aged 20 to 65, especially when health risk is connected with the BMI (24, 25). Correlation between BMI and the percentage of the body fat in a body is on a degree that it allows an assessment of 70 to 80 % of the variation of fat in the Caucasian population (26).

The research conducted in America, China, Taiwan and Korea showed that obesity impaired physical health rather than mental health in urban population (27). Overweight persons in urban population had a higher risk of diabetes mellitus, high blood pressure, ischaemic heart disease and according to some epidemiological studies they had a higher risk of premature death (28, 29).

In urban population activities that formerly required high energy expenditure have been replaced by sedentary activities and eating habits that favor obesity due to the dissemination of refined and processed foods, rich in fat and simple sugars and served in ever-growing portions (30).

The strategies that improve HRQOL in an urban population with high BMI include changing life-style habits including working on the mental health of the population (1, 31).

Conclusion

The participants who were overweight had higher total scores in the ORWELL97 questionnaire compared with those who had normal weight but the difference which was found was not statistically significant. The strong positive correlation between

BMI higher than 25 kg/m^2 and the total ORWELL97 scores was determined. BMI higher than 25 kg/m^2 strongly correlates with lower quality of life.

Further research should be directed towards testing the quality of life after an interventional study in the overweight and obese population.

References

1. Available from: URL: <http://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight> (access April 2017).
2. Gregg EW, Shaw JE. Global health effect of overweight and obesity. *N Engl J Med* 2017; 377:80-1. [\[CrossRef\]](#) [\[PubMed\]](#)
3. Grujic V, Draganic N, Jovanovic Mijatovic V, Ukropina S, Harhaji S, Radic I, et al. Predictors of overweight and obesity among adults aged 50 years and above: Serbian national health survey. *Vojnosanit Pregl* 2017; 74(1):38-45. [\[CrossRef\]](#) [\[PubMed\]](#)
4. Flegal MK, Carroll DM, Kit KB, Ogden LC. Prevalence of obesity and trends in distribution of body mass index among US adults, 1999-2010. *JAMA* 2012; 307(5): 491-7. [\[CrossRef\]](#) [\[PubMed\]](#)
5. Rothberg EA, McEwen NL, Kraftson TA, Neshewat MG, Fowler EC, Burant FC, et al. The Impact of Weight Loss on Health-Related Quality-of-Life: Implications for Cost-effectiveness Analyses. *Qual Life Res* 2014; 23(4):1371-6. [\[CrossRef\]](#) [\[PubMed\]](#)
6. World Health Organization. Methodology and summary. Country profiles, physical activity and obesity in the 53 WHO European Region Member States, 2013. (access April 2017) Google Scholar
7. Ministry of Health od the Republic of Serbia and Institut Of Public Health of Serbia » Dr Milan Jovanović-Batut«. National Health Survey 2013-Key findings, 2014.
8. Wood-Dauphinee S. Assessing quality of life in clinical research: from where have we come and where are we going? *J Clin Epidemiol* 1999; 52:355-63. [\[CrossRef\]](#) [\[PubMed\]](#)
9. Elkington JP. Medicine and quality of life. *Ann Intern Med* 1966; 64:711-4. [\[CrossRef\]](#) [\[PubMed\]](#)
10. Testa MA, Simpson DC. Assessing quality-of-life outcomes. *N Engl J Med* 1996; 334:834-45. [\[CrossRef\]](#) [\[PubMed\]](#)
11. Schalock RL. Quality of life: what we know and do not know. *J Intellect Disabil Res* 2004; 48:203-16. [\[CrossRef\]](#) [\[PubMed\]](#)
12. Kolotkin LR, Andersen RJ. A systematic review of reviews: exploring the relationship between obesity, weight loss and health-related quality of life. *Clinical Obesity* 2017; 7:273-89. [\[CrossRef\]](#) [\[PubMed\]](#)
13. Ul-Haq Z, Mackay DF, Fenwick E, Pell JP. Meta-analysis of the association between body mass index and health-related quality of life among adults, assessed by the SF-36. *Obesity (Silver Spring)* 2013; 21:E322-7. [\[CrossRef\]](#) [\[PubMed\]](#)
14. Kroes M, Osei-Assibey G, Baker-Searle R, Huang J. Impact of weight change on quality of life in adults with Overweight/obesity in US: A systematic review. *Curr Med Res Opin* 2016; 32:485-508. [\[CrossRef\]](#) [\[PubMed\]](#)
15. Zeller HM, Modi CA. Predictors of Health-Related Quality of Life in Obese Youth. *Obesity* 2006; 14(1):122-30. [\[CrossRef\]](#) [\[PubMed\]](#)
16. Wang J. Factors Associated with Health-Related Quality of Life among Overweight or Obese Adults. *J Clin Nurs* 2013; 22(15-16):2172-82. [\[CrossRef\]](#) [\[PubMed\]](#)
17. Finkelstein MM. Body mass index and quality of life in a survey of primary care patients. *J Fam Pract* 2000; 49:734-7. [\[PubMed\]](#)
18. Le Pen C, Leavy E, Loos F, Banzet MN, Basdevant A. "Specific" scale compared with "generic" scale: a double measurement of the quality of life in a French community sample of obese subjects. *J Epidemiol Community Health* 1998; 52:445-50. [\[CrossRef\]](#) [\[PubMed\]](#)
19. Ghosh RK, Ghosh SM, Ganguly G. Health-related quality of life and its growing importance in clinical practice. *N Z Med J* 2010; 131(123):99-101.
20. Panico A, Messina G, Lupoli AG, Lupoli R, Cacciapuoti M, Moscatelli F. Quality of life in overweight (obese)

- and normal-weight women with polycystic ovary syndrome. *Patient Prefer Adherence* 2017; 11: 423-9.
[\[CrossRef\]](#) [\[PubMed\]](#)
21. Keating CL, Peeters A, Swinburn BA, Magliano DJ, Moodie ML. Utility-based quality of life associated with overweight and obesity: the Australian diabetes, obesity, and lifestyle study. *Obesity (Silver Spring)* 2013; 21(3):652-5. [\[CrossRef\]](#) [\[PubMed\]](#)
22. McLaughlin L, Hinyard LJ. The relationship between health-related quality of life and body mass index. *West J Nurs Res* 2014; 36:989-1001. [\[CrossRef\]](#) [\[PubMed\]](#)
23. Dixon JB. The effect of obesity on health outcomes. *Mol Cell Endocrinol* 2010; 316:104-8. [\[CrossRef\]](#) [\[PubMed\]](#)
24. Vucenik I, Stains JP. Obesity and cancer risk: evidence, mechanisms, and recommendations. *Ann N Y Acad Sci* 2012; 1271:37-43. [\[CrossRef\]](#) [\[PubMed\]](#)
25. Zhang X, Brown CJ, Schmitz HK. Association between Body Mass Index and Physical Function among Endometrial Cancer Survivors. *PLoS ONE* 2016; 11(8): e0160954. [\[CrossRef\]](#) [\[PubMed\]](#)
26. Itani L, Calugi S, Grave DR, Kreidieh D, El Kassas G, El Masri D, et al. The Association between Body Mass Index and Health-Related Quality of Life in Treatment-Seeking Arab Adults with Obesity. *Med Sci* 2018; 6: 25. [\[CrossRef\]](#) [\[PubMed\]](#)
27. Wang R, Wu MJ, Ma XQ, Zhao YF, Yan XY, Gao QB, et al. Body mass index and health-related quality of life in adults: a population based study in five cities of China. *Eur J Pub Health* 2012; 22(4):497-502. [\[CrossRef\]](#) [\[PubMed\]](#)
28. Ojeda E, Lopez S, Rodriguez P, Moran L, Rodriguez JM, Delucas P. Prevalence of sleep apnea syndrome in morbidly obese patients. *Chest* 2014; 145 (3 Suppl.): 601A. [\[CrossRef\]](#)
29. Gilad TG, Afek A, Tzur DDE, Cukierman-Yaffe T, Hertzel C, Gerstein CH, et al. Diabetes Risk Among Overweight and Obese Metabolically Healthy Young Adults. *Diabetes Care* 2014; 37(11):2989-95. [\[CrossRef\]](#) [\[PubMed\]](#)
30. NCD-RisC. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. *Lancet* 2017; 390: 2627-42. [\[CrossRef\]](#)
31. USPSTF. Behavioral Counseling to Promote a Healthful Diet and Physical Activity for Cardiovascular Disease Prevention in Adults Without Cardiovascular Risk Factors. *JAMA* 2017; 318(2):167-74. [\[CrossRef\]](#) [\[PubMed\]](#)

Originalni rad

UDC: 613-056.25(497.11)
doi:10.5633/amm.2019.0208

POVEZANOST INDEKSA TELESNE MASE I KVALITETA ŽIVOTA ODRASLOG STANOVNJIŠTVA IZ URBANOG DELA GRADA BEOGRADA

Veroslava Stanković

Visoka zdravstvena škola strukovnih studija u Beogradu, Srbija

Kontakt: Veroslava Stanković
Peđe Milosavljevića 10/14, 11077 Novi Beograd, Srbija
E-mail: stankovicveroslava@gmail.com

Nema jedinstvenih stavova o negativnom uticaju povećane telesne mase na kvalitet života odraslih. Rad je imao za cilj da utvrdi korelaciju između indeksa telesne mase (ITM) i kvaliteta života odraslih. Studija preseka sprovedena je u Domu zdravlja Clinicanova u Beogradu u trajanju od 1. februara do 31. marta 2018. i obuhvatila je 105 ispitanika. Primjenjena su antropometrijska merenja za određivanje telesne mase i visine, i izračunavan je ITM. Primjenjena je korelaciona analiza. Kao instrument za istraživanje kvaliteta života primjenjen je specifični upitnik Obesity Related-Well Being 97 (ORWELL 97). Od 115 distribuiranih upitnika, analizirano je samo 105 kompletno popunjениh. Muškog pola bilo je 45 (43 %) ispitanika, a 60 (57 %) ženskog pola. Prosečna starost ispitanika bila je $29,5 \pm 3,2$ godine, a prosečna vrednost ITM iznosila je $25,4 \pm 4,0 \text{ kg/m}^2$. 54 (51,4 %) ispitanika bilo je normalno uhranjenio, a 51 ispitanik (48,6 %) imao je povećanu telesnu masu. Utvrđena je jaka pozitivna korelacija između ITM = 25-26,9 kg/m² i ukupnog skora u ORWELL97 ($r = 0,96$), ukupnog skora na potpitiranje O ($r = 0,98$) i potpitiranje R ($r = 0,97$). Postoji jaka pozitivna korelacija između ITM = 27-29,9 kg/m² i ukupnog skora u ORWELL97 upitniku ($r = 0,95$), kao i ukupnog skora na potpitiranje O ($r = 0,95$) i potpitiranje R ($r = 0,98$). Statistički značajno niži kvalitet života imali su ispitanici sa ITM = 27-29,9 kg/m² ($t = 6,866$; $p < 0,001$) od ispitanika sa ITM = 25-26,9 kg/m². Ispitanici sa ITM > 25 kg/m² nisu imali statistički značajno veći skor u ORWELL97 upitniku od ispitanika sa ITM < 25 kg/m² ($t = 1,143$; $p > 0,05$). Postoji izrazito jaka pozitivna korelacija između indeksa telesne mase većeg od 25 kg/m² i ukupnog skora u ORWELL97 upitniku, što ukazuje na niži kvalitet života ispitanika.

Acta Medica Medianae 2019;58(2):44-50.

Ključne reči: indeks telesne mase, kvalitet života, urbana populacija