Students' Level of Stress as Related to Some Indicators of Lifestyle

Nivo stresa studenata u odnosu na neke pokazatelje životnog stila

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Abstract: *A 15-item questionnaire for assessment of stress was applied on a sample of 332 students (age from 19 to 27, 184 males and 148 females). It has been found that over 40% of students have elevated stress levels. The empirical results significantly deviated from the normal distribution. Two groups of participants stood out; the greater group had very elevated levels of stress, while the smaller group had very low average values. When answering questions related to stress, respondents evaluated three elements of lifestyle: the quantity and quality of everyday physical activity, subjective feeling of health and regularity of health checks. Results show that students are not active enough physically and that they rarely check their health. The analysis of variance showed that the highest level of stress is present in students who rated themselves as passive sports lovers, while athletes, amateurs and unexpectedly those who are anti-sports expressed significantly lower levels of stress. Significantly higher levels of stress were present in students who rated their health as poor, while respondents who regularly check their health had the lowest level of stress. Men had higher levels of stress than women.*

Keywords: *students, stress, physical activity, lifestyle, health.*

Apstrakt: *Na uzorku od 332 studenta koji studiraju oblast sporta i turizma (starosti 19-27 godina, 184 muškog i 148 ženskog pola) konstruisan je 15-ajtemski upitnik za procenu stresa. Njegovom primenom utvrđeno je da preko 40% studenata ima povećan nivo stresa. Empirijski rezultati značajno su odstupali od normalne distribucije. Izdvojile su se dve grupe ispitanika od kojih je veća imala veoma visok nivo stresa, dok je manja imala veoma niske prosečne vrednosti. Prilikom rešavanja upitnika o stresu, ispitanici su izvršili samoprocenu tri elementa životnog stila: količinu i kvalitet dnevne fizičkih aktivnosti, subjektivni osećaja zdravlja i redovnost zdravstvene kontrole. Rezultati pokazuju da studenti nedovoljno učestvuju u doziranim fizičkim aktivnostima i da veoma retko kontrolišu svoje zdravlje. Analiza varijanse je pokazala da najviši nivo stresa imaju studenti koji su sebe označili kao pasivne ljubitelje sporta, dok su sportisti, rekreativci i neočekivano antisportisti ispoljili značajno niži nivo stresa. Signifikantno veći nivo stresa imali su i studenti koji su svoje opšte zdravlje ocenili kao slabo, dok su najniži stres imali ispitanici koji redovno kontrolišu svoje zdravlje. Muškarci su imali viši nivo stresa od svojih koleginica.*

Ključne riječi: *studenti, stres, fizičke aktivnosti, životni stil, zdravlje.*

Introduction

Stress occurs as a result of person's reactions to life's circumstances in which he or she operates. In literature it is often defined as interaction of an individual and the environment (Lazarus & Folkman, 2004). In the context of human emotions and conflicts (Svičević, 2003) stress is connected to specific mechanisms in the central nervous system. There is positive and negative stress (Watson &

Uvod

Stres se javlja kao posledica reagovanja pojedinca na životne okolnosti u kojima deluje. U literaturi se često definiše kao interakcija pojedinca i okoline (Lazarus & Folkman, 2004). Stres se u kontekstu ljudskih emocija i konflikata (Svičević, 2003) vezuje za određene mehanizme u centralnom nervnom sistemu. Postoji pozitivni i negativni stres (Watson & Pennebaker, 1989). Distres

Pennebaker, 1989). Distress is a term for the stress that has harmful or unpleasant health effects: headaches, stomach problems, etc. It provokes feelings of anger, sadness or fear in people. The person feels like they are under pressure and this makes them nervous. Positive stress motivates people to give their best in a given situation. It can make people feel both nervous and excited. This research deals with the level of negative stress in students in the context of an active lifestyle model (Sharrkey & Gaskill, 2013).

The student population is a growing part of society and perhaps most affected by current life events. This problem is especially pronounced in the recent years since the universities in Serbia abolished compulsory physical education. Some researches done in Serbia (Nešić & Kuburović, 2011; Nešić & Kovačević, 2011; Međedović, Perić & Ahmetović, 2013; Ahmetović, Perić, Međedović, Đokić & Romanov, 2014) indicate a lack of physical activities and a very poor knowledge about healthy habits among youth.

Some studies (Stepanović, Videnović & Plut, 2009; Grandić & Letić, 2009; Nešić, Perić, Ahmetović & Zubanov, 2014) show an increase in negative habits among students which present a health risk: improper and irregular diet, sedentary lifestyle, smoking, alcohol consumption, drug use. These studies clearly show that young people and especially students do not lead lifestyles that are sufficiently healthy.

The sources of stress are external (environmental impact) and internal (own emotions). According to a study of American Psychological Association (Norman et al., 2014) which was conducted on a large number of respondents, the most common sources of stress in students are school obligations, exams and a lack of time for hobbies. Although it was confirmed that the level of stress greatly depends on students' personality and previous habits, the effects of stress in the majority of students are very similar and are expressed in the form of: anxiety, impaired communication with colleagues, insomnia, headaches, stomach problems and so on. It is very significant that physical activity has been identified as one of the most common mechanisms of combating stress. After music, which is in 48% of cases used for relieving stress, the second most common anti-stressor was exercise or walking (used by about 43% of students). Plenty of researches (Godin & Kok, 1996; Pierro, Mannetti & Livi, 2003; Kvaak, Meyer & Tverdal, 2004; Nešić & Kovačević, 2011; Myint et al., 2007; Sharrkey & Gaskill, 2013) demonstrated a positive connection of other healthy habits, in addition to moderate physical activity, to low levels of stress among students (the absence of smoking and alcohol, a proper diet, regular health checks). On the basis of these results the attitude that stress can be managed was formed, namely, that it can be influ-

je termin za stres koji ima štetan ili neprijatan učinak po zdravlje: glavobolje, stomačne tegobe i sl. On kod osoba izaziva osećanje ljutnje, tuge ili straha. Osoba se oseća kao da je pod pritiskom i to je čini nervoznom. Pozitivan stres motiviše ljude da daju svoj maksimum u određenoj situaciji. On može učiniti da se osoba istovremeno oseća i nervozno i uzbuđeno. Ovo istraživanje bavi se nivoom negativnog stresa kod studenata, u kontekstu modela aktivnog životnog stila (*active lifestyale*) (Sharrkey & Gaskill, 2013).

Studentska populacija je sve brojniji deo društva i možda je najviše na udaru aktuelnih životnih pojava. Ovaj problem naročito je izražen poslednjih godina od kada je na univerzitetima u Srbiji ukinuto obavezno fizičko vežbanje. Neka od istraživanja rađena u Srbiji (Nešić & Kuburović, 2011; Nešić & Kovačević, 2011; Međedović, Perić & Ahmetović, 2013; Ahmetović, Perić, Međedović, Đokić & Romanov, 2014) ukazuju na nedovoljnu zastupljenost fizičkog vežbanja omladine, ali i na veoma nizak nivo znanja o zdravim životnim navikama kod mladih. Pojedine studije (Stepanović, Videnović & Plut, 2009; Grandić & Letić, 2009; Nešić, Perić, Ahmetović & Zubanov, 2014) u kazuju na trend porasta negativnih životnih navika kod studenata koje su rizične po zdravlje: nepravilna i neredovna ishrana, sedentarni način života, pušenje, konzumiranje alkohola, upotreba narkotika. Ova istraživanja nedvosmisleno pokazuju da zdravi stilovi života nisu u dovoljnoj meri zastupljeni kod mladih, posebno studenata.

Izvori stresa su spoljašnji (uticaj okoline) i unutrašnji (sopstvene emocije). Prema podacima studije američke asocijacije psihologa (*American Psychological Asociation*) (Norman at al., 2014) sprovedene na velikom broju ispitanika, najčešći izvori strasa kod studenata su školske obaveze, ispiti i nedostatak vremena za hobi. Iako je utvrđeno da nivo stresa dosta zavisi od strukture ličnosti studenata i prethodnih navika, posledice pojave stresa kod većine studenata su veoma slične i ispoljavaju se u vidu: nervoze, poremećene komunikacije sa kolegama, nesanice, glavobolje, stomačnih problema itd. Veoma je značajno da je fizička aktivnost identifikovana kao jedan od najčešćih mehanizama borbe protiv stresa. Nakon muzike koja je u 48% slučajeva korišćena u otklanjanju stresa, drugi najčešće korišćeni antistresor bio je vežbanje i/ili pešačenje (koristi ih oko 43% studenata). Dosta je istraživanja (Godin & Kok, 1996; Pierro, Mannetti & Livi, 2003; Kvaak, Meyer & Tverdal, 2004; Nešić & Kovačević, 2011; Myint et al., 2007; Sharrkey & Gaskill, 2013) u kojima je, osim za doziranu fizičku aktivnost, dokazana pozitivna veza i drugih zdravih ži-

enced by a healthy lifestyle. The subject of this study was to examine relations between some elements of a healthy lifestyle and students' stress levels.

The main goal of this research was to identify stress levels in students that were included in the sample. For its realization, it was necessary to construct a doubly valid, reliable and discriminative instrument. It is a questionnaire that is applicable in everyday (field) work with students, and not only in this research but also in the future similar researches. Special attention was paid to numerical expression of stress levels enabling the comparison of this research results to research results in other countries and application of parametrical statistical procedures. The difference in the levels of stress among participants of different social backgrounds related to health culture was precisely quantified in this research.

Methods and materials

This empirical research is of transversal character. By applying a questionnaire that was intentionally designed for this, 332 students (184 men and 148 women) from Serbian province of Vojvodina were evaluated for stress. The age of respondents ranged between 19 and 27 years. The sample was formed by random selection of students from 6 colleges. According to the Republic Institute for Statistics (webrzs.stat.gov.rs), the total number of students in Serbia is around 229.000, indicating that the confidence interval on the sample of respondents was 5.37 with a confidence level of 95% (Sample size calculator of surveysystem.com). These parameters of the sample are completely acceptable for the purposes of this anthropological study.

In previous pilot studies a 10-item questionnaire proposed by American Psychological Association (Norman et al., 2014) with a 10 point scale was tested on several groups of students. All the trials that preceded this study didn't result in a sufficiently high Cronbach's alpha (it was in the range from 0.32 to 0.42), so the questionnaire was expanded with additional 14 items taken from DASS questionnaire (Antony, Bieling, Cox, Enns, Swinson, 1998), which has been designed as a scale for stress assessment in young adults. Respondents expressed their feelings by selecting one out of five positions on the Likert scale where score 0 represented total rejection and score 4 full acceptance of these claims. After several pilot studies and metrics testing of that expanded and adapted questionnaire, out of 24 statements only 15 items were kept which met metric requirements. Metrics of the questionnaire was tested via two methods: (1) Scale reliability analysis based on Cronbach's alpha (Table 1) and (2) Factor analysis, Principal components analysis (PCA), with direct Obli-

votnih navika sa niskim nivoom stresa kod studenata (odsustvo pušenja i alkohola, pravilan način ishrane, redovne kontrole zdravlja). Na osnovu toga formiran je stav da se stres može kontrolisati, tj. da se na njega može uticati primenom zdravih stilova života. Relacije nekih elemenata zdravog stila života i nivoa stresa studenata bile su predmet ove studije.

Metode i materijal

Ovo je empirijsko istraživanje transferzalnog karaktera. Primenom namenski konstruisanog upitnika izvršena je procena stresa 332 studenta (184 muškarca i 148 žena) srpske pokrajine Vojvodina, koji studiraju fakultete iz oblasti sporta i turizma. Starost ispitanika bila je u rasponu od 19 do 27 godina. Uzorak je formiran slučajnim izborom studenata 6 fakulteta. Prema podacima Republičkog Zavoda za statistiku (webrzs.stat.gov.rs), ukupan broj studenata u Srbiji iznosi oko 229.000, što pokazuje da je Confidence Interval na primenjenom uzorku ispitanika bio 5,37 sa nivoom pouzdanosti od 95% (Sample Size Calculator of Surveysystem.com). Navedeni parametri uzorka potpuno su prihvatljivi za potrebe ovakve antropološke studije.

U prethodnim pilot studijama na nekoliko uzoraka studenata bio je testiran upitnik od 10 ajtema koje je predložila amerčka asocijacija psihologa (American Psychological Asociation) (Norman et al., 2014). Kako je u svim probama koje su prethodile ovoj studiji, dobijena nedovoljno visoka vrednost Kronbahovog alfa koeficijenta (Cronbach's Alpha je bila u opsegu od 0,32-0,42), upitnik je proširen sa dodatnih 14 ajtema preuzetih iz DASS questionnaire (Antony, Bieling, Cox, Enns & Swinson, 1998) koji je konstruisan kao skala za inidividualnu procenu stresa kod mladih osoba. Ispitanici su svoju procenu iskazivali izborom jedne od pet pozicija na skali Likertovog tipa, gde je ocena 0 predstavljala potpuno odbacivanje, a ocena 4 potpuno prihvatanje iznete tvrdnje. Nakon nekoliko probnih istraživanja i provere metrike tog proširenog i adaptiranog upitnika, od 24 tvrdnje zadržano je samo 15 ajtema koji su ispunili metrijske zahteve. Metrika upitnika procenjena je primenom dva postupka: (1) analiza pouzdanosti skale (Scale Reliability Analysis) koja je zasnovana na Kronbahovom alfa koeficijentu (Cronbach's Alpha) (Tabela 1) i (2) faktorskoj analizi (Factor Analysis, Principal Components Analysis - PCA), sa Direct Oblimin metodom rotacije (Tabela 2). Sva statistička zaključivanja sprovedena su na nivou značajnosti od 0,05 (Sig. < ,05). Dobijeni rezultati pokazuju da skala ima dobru unutrašnju saglasnost, na šta ukazuje Kronbahov alfa koeficijent koji je značajno veći od pre-

min method of rotation (Table 2). All statistical inference was carried out at the level of significance of 0.05 (Sig. < .05). The results show that the scale has good internal consistency, which is demonstrated by Cronbach's alpha coefficient that is significantly higher than the recommended theoretical value of 0.7 (De Vellis, 2003). All 15 items had high internal consistency.

In order to assess the validity of the stress questionnaire, 15 items were subjected to principal component analysis (PCA). Before PCA, the suitability of data for a factor analysis was assessed. The examination of the correlation matrix showed a lot of coefficients of 0.3 value or higher. Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was 0.915, which exceeds the recommended value of 0.6 (Kaiser, 1970, 1974). Bartlett's test of sphericity (Bartlett, 1954) also reached statistical significance. All this points to factorability of a correlation matrix.

The analysis of the main components obtained after Oblimin rotation, revealed the presence of two components with Eiegenvalues over one, explaining 55.393% and 7.038% of the variance. The obtained Scree plot showed the existence of a clear breaking point already after the first component (Figure 1). Based on Cattell's criterion (1966) it was decided to retain only one component. This was supported by the results of a parallel analysis with one component whose characteristic values exceed the appropriate threshold values obtained by an equally large matrix of random numbers (15 variables x 332 respondents). This single component solution explained a significant part of the total variance. All 15 variables gave significant factor weight to the only extracted component which proved that the stress questionnaire has high validity and can be applied as an independent scale for assessing the levels of stress. The hierarchical structure of the Component Matrix

poručene teorijske vrednosti 0,7 (De Vellis, 2003). Svih 15 ajtema imalo je visoku unutrašnju saglasnost.

S ciljem da se proceni validnost upitnika, 15 ajtema podvrgnuto je analizi glavnih komponenti (PCA). Pre sprovođenja PCA, bila je ocenjena prikladnost podataka za faktorsku analizu. Pregledom korelacione matrice evidentirano je mnogo koeficijenata vrednosti 0,3 i više. Kajzer-Majer-Olkinov koeficijent adekvatnosti uzorka (*Kaiser-Meyer-Olkin Measure of Sampling Adequacy - KMO*) bio je 0,915 što znatno premašuje preporučenu vrednost 0,6 (Kaiser, 1970, 1974). Bartletov test sferičnosti (*Bartlett's test of sphericity*) (Bartlett, 1954) takođe je dostigao statističku značajnost. Sve to ukazuje na faktorabilnost korelacione matrice.

Analiza glavnih komponenti dobijenih nakon Oblimin rotacije, otkrila je prisustvo dve komponente sa karakterističnim korenovima (*Eiegenvalues*) preko jedan, koje objašnjavaju 55,393% i 7,038% varijanse. Dobijeni dijagram preloma (*Scree plot*) pokazao je postojanje jasne tačke loma već iza prve komponente (Slika 1). Na osnovu Kattel-ovog kriterijuma (1966) odlučeno je da se zadrži samo jedna komponenta. To su podržali i rezultati paralelne analize sa jednom komponentom čije karakteristične vrednosti premašuju odgovarajuće vrednosti praga dobijene pomoću jednako velike matrice slučajnih brojeva (15 varijabli x 332 ispitanika). To jednofaktorsko rešenje objasnilo je značajan deo ukupne varijanse. Svih 15 varijabli dalo je značajnu faktorsku težinu jedinoj ekstrahovanoj komponenti čime je dokazano da Upitnik o stresu (*Stress questionarie*) ima visoku validnost i da se može primenjivati kao samostalna skala za procenu nivoa stresa. Hijerarhijska struktura matrice sklopa pokazuje da je ekstrahovani faktor najviše saturiran ajtemima koji se odnose na opšti osećaj nervne napetosti prou-

*Tabela 1. Statistika pouzdanosti za upitnik o stresu / **Table 1.** Reliability Statistics for Stress questionnaire*

Q	Izjave / *Statements*	Cronbach's Alpha if Item Deleted
1.	Tokom dana često osećam napetost. / *I often feel tension during the day.*	.930
2.	Lako se iznerviram. / *I easily lose temper.*	.932
3.	Teško mi pada da ustajem rano. / *It is hard for me to get up early.*	.935
4.	Tokom dana me hvata drhtavica. / *I sometimes shake during the day.*	.933
5.	Kad me uhvati glad. brzo se unervozim. / *When I'm hungry, I quickly become nervous.*	.939
6.	Stalno mi se čini da nemam dovoljno vremena. / *I always feel like I don't have enough time.*	.935
7.	Imam česte nesanice. / *I often suffer from insomnia.*	.938
8.	Često imam osećaj da mi srce lupa bez razloga. / *I often feel my heart beating louder for no reason.*	.936
9.	Da se ne plašim posledica. rado bih prebio/la neke ljude. / *If I wasn't scared of consequences, I would love to beat some people.*	.932
10.	Već duže planiram da odem kod lekara. ali nemam vremena. / *I've been planning to visit a doctor for a while, but I don't have time.*	.933
11.	Mislim da sam svakodnevno pod povećanim stresom. / *I think I am under a lot of stress on a daily basis*	.933
12.	Pred početak nekog posla uvek se osećam napeto. / *Before starting a new task, I always feel tensed.*	.933
13.	Mrzi me da se spremam za sportske aktivnosti. / *I hate getting ready for sports activities.*	.935
14.	Stalno mi se čini da nisam dovršio/la neki posao ili obavezu. / *I always have a feeling as if I haven't finished some task or duty.*	.933
15.	Osećam kako brzo gubim strpljenje. / *I feel that I'm quickly losing patience.*	.932
	Cronbach's Alpha	.941

shows that the extracted factor is most saturated by items related to the overall feelings of nervous tension caused by the social environment, and least saturated by the claims related to the presence of insomnia and hunger.
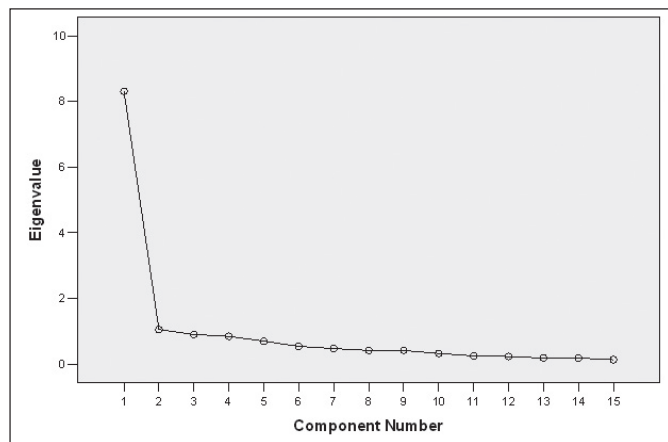

Figure 1. Scree Plot for Stress questionnaire

In addition to the stress questionnaire, an instrument that was used on respondents included questions related to three indicators of quality of life: (1) presence and type of daily physical activity, (2) assessment of their own health and (3) regularity of health checks. Respondents answered by choosing one of the multiple choice options. For evaluation of physical activity five items were offered: an anti-sport person, a passive sports lover (an observer of sports events, betting, etc.), occasional irregular activity (a would-be athlete), a moderately and highly active amateur and an active athlete. For assessment of own health four options were available: poor, satisfactory, good and excellent health. For evaluation of health check the choice was one out of these three options: never, rarely, and regularly. For each sub-sample the average value of stress was calculated, and to test their mutual differences One-Way ANOVA and Independent Samples T-test were applied. All statistical procedures were carried out in the application program SPSS.

Results

On the basis of scalar values (from 0 to 4) by which students expressed their attitude towards the claims stated in 15 items, the average level of stress was calculated for each respondent. The scope of statistical series ranged from 0.2 (minimum) to 3.53 (maximum). The common arithmetic mean (mean = 2.4655) indicates increased stress levels with the average homogeneity which is portrayed by moderately low values of standard deviation. A distribution of 332 scalar averages (Figure 2) revealed itself to be a bimodal distribution. Two groups of respondents stood out - one (much more numerous) in which

zrokovan socijalnim okruženjem, a najmanje tvrdnjama koje se odnose na prisustvo nesanice i gladi.

Table 2. Factor Analysis for Stress questionnaire.

Item hierarchy	Component Matrix	Comunalities
Q01	.858	.771
Q04	.838	.704
Q02	.797	.667
Q09	.788	.646
Q11	.787	.637
Q15	.786	.644
Q12	.777	.617
Q14	.775	.618
Q10	.774	.629
Q06	.715	.555
Q03	.705	.649
Q13	.688	.476
Q08	.677	.651
Q05	.563	.372
Q07	.562	.726

KMO Measure of Sampling Adequacy = ,915
Bartlett's Test of Sphericity = 3521,554 Sig.= ,000

Osim upitnika o stresu, instrument koji su ispitanici rešavali sadržao je i pitanja o tri pokazatelja kvaliteta života: (1) zastupljenost i tip dnevnih fizičkih aktivnosti, (2) procena sopstvenog zdravlja i (3) redovnost kontrolisanja zdravlja. Ispitanici su odgovore davali izborom jedne od više ponuđenih mogućnosti. Za ocenu fizičke aktivnosti u ponudi je bilo pet stavki: antisportista, pasivni ljubitelj sporta (posmatrač sportskih događaja, klađenje isl), povremena neredovna aktivnost (sportista na rečima), umeren rekreativac, jak rekreativac i aktivni sportista. Za procenu sopstvenog zdravlja u ponudi su bile četiri solucije: slabo zdravlje, zadovoljava, dobro i odlično. Kontrola zdravlja vrednovana je izborom jedne od tri alternative: nikad, retko, redovno. Za svaki subuzorak je izračunata prosečna vrednost stresa, a za testiranje njihovih međusobnih razlika primenjena je jednofaktorska analiza varijanse (*One-Way ANOVA*) i T-test nezavisnih uzoraka. Sve statističke procedure realizovane su u aplikacionom programu SPSS.

Rezultati

Na osnovu skalarnih vrednosti (od 0 do 4) kojima su studenti iskazivali svoj stav prema tvrdnjama u 15 ajtema, za svakog ispitanika je izračunat prosečan nivo stresa. Opseg statističke serije se kretao od 0,2 (Minimum) do 3,53 (Maximum). Zajednička aritmetička sredina (Mean = 2,4655) ukazuje na povećan nivo stresa uz prosečnu homogenost o kojoj govore umereno niske vrednosti standardne devijacije. Distribucija 332 skalarna pro-

there were respondents with higher levels of stress and another one (much smaller) formed by respondents with significantly lower stress levels (Figure 2). A detailed review of the original database revealed an alarming fact that even 42.77% of respondents have increased stress levels (greater than the scalar value of 2.5). The highest stress level (above the scalar value of 3) was recorded in 10.24% of the respondents. The group with the lowest levels of stress (scalar value less than 1) made 6.02% of the respondents which primarily included athletes and amateurs. This data called for testing of the significance of differences between arithmetic means of certain subsamples.

The results of ANOVA and T-test indicated a statistically significant difference related to all the monitored criteria. When it comes to movement habits (physical activity), Post Hoc tests (Tukey HSD) revealed that the only source of variability is a significantly higher average value of stress in the group of passive sports lovers. The remaining four groups (anti-sport, moderate and highly active amateurs and active athletes) do not differ significantly statistically. On the basis of the average scalar values, it was noted that elevated stress (values exceeding 2.5) is primarily present in students who are inactive or very rarely and irregularly physical active (Table 3).

Comparing the average values in relation to the self-assessment of health, it was found that those who assessed their health as poor or satisfactory had statistically higher levels of stress in comparison to their colleagues who rated their health as good or excellent (Table 4). Post Hoc test (Tukey HSD) pointed to polarization of the sample, whereby between two sub-samples of negative and two sub-samples of a positive pole there were no statistically significant differences. Despite increased feelings of stress in most respondents, a total of 86.14% of the surveyed students rated their health as good or excellent, while only 13.86% as poor or satisfactory.

ANOVA revealed that the stress in respondents who never or rarely go to preventive health checks is not significantly different. The only source of variability was a lower stress level in students who regularly check their health (Table 5). Only 31.93% of students from Vojvodina said they regularly checked their health. This alarming rate is likely to be even lower given that the respondents in these anthropological studies often give socially acceptable answers in order to improve their self-image.

The results of T-test revealed that male students are under higher levels of stress than female students (Table 6). This difference was statistically significant, which can be accepted with reservations due to the relatively small

seka (Slika 2) otkriva bimodalni raspored. Izdvojile su se dve grupe ispitanika – jedna (mnogo brojnija) u kojoj se nalaze ispitanici sa višim nivoom stresa i druga (izrazito manja) koju su formirali ispitanici sa značajno manje izraženim stresom (Slika 2). Detaljnijim pregledom izvorne baze podataka, uočen je zabrinjavajući podatak da čak 42,77% ispitanika ima povećan nivo stresa (veći od skalarne vrednosti 2,5). Najviši nivo stresa (iznad skalarne vrednosti 3) registrovan je kod 10,24% ispitanika. Grupu sa najnižim nivoom stresa (skalarna vrednost niža od 1) formiralo je 6,02% ispitanika među kojima su prvenstveno sportisti i rekreativci. Ovaj podatak otvorio je potrebu da se testira značajnost razlika između aritmetičkih sredina pojedinih subuzoraka.

Rezultati ANOVA i T-testa ukazali su na postojanje statistički signifikantne razlike u odnosu na sve praćene kriterijume. Kada su u pitanju kretne navike (nivo fizičke aktivnosti), *Post Hoc* test (*Tukey HSD*) otkrio je da je jedini izvor varijabiliteta signifikantno veća prosečna vrednost stresa u grupi pasivnih ljubitelja sporta. Preostale četiri grupe (antisportisti, prosečni i jaki rekreativci, kao i aktivni sportisti) nisu se među sobom statistički značajno razlikovale. Na osnovu prosečnih skalarnih vrednosti ipak je konstatovano da povećan stres (vrednosti preko 2,5) imaju prvenstveno studenti koji su neaktivni ili su veoma retko i neredovno fizički aktivni (Table 3).

Upoređivanjem prosečnih vrednosti u odnosu na samoprocenu zdravlja, utvrđeno je da statistički veći nivo stresa imaju oni koji su svoje zdravlje ocenili kao slabo ili zadovoljavajuće u odnosu na svoje kolege koje su zdravlje proglasili dobrim ili odličnim (Tabela 4). *Post Hoc* test (*Tukey HSD*) ukazao je na polarizaciju uzorka, pri čemu između dva subuzorka sa negativnog kao i dva sa pozitivnog pola nije bilo statistički značajnih razlika. Uprkos povećanom osećanju stresa kod većine ispitanika, ukupno 86,14% anketiranih studenata je svoje zdravlje ocenilo kao dobro ili odlično, a samo 13,86% kao slabo ili zadovoljavajuće.

ANOVA je otkrila da se stres ispitanika koji nikad ili retko idu na preventivne preglede značajno ne razlikuje. Jedini izvor varijabiliteta bio je niži nivo stresa kod studenata koji redovno kontrolišu svoje zdravlje (Tabela 5). Samo 31,93% vojvođanskih studenata izjavilo je da redovno kontroliše zdravlje. Ovaj zabrinjavajući podatak verovatno je i niži kada se zna da ispitanici u ovakvim antropološkim studijama često daju socijalno poželjne odgovore u želji da ulepšaju sliku o sebi.

Rezultati T-testa otkrili su da muškarci imaju veći nivo stresa od studentkinja (Tabela 6). Ova razlika je bila statistički signifikantna, što se može prihvatiti s rezervom obzi-

number of respondents and the fact that the significance is very close to the limit value of 0.05 (sig. =. 045).

rom na relativno mali broj ispitanika i na signifikative koja su bili veoma blizu granične vrednosti od 0,05 (*Sig.* = ,045).
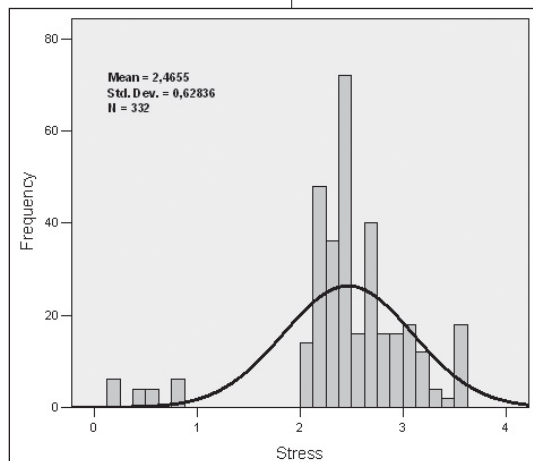

Figure 2. *Frequencies and Descriptives for Student Stress*

Table 3. *Descriptives and ANOVA za ispitanike sa različitim kretnim navikama*

Subsample	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Antisportisti / *Anti-sport*	36	**2.30**	.101	.017	2.20	2.40
Pasivni ljubitelji sporta / *Passive sports lovers*	36	**3.00**	.541	.090	2.47	3.53
Sportista na rečima / *Would-be athletes*	20	**2.55**	.295	.066	2.20	2.93
Umereni rekreativci / *Moderate amateurs*	118	**2.51**	.707	.0651	.20	3.27
Jaki rekreativci / *Highly active amateurs*	80	**2.26**	.649	.073	.20	3.00
Aktivni sportisti / *Active athletes*	42	**2.39**	.527	.081	.80	3.40
Ukupno / *Total*	332	**2.4655**	.62836	.03449	.20	3.53

$F = 8.602^*; Sig. = .000$

Table 4. *Descriptives and ANOVA za ispitanike sa različitom samoprocenom zdravlja*

Ocena zdravlja / *Health evaluation*	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Slabo / *Poor*	8	**3.08**	.354	.125	2.73	3.53
Zadovoljava / *Satisfactory*	38	**3.13**	.434	.070	2.40	3.53
Dobro / *Good*	122	**2.33**	.671	.061	.20	3.40
Odlično / *Excellent*	164	**2.39**	.527	.041	.20	3.20
Ukupno / *Total*	332	**2.4655**	.62836	.03449	.20	3.53

$F = 23.410^*; Sig. = .000$

Table 5. *Descriptives and ANOVA za ispitanike sa različitim navikama kontrole zdravlja*

Kontrola zdravlja / *Health check*	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Nikad / *Never*	60	**2.79**	.701	.090	.20	3.53
Retko / *Rarely*	166	**2.46**	.625	.048	.20	3.20
Redovno / *Regularly*	106	**2.29**	.510	.049	.47	3.27
Ukupno / *Total*	332	**2.4655**	.62836	.03449	.20	3.53

$F = 13.521^*; Sig. = .000$

Table 6. *Descriptives and T-test za ispitanike različitog pola*

Pol / *Gender*	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Muški / *Male*	184	**2.53**	.597	.044	.53	3.53
Ženski / *Female*	148	**2.39**	.659	.054	.20	3.40
Ukupno / *Total*	332	**2.4655**	.62836	.03449	.20	3.53

$t = 2.016^*; Sig. = .045$

Discussion

This study offered the research practice a stress assessment questionnaire with good metrics that has been tested on population of students. Although the original idea of the authors was to use a previously standardized instrument of American Psychological Association (Norman et al., 2014), test analyses did not confirm the expected scale reliability. The new questionnaire for assessing stress levels of students (SSQ-15) consists of 15 items and has a high internal consistency (Cronbach's alpha over 0.9). A stable single-factor structure allows it to be used as a unique measuring scale where the value of 0 indicates complete absence of stress and the maximum value of 4 indicates very high stress. Through this instrument, it was found that a high percentage of students from the Serbian province of Vojvodina have elevated stress levels. Compared to the US population where the number of students with elevated feelings of stress in 2014 was estimated at 37% (Norman et al., 2014), the feeling of stress is more pronounced in students from Vojvodina and it is at the level of 42%. In addition to fluctuations in the sample, which is always a potential parasitic factor, this difference is likely to be explained by a larger number of stress sources that students in Serbia are exposed to. There is, first of all, a very low economic power of Serbian society and a still volatile political situation. Most of the students in Serbia are aware that it is very difficult to find a job with a university degree and the time one needs to find a job is very much influenced by their ties to the political elite.

Scalar averages greater than 2.5 indicate elevated stress levels. Based on this criterion, it was concluded that the increase in physical activity helps stress levels decrease. An acceptable stress level was primarily noted in highly active amateurs and active athletes. The highest values were registered in the subsample of passive sports lovers. These are usually those who watch sport on TV or monitor sports results at bookmakers. Instead of having a relaxing effect, their contact with sports further intensified the excitement stirring strong fan emotions whose direction depends on the performance of others. Being an anti-sport person and consciously accepting a life without physical activity turned out to be healthier, than to be a sports fan. The level of stress in respondents who view themselves as anti-sport oriented was below 2.5 and wasn't statistically significantly different from the feelings of stress expressed by amateurs and active athletes. These data are consistent with the findings in similar studies carried out in other countries. Thus, for example, 39% of young people in the United States claim that their

Diskusija

Ova studija je istraživačkoj praksi ponudila upitnik za procenu stresa sa dobrom metrikom koja je proverena na populaciji studenata. Iako je prvobitna ideja autora bila da se posluže prethodno standardizovanim instrumentom *American Psychological Asociation* (Norman et al., 2014), probne analize nisu potvrdile očekivanu pouzdanost skale (*Scale Reliability*). Novi upitnik za procenu nivoa stresa studenata (SSQ-15) sastoji se od 15 ajtema koji su pokazali visoku unutrašnju saglasnost (*Cronbach's Alpha* preko 0,9). Stabilna jednofaktorska struktura omogućava da se instrument koristi kao jedinstvena skala na kojoj vrednost 0 pokazuje potpuno odsustvo stresa, a maksimalna vrednost 4 označava veoma visok stres. Koristeći se ovim instrumentom, utvrđeno je da veoma visok procenat studenata iz srpske pokrajine Vojvodina ima povećan nivo stresa. U poređenju sa američkom populacijom u kojoj je broj studenata sa povećanim osećanjem stresa u 2014-oj godini procenjen na 37% (Norman et al., 2014), kod vojvođanskih studenata koji studiraju sport i turizam je osećaj stresa više izražen i kreće se na nivou od 42%. Osim fluktuacijom uzorka koja je uvek potencijalni parazitarni faktor, ove razlike se verovatno mogu objasniti većim brojem izvora stresa sa kojima se susreću vojvođanski studenti. Tu se, pre svega, radi o veoma niskoj ekonomskoj moći srpskog društva u celini, kao i još uvek nestabilnim političkim prilikama. Najveći broj studenata u Srbiji je svestan da je veoma teško naći posao sa fakultetskom diplomom i da na brzinu nalaženja posla veliki uticaj ima bliskost sa političkim elitama.

Na povećan nivo stresa ukazivale su skalarni proseci veći od 2,5. Polazeći od ovog kriterijuma, zaključeno je da sa povećanjem fizičke aktivnosti opada nivo stresa. Prihvatljiv stres iskazali su prvenstveno jaki rekreativci i aktivni sportisti. Najveće vrednosti registrovane su u subuzorku pasivnih ljubitelja sporta. To su obično oni koji u kontakt sa sportom dolaze preko TV ili praćenjem sportskih rezultata na kladionicama. Njihov kontakt sa sportom je, umesto relaksirajućeg efekta, dodatno pojačavao uzbuđenje budeći jake navijačke emocije čiji smer zavisi od učinka drugih. Pokazalo se da je zdravije biti antisportista i svesno prihvatiti život bez fizičkih aktivnosti, nego biti sportski navijač. Nivo stresa kod ispitanika koji su sebe prikazali kao antisportistu bio je ispod 2,5 i nije se statistički značajno razlikovao od osećaja stresa rekreativaca i aktivnih sportista. Ovi podaci su u skladu sa zaključcima sličnih istraživanja realizovanih u drugim zemljama. Tako, na primer, 39% mladih ljudi u SAD tvrdi da im osećaj stresa raste u periodima kada su im tokom prethodnog meseca dana izostale fizičke ak-

feelings of stress become stronger when they don't engage in physical activity during a previous month, and 50% report that they feel much healthier when they exercise regularly (Norman et al., 2014). All this shows that moderate physical activity can help relieve stress.

The link between stress and subjective feeling of health is indicated by the relative similarity of the number of respondents with the highest levels of stress and those who rated their health as poor (about 13%). This number is slightly lower than the information cited for economically developed countries. Thus Norman et al. (2014) report that about 20% of young adult Americans rate their health as satisfactory or poor, and 80% as good or excellent. Whether students from Vojvodina are actually healthier is difficult to prove. What is more important than this information is that about 2/3 of respondents do not have a habit to regularly check their health, either through annual medical check-ups or through occasional preventive consultation with their doctor. Apparently, in the Republic of Serbia, a lot of work needs to be done on increasing students' health culture.

Conclusion

Two most significant pieces of data obtained in this study are: (1) stress is highly prevalent among students and (2) systematical physical activity is a significant factor of discrimination on those who have high and low levels of stress. Data related to levels of stress in the sample confirmed the results of previous researches that were carried out in the USA and developed European countries which indicate that studying is a highly stressful activity (due to obligations related to exams, lack of free time, financial issues, job uncertainty after graduation, etc.). The research showed that students who are physically active (in sports recreation) mostly have lower levels of stress. This confirms the hypothesis about significance of sports and recreation in overcoming of stress and lowering its damaging effects. Similar results occurred in researches undertaken in other developed countries (the USA and EU) in which music and physical activities have been prevalent in students' free time. This information indicates that it would be possible to generalize data obtained in this study, and that studying in all countries has similar social characteristics.

A special significance of this study is its contribution to the advancement of methodology of evaluation (qualification) of stress. Based on the instruments used in previous researches which were carried out in different environments, a very stable 15-item questionnaire was constructed which is easily applicable in the field. The claims from the questionnaire proved to be clear to the participants and they motivated them sufficiently to give fast and honest answers. The

tivnosti, a 50% izjavljuje da se osećaju mnogo zdravije kada redovno vežbaju (Norman et al., 2014). Sve ovo pokazuje da se pomoću dozirane fizičke aktivnosti može upravljati stresom.

Na vezu između stresa i subjektivnog osećaja zdravlja ukazuje relativna sličnost broja ispitanika sa najvećim nivoom stresa i onih koji su svoje zdravlje ocenili kao slabo (oko 13%). Ovaj broj je nešto niži od podataka koji se navode za ekonomski razvijenije zemlje. Tako Norman et al. (2014) navode da oko 20% mladih odraslih amerikanaca svoje zdravlje ocenjuje kao zadovoljavajuće ili slabo, a oko 80% kao dobro ili odlično. Da li su vojvođanski studenti zaista zdraviji teško je dokazati. Od tog podatka mnogo je značajnije to što oko 2/3 ispitanika nema naviku da redovno kontroliše svoje zdravlje, bilo kroz jednogodišnje sistematske preglede, bilo kroz povremene preventivne konsultacije sa svojim lekarom. Po svemu sudeći, u Republici Srbiji je neophodno dosta raditi na povećanju zdravstvene kulture studenata.

Zaključak

Dva najznačajnija rezultata dobijena u ovoj studiji su: (1) stres je veoma učestao među studentima i (2) redovna fizička aktivnost je značajan faktor koji diferencira one koji imaju visok i nizak nivo stresa. Podaci koji se odnose na nivo stresa u uzorku potvrdili su rezultate prethodnih istraživanja koja su provedena u SAD i razvijenim evropskim zemljama i ukazuju da se studiranje može doživeti kao veoma stresna aktivnost (zbog obaveza vezanih za ispite, nedostatak slobodnog vremena, finansijska pitanja, neizvesnost dobijanja posla nakon diplomiranja, itd.). Istraživanje je pokazalo da studenti koji su fizički aktivni uglavnom imaju niži nivo stresa. To potvrđuje hipotezu o značaju sporta i rekreacije u prevazilaženju stresa i sniženju njegovih štetnih efekata. Slični rezultati se uočavaju u istraživanjima koja su sprovedena u drugim razvijenim zemljama (SAD i EU) u kojima su muzika i fizičke aktivnosti prevladavale kao aktivnosti u slobodnom vremenu učenika. Ove informacije ukazuju na moguću generalizaciju istraživačkih podataka dobijenih u ovoj studiji, odnosno pokazuju da studiranje u gotovo svim zemljama ima slične socijalne karakteristike.

Poseban značaj ove studije je njen doprinos unapređenju metodologije vrednovanja (kvalifikacije) stresa. Na osnovu instrumenata koji su korišćeni u prethodnim istraživanjima koja su sprovedena u različitim okruženjima, napravljen je veoma stabilan upitnik od 15 stavki koji je moguće realtivno lako i efikasno primeniti na terenu. Tvrdnje iz upitnika pokazale su se jasnim učesnicima ankete i bile su dovoljno egzaktne za motivisanje na da-

claims aren't saturated with specific social or cultural characteristics of participants, but they contain general conditions typical of students' everyday life in any environment. Therefore, it is realistic to expect for the questionnaire to be used in further research in any country in the world. It is especially significant that the factor analysis of the results that were obtained via the use of this questionnaire, revealed only one component of stress (general factor). This shows that the questionnaire measures general markers of stress and that it can be further developed with regards to the specific manifestations of stress.

vanje brzih i iskrenih odgovora. Ajtemi uptinika nisu zasićeni specifičnim društvenim ili kulturnim karakteristikama učesnika, ali sadrže opšte uslove karakteristične za svakodnevni život studenata u bilo kom okruženju. Stoga je realno očekivati da se upitnik pokaže korisnikm u daljim istraživanjima u bilo kojem akademskom okruženju. Posebno je značajno da faktorska analiza dobijenih korišćenjem ovog upitnika otkriva samo jednu komponentu stresa (opšti faktor). Ovo pokazuje da upitnik meri opšte markere stresa, te da se može dalje razvijati i unapređivatis obzirom na specifičnost manifestacije stresa.

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