

MEASUREMENT OF HEALTH AND SOCIAL BEHAVIORS IN SCHOOLCHILDREN: RANDOMIZED STUDY COMPARING PAPER VERSUS ELECTRONIC MODE

MERITVE ZDRAVSTVENEGA IN SOCIALNEGA VEDENJA PRI ŠOLOOBVEZNIH OTROCIH: RANDOMIZIRANA ŠTUDIJA, KI PRIMERJA UPORABO TISKANIH IN ELEKTRONSKIH VPRAŠALNIKOV

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ABSTRACT

Keywords:

school-aged children, health behavior, social support, prevalence, validity, reliability, questionnaire design, Lithuania

Introduction: Electronic survey mode has become a more common tool of research than it used to be previously. This is strongly associated with the overall digitization of modern society. However, the evidence on the possible mode effect on study results has been scarce. Therefore, the aim of this study is to investigate the comparability of findings on health and behaviours using a paper-versus-electronic mode of survey with randomization design among schoolchildren.

Methods: A randomized study was conducted using a mandatory questionnaire on international Health Behaviour in School-aged Children (HBSC) study in Lithuania, enrolling 531 schoolchildren aged 11-15 years. The questionnaire included health and social topics about physical activity, risk behaviours, self-reported health and symptoms, life satisfaction, bullying, fighting, family and school environment, peer relationships, electronic media communication, sociodemographic indicators, etc. The schoolchildren within classes were randomly selected for electronic or paper mode.

Results: It was found that by study mode differences are inconsistent and in the majority of cases do not exceed 5%-point difference between the modes. The only significant difference was that in the paper survey the participants reported more exercise than in the electronic survey (OR=8.08, P<.001). Other trends were nonsignificant and did not show a consistent pattern - in certain behaviours the paper mode was related to healthier choices, while in others - the electronic.

Conclusions: The use of electronic questionnaires in surveys of schoolchildren may provide findings that are comparable with concurrent or previously conducted paper surveys.

IZVLEČEK

Ključne besede:

šoloobvezni otroci, zdravstveno vedenje, socialna podpora, razširjenost, veljavnost, zanesljivost, oblika vprašalnika, Litva

Uvod: Uporaba elektronskih vprašalnikov postaja vse bolj pogosto raziskovalno orodje, ki ga omogoča vsesplošna digitalizacija sodobne družbe. Dokazi o morebitnih učinkih elektronskih vprašalnikov na rezultate študije pa so pomanjkljivi. Cilj te študije je raziskati primerljivost dognanj o zdravstvenih vedenjih med šoloobveznimi otroki z uporabo tiskanih vs. elektronskih vprašalnikov.

Metode: Randomizirano študijo smo izvajali v Litvi in je vključevala 531 šoloobveznih otrok med 11. in 15. letom starosti. Uporabili smo vprašalnik mednarodne raziskave Z zdravjem povezano vedenje šoloobveznih otrok (Health Behaviour in School-aged Children (HBSC)). Vprašalnik je zajemal vprašanja s področja zdravja in družbe; povpraševal je o fizični aktivnosti otrok, tveganih vedenjih, samoporočanem zdravju in simptomih, življenjskem zadovoljstvu, ustrahovanju, pretepanju, družinskem in šolskem okolju, odnosih z vrstniki, sociodemografskih dejavnikih, komunikaciji po elektronskih medijih itd. Šoloobvezni otroci znotraj razredov so bili naključno izbrani za odgovarjanje na vprašalnike v tiskani in elektronski obliki.

Rezultati: Ugotovitve kažejo, da so razlike med obema oblikama vprašalnikov nekonsistentne in v večini primerov ne presegajo 5 % razlike med oblikama. Edina pomembna razlika je, da so v skupini, ki je odgovarjala na tiskani vprašalnik, poročali o več gibanja kot v skupini, ki je uporabljala elektronski vprašalnik (OR = 8,08, P < ,001). Drugi trendi niso znatni in ne prikazujejo konsistentnega vzorca; pri določenih vedenjih so se rezultati tiskanega vprašalnika nagibali k bolj zdravim izbiram, medtem ko so se v nekaterih drugih vedenjih nagibali k bolj zdravim izbiram rezultati elektronskega vprašalnika.

Zaključek: Uporaba elektronskega vprašalnika v raziskavah pri šoloobveznih otrocih lahko prinaša rezultate, ki so primerljivi s sočasnimi ali predhodno izvedenimi raziskavami, ki so uporabljale tiskane vprašalnike.

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1 INTRODUCTION

Information and communication technology has become an ever more demanded working tool to enhance the management, efficiency, and quality of surveys on health and social phenomena. There are several kinds of electronic questionnaires - online access, mobile device administered by the researcher, or computer/device handled by respondent. The responses can be collected by participant, researcher or a proxy (if a participant is minor). Overall digitization of social life and communication suggests ever-increasing pressure to conduct digital surveys and, therefore, it is essential to assess how reliable and valid the digital methods are and, if they replace paper-and-pencil method, are the findings comparable?

The online mode reduces the study costs by saving on the costs of paper and printing as well as from transportation (1). Besides, it ensures quick data with virtually no errors and suggests fewer no-response answers (2). Another important point is that these devices permit automatic checking of responses and complex skip patterns. However, in the digital survey mode, it is essential to ensure who is filling in the questionnaire, which is not always feasible.

The literature on the effects of digital-based and computer-adaptive testing suggests that digitization of standardized tests is a precise and appropriate research mode both from a scientific and logistic point of view (3, 4). Nonetheless, some researchers propose that the reliability of data obtained by the web-based approach should be determined (5). There is also a potential for selection bias, where a particular type of participant may be more prone to a particular survey mode (e.g. preference for digital mode among younger, more affluent or educated people). Moreover, in online mode, the participants can be unknown, not meet eligibility criteria or make double entries. Therefore, due to the potential for selection bias a randomized controlled design could be regarded as the main choice in studies on potential mode effects.

Even though many studies analysing the issue of mode effect on study results use randomization, quite a lot of them address the issue of response rate foremost, while content-specific comparison receives less attention. Also, such studies rarely investigate younger groups and the majority of them do not use randomization. For example, in the international Health Behaviour in School-aged Children (HBSC) study some countries use mixed mode design for more than a decade, e.g. Belgium (6), but they usually do not randomize the schools or children, leaving the choice of mode up to the school's or child's preference - which may be a subject to bias.

Thus, even though research on the validity and reliability of digital versus paper mode is quite extensive, such

assessment in adolescents is rarely addressed. Moreover, the randomized approach in the research of mode effect is not always applicable, leaving the findings with a potential for self-selection or school-specific bias. In addition, the health perceptions and behaviours have also been under-investigated from this perspective. Therefore, the objective of our study is to compare the findings from paper and electronic mode using a randomized controlled design among schoolchildren.

2 METHODS

2.1 Study Process and Sample

The randomized controlled study was conducted in May 2017 at five secondary schools in Lithuania. All study subjects were informed about the details of the study and that the return of the filled questionnaire will be treated as the informed consent. The anonymity of study participants and confidentiality of the data was ensured. The study was conducted as a pilot project for an oncoming 2018 Health Behaviour in School-aged Children study in Lithuania. The schools were randomly selected from the national schools' list, by choosing the first five schools who agreed to participate in the study. The schools were from the second-largest city, other cities, and one town. In every school, the questionnaire was administered to 5th, 7th, and 9th grades (predominant age of children 11, 13 and 15 years, respectively). Then, the randomization was applied for every class in the school, with one-half of students filling the questionnaire in paper mode and the other half in electronic mode. Every class was randomized to define which half of the students' list filled the online and which the paper version of the questionnaire.

Questionnaires (both electronic and paper mode) were administered in school classrooms by trained researchers who complied with written instructions. The electronic version of the questionnaire was uploaded to Google Forms, which was available only to the researchers. During the survey, the researchers shared the web link to study participants. The online questionnaire was filled in on desktop or tablet computers. The places for survey were usually classrooms, computer rooms or libraries. In some cases, the survey of paper and online mode was conducted simultaneously in the same room. Every researcher wrote the notes about the procedure of survey.

2.2 Measurements

The tool for the study was based on the then-current version of the standardized international HBSC research protocol (7). The HBSC questionnaire covers a wide range of health and social topics about schoolchildren's physical activity, risk behaviours, self-reported health and symptoms, life satisfaction, bullying, fighting, family, school environment, peer relationships, electronic media

communication, sociodemographic indicators, etc. Only the mandatory items were included. The sequence, formulation, and overall visualization of items did not differ by mode.

Some items of the questionnaire were used from particular scales or subscales:

- HBSC symptom checklist, 8 items (7),
- Family Affluence Scale, 6 items (8),
- Multidimensional Scale of Perceived Social Support: Family, 4 items (9),
- Multidimensional Scale of Perceived Social Support: Friends, 4 items (adapted from (9)),
- Teacher and Classmate Support Scale: Classmates, 3 items (adapted from (10)),
- Teacher and Classmate Support Scale: Teachers, 3 items (adapted from (10)),
- Online contact with friends and others, 4 items (11),
- Preference for online communication, 3 items (12),
- Social media addiction, 9 items (13).

2.3 Data Analysis

Data was processed using MS Excel 2010 and analysed using IBM SPSS Statistics, version 20. The descriptive analysis included the calculation of the prevalence of different health behaviours (%). The items were dichotomized based on the cut-offs used in the 2014 Health Behaviour in School-aged Children study report (14). The main purpose of the analysis was to estimate whether various health-related items are similarly distributed among study groups in schoolchildren that filled in the questionnaire in paper-versus-electronic mode. For this, the percentage point differences were calculated, and logistic regression was used with the calculation of certain behaviours' risk when comparing the modes. The differences between the modes were estimated using percentage point difference and odds ratios with the reference group being electronic mode (OR=1.00). Given that despite randomization there were some imbalances between the study groups by gender, grade, and school, these indicators were adjusted for in the multivariate logistic regression model.

Table 2. Internal consistency of study scales and subscales by survey mode.

Scale	Number of items	Internal consistency (α)	
		Electronic mode	Paper mode
HBSC symptom checklist	8	.78	.79
Family Affluence Scale	6	.52	.58
Multidimensional Scale of Perceived Social Support: Family	4	.76	.69
Multidimensional Scale of Perceived Social Support: Friends	4	.90	.85
Teacher and Classmate Support Scale: Classmates	3	.77	.70
Teacher and Classmate Support Scale: Teachers	3	.75	.74
Online contact with friends and others	4	.54	.54
Preference for online communication	3	.84	.81
Social media addiction	9	.75	.76

Due to multiple comparisons of different indicators, the Bonferroni correction was used: in total, 78 variables were compared, so the conventional significance level of $P < 0.05$ was decreased to $P < 0.001$ ($0.05/78 = 0.00064$). The P-values between 0.001 and 0.05 were reported as trends.

3 RESULTS

The study sample comprised 531 schoolchildren - 261 filled the electronic questionnaire and 270 the paper version. The overall response rate was 83.0% with higher rates among girls and elder schoolchildren. A detailed comparison of study groups by gender, grade, and school are presented in Table 1. Regardless of randomization, there were some differences observed between study groups and since they were definitely random (by design of the study) their statistical significance was not calculated.

Table 1. The main characteristics of study sample.

Characteristic	Electronic mode	Paper mode	n	Response rate
Gender				
Boys	51.4	48.6	255	77.0
Girls	47.3	52.7	275	89.0
Grade				
5th	49.7	50.3	187	77.9
7th	48.8	51.2	201	84.1
9th	49.0	51.0	143	88.8
School				
#1 (large city)	47.3	52.7	74	89.2
#2 (large city)	48.7	51.3	224	94.5
#3 (city)	50.5	49.5	103	60.6
#4 (city)	50.0	50.0	48	80.0
#5 (town)	50.0	50.0	82	91.1

In this study, the internal consistency of scales and subscales was acceptable and the difference between the modes was not more than .07 points - with no consistent superiority of either mode (Table 2).

3.1 Health Behaviours

In the field of health behaviours (Table 3), the largest difference depending on survey mode was observed in extensive physical activity - in paper mode, the schoolchildren more frequently reported daily exercise until getting out of breath or sweating (OR=8.08, P<.001).

Other indicators had no differences except the trends that students in paper mode more frequently reported, such as having a regular breakfast on weekends (OR=1.93, P=.009). Almost all aspects of health behaviours differed between the survey modes by no more than 5% points.

Table 3. Health behaviours of schoolchildren by survey mode.

Characteristic		Prevalence, %		% difference	OR	P
		Electronic	Paper			
Eating habits						
Having breakfast during the weekdays	Every day	58.8	62.7	3.9	1.18	.366
Having breakfast during the weekends	Every day	79.6	87.7	8.1	1.93	.009
Having breakfast with parents	Every day	41.0	40.7	-.3	1.00	.982
Having dinner with parents	Every day	47.1	45.6	-1.5	.96	.816
Eating fruits	Every day	41.8	38.5	-3.3	.87	.446
Eating vegetables	Every day	32.6	34.2	1.6	1.07	.707
Eating sweets	Every day	16.1	13.8	-2.3	.83	.453
Drinking soft drinks	Every day	5.4	6.3	.9	1.23	.593
Drinking energy drinks	Every day	2.3	.4	-1.9	.16	.097
Health and well-being						
Subjective health assessment	Good	88.5	91.8	3.3	1.59	.132
Life satisfaction	6-10 (10 pts scale)	87.7	85.8	-1.9	.84	.510
Headache	Rarely	84.3	82.5	-1.8	.91	.707
Stomach ache	Rarely	93.5	93.7	.2	1.04	.912
Backache	Rarely	91.6	92.1	.5	1.09	.794
Feeling low	Rarely	80.1	81.3	1.2	1.14	.577
Irritability or bad temper	Rarely	72.0	76.5	4.5	1.39	.115
Feeling nervous	Rarely	70.5	69.7	-.8	1.01	.946
Difficulties in getting to sleep	Rarely	79.7	83.2	3.5	1.33	.214
Feeling dizzy	Rarely	89.7	89.9	.2	1.08	.798
Brushing the teeth	More than once a day	61.3	62.8	1.5	1.05	.809
Body image	A bit too thin	11.9	15.0	3.1	.71	.200
	A bit too fat	29.1	30.7	1.6	.91	.654
	About the right size	59.0	54.3	-4.7	1.00	-
Physical activity						
Physical activity at least 60 minutes per day (last week)	7 days	18.9	20.6	1.7	1.16	.518
Exercise in free time until getting out of breath or sweating	Every day	3.1	19.7	16.6	8.08	<.001
Risk behaviour						
Cigarette smoking (lifetime)	Never	73.2	77.8	4.6	1.37	.187
Cigarette smoking (last month)	Never	88.1	92.3	4.2	1.75	.097
Alcohol drinking (lifetime)	Never	62.8	68.4	5.6	1.37	.129
Alcohol drinking (last month)	Never	88.9	88.0	-.9	.89	.706
Cannabis taking (lifetime)	Never	94.3	97.0	2.7	2.22	.101
Cannabis taking (last month)	Never	98.1	99.2	1.1	2.13	.376
Sexual intercourse	No	95.0	93.3	-1.7	.81	.626

3.2 Social Behaviours and School

The selected indicators of social behaviours under study showed slightly bigger differences than health behaviours, though they were inconsistent and nonsignificant (Table 4). Here the trend in paper mode was that the children were more likely to report having friends to share joys and sorrows, but also more cyber-bullying and more treatment-needed injuries ($.001 < P < .05$).

Table 4. School behaviours of schoolchildren by survey mode.

Characteristic		Prevalence, %		% difference	OR	P
		Electronic	Paper			
Friends support						
Friends help	Agree	76.6	76.4	-.2	.97	.870
Counting on friends	Agree	75.1	78.3	3.2	1.18	.440
Having friends to share joys and sorrows	Agree	78.2	87.7	9.5	1.98	.005
Being able to talk about problems with friends	Agree	70.5	76.4	5.9	1.35	.138
Classmate support						
Enjoy being together with students	Agree	59.8	54.1	-5.7	.81	.243
Students in class are kind and helpful	Agree	53.3	52.8	-.5	1.00	.982
Students accepting one as he/she is	Agree	67.4	61.8	-5.6	.80	.231
Teacher support						
Teachers accepting one as he/she is	Agree	75.1	78.1	3.0	1.23	.348
Teachers caring	Agree	49.8	52.6	2.8	1.15	.426
Feeling a lot of trust in teachers	Agree	65.1	67.5	2.4	1.16	.462
School perception						
Feeling about school	I like it a lot	81.1	82.9	1.8	1.14	.586
Pressure by schoolwork	Some or a lot	72.2	72.7	.5	.99	.947
Bullying						
Taking part in bullying another student at school, last two months	Yes	44.2	42.9	-1.3	.97	.889
Being bullied at school, last two months	Yes	50.2	46.5	-3.7	.86	.402
Taking part in cyber-bullying, last two months	Yes	20.3	18.7	-1.6	.92	.708
Being cyber-bullied, last two months	Yes	14.1	22.3	8.2	1.82	.011
Physical fighting						
Having a physical fight, last year	Yes	31.7	29.4	-2.3	.92	.688
Injuries						
Being injured with treatment needed, last year	Yes	48.8	57.6	8.8	1.45	.036

3.3 Family Environment

The evaluation of schoolchildren's family environment revealed that there were almost no differences depending on survey mode (Table 5). The children in paper mode reported slightly better family communication and support, but this was nonsignificant ($P=0.068$). All other indicators did not reach a 5%-point difference and, regarding items on family affluence, the differences by paper mode were also minor.

Table 5. Family-related perceptions of schoolchildren by survey mode.

Characteristic		Prevalence, %		% difference	OR	P
		Electronic	Paper			
Communication						
Ease to talk about things that really bother: to father	Easy	63.2	69.7	6.5	1.43	.068
Ease to talk about things that really bother: to stepfather	Easy	11.5	15.5	4.0	1.48	.221
Ease to talk about things that really bother: to mother	Easy	79.7	82.0	2.3	1.15	.526
Ease to talk about things that really bother: to stepmother	Easy	9.6	10.1	.5	1.08	.848
Support						
Family really tries helping	Agree	92.0	93.7	1.7	1.29	.461
Getting emotional help and support from family	Agree	83.9	88.0	4.1	1.43	.164
Being able to talk about problems with family	Agree	69.3	71.2	1.9	1.13	.537
Family is willing to help in making decisions	Agree	86.6	90.3	3.7	1.45	.183
Affluence						
Own bedroom	Yes	81.2	81.4	.2	1.02	.941
Dishwasher at home	Yes	62.5	59.7	-2.8	.87	.496
Bathrooms at home	One or more	97.7	97.8	.1	1.03	.958
Family car	One or more	95.0	93.7	-1.3	.78	.525
Computers at home	One or more	97.3	97.7	.4	1.15	.806
Family travel abroad for vacation, last year	Once or more	86.5	81.6	-4.9	.68	.129

3.4 Electronic Media Communication

The survey included three main aspects of electronic communication - online contact with friends, preference for online communication, and social media addiction (Table 6). Here there were two trends: in electronic mode, children reported using social media more as a way to escape from negative feelings and having conflicts with family members because of social media use (.001<P<.05). All other items were indifferent by mode and rarely exceeded a 5%-point difference.

Table 6. Electronic media communication of schoolchildren by survey mode.

Characteristic		Prevalence, %		% difference	OR	P
		Electronic	Paper			
Online contact with friends and others						
Close friend(s)	Every day	66.7	63.3	-3.4	.81	.277
Friends from a larger friend group	Every day	37.9	40.6	2.7	.12	.535
Friends that you got to know through the internet but didn't know before	Every day	11.5	14.7	3.2	1.32	.302
Other people than friends	Every day	44.8	47.7	2.9	1.11	.563
Preference for online communication						
On the internet, I talk more easily about secrets than in a face-to-face encounter	Agree	27.3	25.7	-1.6	.93	.725
On the internet, I talk more easily about my inner feelings than in a face-to-face encounter	Agree	26.8	22.4	-4.4	.78	.238
On the internet, I talk more easily about my concerns than in a face-to-face encounter	Agree	27.6	20.1	-7.5	.67	.054
Social media addiction						
Regularly felt dissatisfied because you wanted to spend more time on social media	Yes	16.9	18.0	1.1	1.03	.912
Often felt bad when you could not use social media	Yes	27.2	25.7	-1.5	.88	.528
Tried to spend less time on social media, but failed	Yes	28.7	25.3	-3.4	.81	.284
Regularly neglected other activities (e.g. hobbies, sport) because you wanted to use social media	Yes	13.8	12.4	-1.4	.90	.700
Regularly had arguments with others because of your social media use	Yes	14.9	12.0	-2.9	.76	.290
Regularly lied to your parents or friends about the amount of time you spend on social media	Yes	17.2	16.1	-1.1	.89	.628
Often used social media to escape from negative feelings	Yes	30.3	22.5	-7.8	.64	.030
Had serious conflict with your parents, brother(s) or sister(s) because of your social media use	Yes	21.8	13.5	-8.3	.49	.004
Regularly found that you can't think of anything else but the moment that you will be able to use social media again	Yes	40.6	39.9	-.7	.93	.704

3.5 Procedure-Specific Findings

In this study, the environment and circumstances of the survey were also documented in order to depict the procedure-specific findings. So, during the survey and especially in online mode some participants were able to see the adjacent participants' responses, thus infringing the privacy of other responders. In addition, the teachers sometimes refused to leave the classroom even when asked.

It was also observed that some schoolchildren were not content with the assigned mode of the survey. However, this was not mode-specific: some adolescents expressed the wish to move from paper mode to electronic, while others vice versa. The former ones were keener to choose the electronic device (computer or tablet) instead of paper, while the latter preferred more privacy. Of note, some students were concerned about the split of the class into different modes as if treated unequally.

4 DISCUSSION

Electronic research mode is very convenient for large-scale studies. In order to address the possible effect of survey mode on its results, we conducted a randomized study to eliminate the potential for selection bias within the study sample. This is the main strength of our study since the previous research has quite frequently neglected the issue of self-selection bias that arises in non-randomized studies. This is especially relevant across different social conditions such as schools, where some of them may have better resources to prefer online mode, either through better financing or through higher quality of educational services. So, by the study design, our study avoided the possible self-selection bias or school-specific differences by randomizing the schoolchildren within classes. We also adjusted the calculations by main sociodemographic indicators that could affect the differences. Besides, the inclusion of different size schools from bigger and smaller urban areas also increased the diversity of schoolchildren.

However, when discussing our study weaknesses, we had a limited sample size, which potentially led to an underestimating of the statistical significance of differences, especially when controlling for multiplicity. Nevertheless, we found that in the majority of cases the differences between the modes were small and did not exceed a 5% point. For such five percent differences to detect as statistically significant at $P < 0.05$ level, we would have needed the sample from 431 to 1,559 per arm - and this without the multiplicity correction that was applied in our study (for $P < 0.01$ 640 and 2,315 participants would be needed (15), respectively, and for $P < 0.001$ even more). Compared to previous studies, our sample size was rather medium, and we had no intention to find minor differences as statistically significant. After all, the fact that absolute differences between the modes were inconsistent (i.e. not showing better health behaviours in either mode) suggests the likely absence of substantial differences.

Another limitation of our study was the lack of replicability since our study participants had an opportunity to fill in the questionnaire only in one of the modes. Therefore, the assessment of the consistency of results within individuals was not possible. This occurred because we raised no question regarding the particular subject's replicability of responses - rather, we had an interest in comparing the population (i.e. study sample) estimates.

Overall, our study findings revealed that differences by study mode are virtually absent and in the majority of cases do not exceed five percent difference between the modes. These findings do not have many studies to compare with since the schoolchildren's health behaviours have rarely been addressed in previous research on survey modes. The study on the HBSC sample was previously

reported by Vereecken and Maes (6) in Belgium. Their findings showed some differences by mode, but our results did not support them. We did not detect those differences not only due to a smaller sample size (i.e. lower power of the study) but rather due to the absence of absolute difference.

That same study (6) noted that for several questions about feelings and affective states more socially desirable responses were found in paper format. However, in our case, this was not observed. Even though we saw some larger differences when assessing social support measures, this was also inconsistent. The fact that the adolescents provide equivalent responses in paper and computer formats was also found elsewhere (16).

It was found that adolescents were more likely to report substance use and less desirable aspects of psychological well-being using a digital format (17). However, we found that subjective health was reported as slightly better in paper mode (like Smith et al. (18) in the military sample), while higher life satisfaction was reported as better in electronic mode, which does not suggest the consistency of mode effect.

The issue of different responses by survey mode has been addressed with other samples as well. For example, patients after knee surgery reported similar levels of daily functioning, quality of life, pain intensity as well as symptoms (19). Similarly, for college students in education and psychology, the survey mode did not have strong differential effects on data quality regarding the learning environment and perceptions (20). One study on military participants found some differences in health behaviours by mode, though like our study they did not exceed five percent (18).

We also compared the internal consistency of scales. Previous studies demonstrated that electronic mode is likely to show higher internal consistency compared to the paper, with differences by up to .30 (16), however, in our study there was no superiority of either mode (differences did not exceed .07). Some other studies also showed no relevant differences in psychometric properties by mode (21).

Previous research suggests that young people are keener to choose the electronic than the paper version (22), while the studies of other samples are rather ambivalent: for instance, the study on people who take supplements and vitamins found the electronic version as more acceptable (1, 23), while HIV patients preferred the paper version (24). Interestingly, our procedure-specific findings also indicate ambiguity, since some children preferred to move to electronic, while others to paper mode. This was rather unexpected due to the hypothesized preference of digital natives toward electronic mode. It could be explained by the fact that maintaining privacy was an issue during this

study, especially when filling in electronic questionnaires on desktop computers: schoolchildren were able to see the answers of adjacent classmates, which could have made them feel insecure. Additionally, in some classes, the teachers refused to leave the room, which may interfere with the confidentiality perceptions of children and the sincerity of their responses. The fact that some schoolchildren complained about having different survey modes across the class implies that, in the future, a class as an entity should preferably be investigated using the same mode.

Regarding the cost-effectiveness of the shift from paper mode to an electronic mode in our study, the main difference was related to expenses for paper and printing the questionnaire as well as typing in the responses from paper to database. In addition, the probability of data typing errors in case of the electronic mode is virtually zero. Nevertheless, the shift toward electronic mode should be approached carefully: if the survey is going to be uploaded online with a non-restricted access, the study participants cannot be controlled. This may further result in a situation where some subjects submit several questionnaires, or they do not meet the eligibility criteria for age or other relevant characteristics. It should be emphasized that in online surveys the basic concern is related to the problem of who really fills in the questionnaire and if they meet the eligibility criteria of the study. This should be controlled whenever possible.

5 CONCLUSIONS

Summarizing our study, it can be stated that the comparison of electronic and paper mode in the research of health and social behaviours among schoolchildren revealed no consistent differences between the modes. There were some items or questions that had larger differences between the survey modes, however, they did not have a trend to be healthier or more socially desirable in one particular mode. This suggests that, in the future, the use of electronic questionnaires in surveys of schoolchildren may provide findings that are comparable with concurrent or previously conducted paper surveys. However, this does not relieve the concerns related to electronic surveys where the study participants are not controlled in terms of eligibility criteria. Thus, when the electronic survey responders are unknown, this still threatens the validity of study findings.

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CONFLICTS OF INTEREST

The authors declare that no conflicts of interest exist.

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ETHICAL APPROVAL

The study protocol was approved by the Ethics Committee at the Lithuanian University of Health Sciences, reference number BEC-SP(B)-129, and it conforms to the provisions of the Declaration of Helsinki in 1995 (as revised in Edinburgh in 2000).

REFERENCES

1. Touvier M, Méjean C, Kesse-Guyot E, Pollet C, Malon A, Castetbon K, et al. Comparison between web-based and paper versions of a self-administered anthropometric questionnaire. *Eur J Epidemiol.* 2010;25(5):287-96. doi: 10.1007/s10654-010-9433-9.
2. Bech M, Kristensen MB. Differential response rates in postal and web-based surveys among older respondents. *Surv Res Methods.* 2009;3:1-6. doi: 10.18148/srm/2009.v3i1.592.
3. Couper MP. The future of modes of data collection. *Public Opin Q.* 2011;75:889-908. doi: 10.1093/poq/nfr046.
4. Steelman ZR, Hammer B, Limayem M. Data collection in the digital age: innovative alternatives to student samples. *MIS Q.* 2014;38:355-78. doi: 10.25300/MISQ/2014/38.2.02.
5. van Gelder MMHJ, Bretveld RW, Roeleveld N. Web-based questionnaires: the future in epidemiology? *Am J Epidemiol.* 2010;172:1292-8. doi: 10.1093/aje/kwq291.
6. Vereecken CA, Maes L. Comparison of a computer-administered and paper-and-pencil administered questionnaire on health and lifestyle behaviors. *J Adolesc Health.* 2006;38:426-32. doi: 10.1016/j.jadohealth.2004.10.010.
7. Inchley J, Currie D, Cosma A, editors. *Health Behaviour in School-aged Children (HBSC) study protocol: background, methodology and mandatory items for the 2017/18 survey.* St Andrews: CAHRU, 2018.
8. Torsheim T, Cavallo F, Levin K, Schnohr C, Mazur J, Nielsen B, et al. Psychometric validation of the revised family affluence scale: a latent variable approach. *Child Indic Res.* 2015;9:771-84. doi: 10.1007/s12187-015-9339-x.
9. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *J Pers Assess.* 1988;52:30-41. doi: 10.1207/s15327752jpa5201_2.
10. Torsheim T, Samdal O, Rasmussen M, Freeman J, Griebler R, Dür W. Cross-national measurement invariance of the teacher and classmate support scale. *Soc Indic Res.* 2012;105:145-60. doi: 10.1007/s11205-010-9770-9.

11. Mascheroni G, Ólafsson K. Net children go mobile: cross-national comparisons: report D3.3. Milano: Educatt, 2014.
12. Peter J, Valkenburg P. Individual differences in perceptions of internet communication. *Eur J Commun.* 2006;21:213-26. doi: 10.1177/0267323105064046.
13. Van den Eijnden RJ, Lemmens JS, Valkenburg PM. The social media disorder scale. *Comput Human Behav.* 2016;61:478-87. doi: 10.1016/j.chb.2016.03.038.
14. Inchley J, Currie D, Young T, Samdal O, Torsheim T, Augustson L, et al. Growing up unequal: gender and socioeconomic differences in young people's health and well-being. World Health Organisation, Health Policy for Children and Adolescents, 2016;7. Accessed March 19th, 2018 at: http://www.euro.who.int/__data/assets/pdf_file/0003/303438/HSBC-No.7-Growing-up-unequal-Full-Report.pdf.
15. Chow S, Shao J, Wang H. Sample size calculations in clinical research. 2nd ed. Chapman & Hall/CRC Biostatistics Series, 2008:89.
16. Norman GJ, Sallis JF, Gaskins R. Comparability and reliability of paper- and computer-based measures of psychosocial constructs for adolescent physical activity and sedentary behaviors. *Res Q Exerc Sport.* 2005;76:315-23. doi: 10.1080/02701367.2005.10599302.
17. Wright DS, Aquilino W, Supple A. A comparison of computer-assisted and paper-and-pencil self-administered questionnaires in a survey on smoking, alcohol, and drug use. *Public Opin Q.* 1998;62:331-53. doi: 10.1086/297849.
18. Smith B, Smith TC, Gray GC, Ryan MAK. When epidemiology meets the internet: web-based surveys in the millennium cohort study. *Am J Epidemiol.* 2007;166:1345-54. doi: 10.1093/aje/kwm212.
19. Bojcic JL, Sue VM, Huon TS, Maletis GB, Inacio MCS. Comparison of paper and electronic surveys for measuring patient-reported outcomes after anterior cruciate ligament reconstruction. *Perm J.* 2014;18:22-6. doi: 10.7812/TPP/13-142.
20. Hardré PL, Crowson HM, Xie K, Ly C. Testing differential effects of computer-based, web-based and paper-based administration of questionnaire research instruments. *Br J Educ Technol.* 2007;38(1):5-22. doi: 10.1111/j.1467-8535.2006.00591.x.
21. Riva G, Teruzzi T, Anolli L. The use of the internet in psychological research: comparison of online and offline questionnaires. *Cyberpsychol Behav.* 2003;6:73-80. doi: 10.1089/109493103321167983.
22. Miller ET, Neal DJ, Roberts LJ, Baer JS, Cressler SO, Metrik J, et al. Test-retest reliability of alcohol measures: is there a difference between Internet-based assessment and traditional methods? *Psychol Addict Behav.* 2002;16:56-63. doi: 10.1037/0893-164X.16.1.56.
23. Carvalho JC, Declerck D, De Vos E, Kellen J, Van Nieuwenhuysen JP, Vanobbergen, et al. Validation of the oral survey-b system for electronic data capture in national oral health surveys. *Caries Res.* 2016;50:288-94. doi: 10.1159/000445446.
24. Duracinsky M, Lalanne C, Goujard C, Herrmann S, Cheung-Lung C, Brosseau JP, et al. Electronic versus paper-based assessment of health-related quality of life specific to HIV disease: reliability study of the PROQOL-HIV questionnaire. *J Med Internet Res.* 2014;16(4):e115. doi: 10.2196/jmir.3330.

SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED WITH SMOKING HABITS AMONG UNIVERSITY STUDENTS IN BELGRADE, SERBIA

SOCIODEMOGRAFSKI DEJAVNIKI, POVEZANI S KAJENJEM, PRI ŠTUDENTIH V BEOGRADU, SRBIJA

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ABSTRACT

Keywords:

students, faculties,
smoking, tobacco

Background: Smoking rates in Serbian adults are among the highest in Europe. The objective of this study is to assess the prevalence of smoking and smoking-related behaviours of Belgrade University students depending on their sociodemographic characteristics and faculty group.

Methods: A cross-sectional study was carried out among 2,608 Belgrade University students (59.6% female) in 2015. A self-administered questionnaire was applied to the opportunity sample to collect the data describing students' smoking habits and attitudes across all 30 faculties of the university.

Results: 30.5% of students reported smoking: 26.4% of medical, and 31.1% of non-medical ones. Smoking rate among female students was 31.2% vs. 29.5% among males. Age ($p=0.001$), relationship (<0.001) and employment status ($p=0.002$) had statistically significant influence on smoking status, while the differences in smoking status between genders ($p=0.141$) and medical and non-medical group of students ($p=0.066$) were not statistically significant. The highest percentage of students started smoking during high school (66.2%). As the most common reason to start smoking, respondents cited peer influence (36.5%). 44.3% of students who smoked unsuccessfully tried to quit smoking.

Conclusion: To combat high smoking prevalence among a younger population, the formal education of students about the adverse impacts of smoking should be integrated in all active anti-smoking programs. Medical students, as future healthcare professionals, can play an important role in smoking rates reduction among both younger and general populations, if properly trained and educated about smoking prevention and cessation techniques.

IZVLEČEK

Ključne besede:

študenti, fakultete,
kajenje, tobak

Ozadje: Stopnja kajenja pri odraslih v Srbiji je med najvišjimi v Evropi. Cilj te študije je bil ovrednotiti razširjenost kajenja in vedenj, povezanih s kajenjem, med študenti beograjske univerze glede na njihove sociodemografske značilnosti in fakulteto, ki jo obiskujejo.

Metode: V letu 2015 smo med 2608 študentov v Beogradu (59,6 % žensk) izvedli presečno raziskavo. Uporabili smo samoodzivni vprašalnik, ki je zbiral podatke o kadilskih navadah in o odnosu študentov vseh 30 beograjskih fakultet do kajenja.

Rezultati: Da kadi, je poročalo 30,5 % študentov: 26,4 % študentov medicine in 31,1 % študentov drugih fakultet. Stopnja kajenja pri študentkah je bila 31,2-odstotna, pri študentih pa 29,5-odstotna. Starost ($p = 0,001$), stan ($< 0,001$) in zaposlitveni status ($p = 0,002$) so statistično značilno vplivali na status kajenja, medtem ko spol ($p = 0,141$) in študijska smer (medicina vs. nemedicina) ($p = 0,066$) nista bila statistično značilna. Največ študentov je začelo kaditi v srednji šoli (66,2 %). Kot najpogostejši razlog za začetek kajenja so anketiranci navedli vpliv vrstnikov (36,5 %). Neuspešno je poskušalo prenehati kaditi 44,3 % študentov.

Zaključek: V boj proti kajenju med mlajšo populacijo je v formalno izobraževanje študentov o škodljivih učinkih kajenja treba vključiti tudi vse aktivne protikadilske programe. Študenti medicine lahko imajo kot bodoči zdravstveni delavci pomembno vlogo pri zmanjševanju števila kadilcev pri mlajši in splošni populaciji, če so seveda ustrezno izobraženi o preprečevanju kajenja in poznajo tehnike prenehanja kajenja.

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1 INTRODUCTION

According to the World Health Organization (WHO) data from 2008, 5.4 million deaths each year were attributed to tobacco (1). This number had risen to over 7 million annually by 2015 (2). WHO estimates that tobacco kills up to half of its users globally (3), and the same death rate is reported in 2014 by the European Commission for the European Union (EU) countries, where 50% of smokers die prematurely (14 years earlier on average) (4).

Average smoking rates are declining globally (WHO: 24% in 2007 - 21% in 2015) (2), but the number of smokers stagnates as the world population grows (5).

WHO estimated that out of 1.1 billion smokers in the world in the beginning of the 1990s, 800 million were from developing countries (5). The number of smokers remains unchanged to this day. Around 80% of smokers live in developing countries (3).

As WHO reported, the smoking rate in the Serbian population aged over 15 years stood at 33% in 2015. There were only six other European countries with smoking rates exceeding the 30% threshold: Montenegro (38%), Greece (35%), Russia (33%), Bosnia and Herzegovina (32%), Croatia (32%), and Latvia (31%). Results achieved in Slovenia and Albania, where the smoking rates in 2015 were 19% and 23% respectively, are an important reminder of the milestones Serbia should set as well (2).

A national health survey conducted in Serbia in 2013 showed smoking prevalence in persons over the age of 15 to be 34.7%: 31.6% among females (F) and 37.9% among male population (M). In particular, smoking prevalence in the age group of 15-24 years was 26%, increasing to 44.1% at 25-34 years (6).

In comparison to Serbia, the overall smoking prevalence in the EU in 2014 was lower (26%), but a larger share of young Europeans aged 15-24 were smokers (29%) (4). Similarly, Slovenia had a higher smoking prevalence among the younger population (25.2% in 15-year-olds, 2014 data) (7), than the overall smoking rate was (19%) (2).

Tobacco-related deaths in Serbia were estimated by WHO at 1.23 million of 2.46 million smokers in 2016. The death rate might even increase unless stronger tobacco-control policies are enforced (8). Although Serbia has significantly advanced its tobacco-control agenda, the smoking rate in the country is still high. Serbia signed the WHO Framework Convention on Tobacco Control (WHO FCTC) (9) in 2006, and smoke-free law was adopted in 2010 (10). Some of the key tobacco-control measures in line with the WHO FCTC and national laws (8-11) are:

- Protection from second-hand smoke at public indoor places (public transportation, educational, health, government facilities, but not at bars and restaurants)

- Access to smoking-cessation services at some healthcare facilities, covered by the national Health Insurance Fund
- Health warnings placed on cigarette packages (without accompanying graphic images)
- Gradual cigarette taxes increase (closing the gap between Serbian and EU cigarette prices)
- Occasional low-level media campaigns
- Restrictions on tobacco industry advertising, promotions and sponsorships

A smoke-free lifestyle should be promoted from childhood, and strengthened through school education (12). Healthcare professionals can influence their patients' smoking habits. There are plenty of studies on medical students' tobacco-related behaviour and attitudes, but non-medical faculties are barely analysed (13). Some authors marked the period of studying as the period of increased risk for students to start smoking or continue smoking more intensively, which is attributed to the additional stress, lack of restrictions/control from parents or regulations, social integration, and accessibility to tobacco (14).

Warren et al. reported that a high percentage of medical students from Serbia believed that health workers play a role in advising patients on quitting smoking (89.9%, 2006 data), and that health workers should get specific training on this subject (81.5%), but relatively modest formal training in smoking cessation was offered at medical schools (21.3% of participants from Serbia received any formal training in smoking cessation) (15).

We found no published data about the student population in Serbia analysed as per multiple predictors such as sociodemographic characteristics, factors of smoking pertaining to the social environment (influence of friends, family, social experiences, education), psychological indicators (behaviours, motives, attitudes), all investigated from an academic background perspective (by faculty group). Our research took all the listed variables into consideration when assessing smoking among Belgrade University students.

2 MATERIALS AND METHODS

The research objectives of our cross-sectional study were to assess the prevalence of smoking and smoking behaviours, motives, experiences and attitudes of undergraduate students attending the University of Belgrade (BU). Smoking prevalence was analysed by gender and faculty group. Smoking behaviours (smoking onset, length of smoking, and attempt to quit smoking) and motives (presence of smokers in the family and reasons for starting smoking) were analysed by faculty group. We analysed the differences in smoking experiences and

attitudes by sociodemographic characteristics, faculty group, and smoking status to estimate the influence of each variable on the smoking habits of students.

Particular attention was given to the differences in analysed variables between medical and non-medical students.

The survey was conducted between February and October 2015 among 2,608 students of all faculties at BU.

The selection criteria for participants were (a) studying at BU and (b) consent to participate in the research (outlined in the questionnaire introduction).

We chose BU, being the biggest and oldest university in Serbia, with enrolment of students from across the country accounting for 36% of total higher education students in Serbia (16). BU has 30 faculties seated in Belgrade divided in four sections: 4 Faculties of Medical Sciences (MF), 10 Faculties of Social Sciences and Humanities (SSHf), 6 Faculties of Natural Sciences and Mathematics (NSMF), and 10 Faculties of Technology and Engineering Sciences (TESF).

For the purposes of our research, the students were classified as per faculty groups. SSHf, NSMF, and TESF were observed as a single group of non-medical faculties (NMF) and the results were interpreted in comparison to the findings pertaining to the medical faculties (MF). Where no statistically significant differences were detected between MF and NMF, the differences were also investigated among the three sub-groups of NMF.

Respondents were classified according to their smoking status as:

- Non-smokers
- Ex-smokers
- Smokers

An anonymous self-administered questionnaire was designed specifically for this research. It contained 31 questions divided in four sections. Part one was applied to all respondents. It included questions on different sociodemographic factors and smoking status, and 5 questions about tobacco-related experiences and attitudes toward smoke-free legislation.

Three subsequent parts were applied to smokers, ex-smokers or non-smokers only. Depending on the reported smoking status, the participants were asked about onset age, length of smoking, reasons for starting/quitting smoking, number of smokers in the family, smoking habits and effects, attempts to quit smoking, and exposure to second-hand tobacco smoke.

The questionnaire was piloted among 50 students, in order to affirm whether the questions were clearly formulated. Reproducibility was estimated through a one-month test-retest among 50 students.

We used an opportunity sample comprised of students available at the time the study was carried out. To minimize the sample selection bias, the classes during which the questionnaires were administered were not chosen according to any prior scheme or selection criteria. The class sessions were mandatory for all the students of particular faculties and the researchers had no control or influence over the structure of attendees.

The sample was designed to include at least 5% (2,455) of the BU student population (49,105 - as per the total enrolment data provided by each faculty of the BU). The response rate of 98.9% was higher than expected, so the total number of participants reached 2,608 (5.3% instead of the planned 5% of the population).

The sample followed the population distribution by faculty groups and gender. The data on population structure by age/year of study was not available and, for potential differences in those variables, no weighting adjustments were applied as the population distribution was unknown. Program SPSS (SPSS 22.0 for Windows, SPSS Inc., Chicago, IL, USA) was used for collected data analysis. Descriptive statistics were used to describe the variables in the research. The data was analysed using a nonparametric chi-square (χ^2) test with a post-hoc Bonferroni test (when conducting multiple intragroups comparisons simultaneously). The significance level was set at 0.05. When χ^2 test indicated an overall significant difference between multiple groups, we were applying adjusted p value (Bonferroni correction) (17).

3 RESULTS

The total number of the students participating in the research was 2,608 (59.6% female). 12.6% of the respondents were from MF and 87.4% from NMF.

The distribution of sampled students by sociodemographic characteristics and faculty groups is presented in Table 1. The sample distribution by gender and faculty groups approximated the population structure. In the academic year 2015/16 (16), 59.6% of BU students were females, 12% were attending MF.

Table 1. Distribution of students by sociodemographic characteristics and faculty group.

Faculty Group / Sociodemographic characteristics	MF (n=329) 12.6%	TOTAL NMF (n=2,279) 87.4%	SSHF (n=1,225) 47%	NSMF (n=200) 7.7%	TESF (n=854) 32.7%	TOTAL (n=2,608) 100%
Gender (%)						
Female	63.5	59.1	68.9	66.0	43.3	59.6
Male	36.5	40.9	31.1	34.0	56.7	40.4
Age (Mean±Sd)	24.3±1.6	23.7±2.7	24.2±2.9	23.3±1.8	23.2±2.5	23.8±2.6
Year of study (%)						
I	9.4	22.2	17.4	24.2	28.5	20.5
II	18.9	22.6	16.9	30.4	29.0	22.1
III	52.5	24.5	26.2	21.6	22.8	28.1
IV	14.5	21.0	27.6	20.1	11.9	20.2
V	4.7	9.7	12.0	3.6	7.9	9.1

Average age of the respondents was 23.8±2.6 years. The third year of studying prevailed (28.1% vs. 9.1-22.1%).

The results of analysed influence of 4 predictors of smoking status are shown in Table 2.

Table 2. Smoking status and sociodemographic characteristics of students.

Predictors	Pearson's χ^2 test	P value	Statistically significant influence of predictors on smoking status
Gender	3.9	0.141	-
Age	15.1	0.001	Ex-smokers - ≤25 Ex-smokers - >25
Faculty group MF, SSHF, NSMF, TESH	14.4	0.025	Smoking status - MF and SSHF Smoking status - NSMF and SSHF
MF, NMF	5.4	0.066	-
Year of study	8.2	0.411	-

Age (p=0.001) and faculty group (p=0.025, all four groups analysed) had a statistically significant influence on smoking status.

There were no statistically significant differences in smoking status between students of MF and NMF (p=0.066). When all four faculty groups were included in the analysis, statistically significant differences in smoking status of students from MF and SSHF were discovered, as well as between those attending NSMF and SSHF.

An overview of the smoking status of the students by faculty group and gender is presented in Table 3.

Table 3. Smoking status of students by faculty group and by gender.

Faculty Group		Smoking status								P (Gender/ Smoking status)
		Non-smokers		Ex-smokers		Smokers		TOTAL		
		n	%	n	%	n	%	n	%	
MF	Female	149	71.3	6	2.9	54	25.8	209	8.0	0.224
	Male	79	65.8	8	6.7	33	27.5	120	4.6	
NMF	Female	842	62.6	73	5.4	431	32.0	1346	51.6	0.244
	Male	591	63.3	64	6.9	278	29.8	933	35.8	
SSHF	Female	517	61.3	46	5.5	281	33.3	844	32.4	0.029
	Male	230	60.4	36	9.4	115	30.2	381	14.6	
NSMF	Female	90	68.2	4	3.0	38	28.8	132	5.1	0.587
	Male	51	75.0	2	2.9	15	22.1	68	2.6	
TESF	Female	235	63.5	23	6.2	112	30.3	370	14.2	0.871
	Male	310	64.0	26	5.4	148	30.6	484	18.6	
TOTAL MF		228	69.3	14	4.3	87	26.4	329	12.6	0.066
TOTAL NMF		1433	62.9	137	6.0	709	31.1	2279	87.4	
TOTAL FEMALE		991	63.7	79	5.1	485	31.2	1555	59.6	0.141
TOTAL MALE		670	63.6	72	6.8	311	29.5	1053	40.4	
TOTAL		1661	63.7	151	5.8	796	30.5	2608	100.0	

The prevalence of smokers was lower among medical students than among non-medical ones (MF: 26.4% vs. NMF: 31.1%), but this difference was not statistically significant ($p=0.066$).

Although the percentage of smokers was higher among women (31.2% vs. 29.5%), the gender difference in smoking status among students was not statistically significant ($p=0.141$).

The analysis of smoking-related experiences and attitudes of students depending on their sociodemographic characteristics, faculty group, and smoking status is depicted in Table 4.

Table 4. Smoking experiences and attitudes of students by sociodemographic characteristics, faculty group and smoking status.

Predictors	Experience / Attitude									
	Attendance to tobacco industry sponsored event		Supporting the smoking ban		Compliance with the smoking ban at my faculty		There is a sufficiently broad debate about the harmful effects of smoking at my faculty		Adequate public health training is provided at my faculty	
	%	p	%	p	%	p	%	p	%	p
Gender										
Female	18.1	0.001	78.8	<0.001	61.7	0.251	11.5	0.377	12.2	0.066
Male	24.1		72.9		60.7		13.0		15.2	
Age										
≤25	18.6	<0.001	75.4	0.018	60.9	0.091	11.7	0.179	13.3	0.415
>25	30.1		81.5		62.8		14.2		13.5	
Faculty group										
MF	16.8	0.256	83.5	0.001	57.2	<0.001	35.8	<0.001	41.1	<0.001
SSHf	22.5		75.1		65.2		8.2		7.5	
NSMF	19.6		81.8		57.7		13.6		13.6	
TESF	19.3		74.2		58.1		8.2		11.1	
Year of study										
I	15.0	<0.001	70.3	0.001	62.1	0.005	11.4	<0.001	14.7	<0.001
II	18.3		75.0		65.0		9.2		10.5	
III	19.0		76.7		53.9		16.3		16.7	
IV	25.7		81.3		64.8		11.5		11.1	
V	28.9		84.2		63.2		10.5		10.7	
Smoking status										
Non-smokers	18.2	0.002	83.4	<0.001	60.7	0.011	11.6	0.002	14.1	0.061
Ex-smokers	28.7		75.8		59.7		8.7		11.6	
Smokers	23.7		62.1		62.8		13.9		12.4	
Total	20.5		76.4		61.3		12.1		13.4	

Experience with tobacco industry sponsored events depended on gender ($p=0.001$), age ($p<0.001$), year of study ($p<0.001$; I, IV and V year of study were statistically significant, as revealed using Bonferroni correction), and smoking status ($p=0.002$; non-smokers had statistically significant influence). Events sponsored by the tobacco industry were mostly visited by male students (24.1% vs. 18.1%), students older than 25 years (30.1% vs. 18.6%), fifth-year students (28.9% vs. 15.0-25.7%), and students who were ex-smokers (28.7% vs. 18.2-23.7%).

Support of the smoking ban at educational institutions depended on gender ($p<0.001$), faculty group ($p=0.001$; MF category had a statistically significant influence), year of study ($p=0.001$; I year of study was statistically significant) and smoking status ($p<0.001$; non-smokers and smokers). A smoking ban was supported by 76.4% of all students, mostly by females (78.8% vs. 72.9%), non-smokers students (83.4% vs. 62.1-75.8%), fifth-year students (84.2% vs. 81.3-70.3%), and those attending MF (83.5% vs. 81.8-74.2%).

Students' perception of the compliance with the smoking ban at their faculties was significantly influenced by their faculty group ($p<0.001$; SSHf), year of study ($p=0.005$; III year of study) and smoking status ($p=0.011$; smokers and non-smokers). The respondents who stated that the smoking ban was adhered to at their faculties were mostly smokers (62.8% vs. 59.7-60.7%), second-year students (65% vs. 53.9-64.8%), and those attending SSHf (65.2% vs. 57.2-58.1%).

Faculty group ($p<0.001$; MF, SSHf and TEsF), year of study ($p<0.001$; III year of study) and smoking status ($p=0.002$; smokers and non-smokers) were statistically significant factors influencing the positive perception of the students on whether the harmful effects of smoking were sufficiently discussed at their faculties. The highest percentage of MF students (35.8% vs. 8.2-13.6%) and those in the third year of study (16.3% vs. 9.2-11.5%) believed that the adverse effects of smoking were addressed to a sufficient extent, and this perception was more common in smokers than in ex-smokers and non-smokers (13.9% vs. 8.7-11.6%).

Only two of the analysed variables (faculty group - MF and SSHF and year of study - III) had a statistically significant influence ($p < 0.001$) on the students' attitude that perception that public health training was provided at their faculties.

The results of the analysis of smoking-related behaviours and motives of smokers per faculty group can be found in Table 5.

Table 5. Smoking behaviours and motives of students who smoked per faculty group.

Smoking behaviours and motives	FACULTY GROUP (%)						P (Behaviours & motives / Faculty group)
	MF	TOTAL NMF	SSHF	NSMF	TESF	TOTAL	
Smoking onset							
In elementary school	9.0	8.7	8.1	15.2	8.3	8.7	0.555
In high school	62.8	66.6	66.9	54.3	68.5	66.2	
At faculty	28.2	24.7	24.9	30.4	23.2	25.1	
Length of smoking							
Less than a year	10.3	13.4	11.5	28.3	13.5	13.1	0.068
1-5 years	71.8	67.1	67.5	58.7	68.0	67.6	
Over 5 years	17.9	19.5	21.0	13.0	18.4	19.3	
Presence of smokers in the family							
No	34.6	29.8	28.2	18.2	34.6	30.4	0.084
Yes	65.4	70.2	71.8	81.8	65.4	69.6	
One smoker	23.1	27.6	29.5	25.0	25.1	27.1	0.088
Two smokers	20.5	28.5	29.0	34.1	26.7	27.6	
Three smokers	7.7	7.3	7.8	13.6	5.3	7.3	
More than three smokers	14.1	6.8	5.6	9.1	8.2	7.6	
Reasons for starting smoking							
Stress	15.5	15.7	16.1	18.8	15.2	15.9	0.111
Peer influence	37.9	36.3	37.8	34.4	34.3	36.5	
Pleasure and party	15.5	14.7	16.8	3.1	13.5	14.8	
Personal attitude/choice	31.0	27.2	24.5	43.8	28.1	27.4	
I do not know/remember	0.0	6.0	4.9	0.0	9.0	5.4	
Attempted to quit smoking							
Yes	52.6	43.3	44.1	34.9	43.6	44.3	0.289
No	47.4	56.7	55.9	65.1	56.4	55.7	

As the most common reason to start smoking, respondents cited peer influence (34.3-37.9%) compared to personal attitude (24.5-43.8%), stress (15.2-18.8%), pleasure and party (3.1-16.8%). 5.4% of all smokers were not aware or had no recollection of the reason.

NSMF had the highest percentage of students who smoked that had smokers in their families (81.8% vs. 71.8-65.4% in SSHF and TESH respectively and 65.4% in MF). More than three smokers in the family was the most frequent occurrence among smokers from MF (14.1%).

55.7% of all smokers never tried to quit smoking. Over half of medical students (52.6% vs. 34.9-44.1%) did try to quit smoking.

4 DISCUSSION

Although data on smoking prevalence in Serbian medical students is available (15, 18), much less is known about smoking prevalence, behaviours, motives, experiences, and attitudes among other students. Studies addressing smoking in university settings in Serbia were usually limited to a specific age group (year of study), certain group of students, or focused on general health issues, without investigating smoking-related behaviours and attitudes (18-21). Our research included all medical and non-medical BU faculties, assessing both smoking prevalence and other smoking-related variables.

In 2009, a cross-sectional study about the health-related quality of life of BU students was carried out at The Institute for Students' Health of Belgrade University. The survey sample included 1.8% of BU students from all faculties, and the results revealed 21.1% of smokers (19). 2008 research about a smoking ban in closed public places, similar to ours in its methods (cross-sectional study, self-administered questionnaire, 5% of the population) was conducted among BU students from all faculties. It showed that 29.5% of BU students were smokers (18). Our research found that the smoking prevalence among BU students even increased slightly since 2008 (30.5% vs. 29.5%) (18).

We found no smoking-related research conducted among all students of other major universities in Serbia (University of Novi Sad - NSU, and the University of Niš - NU). At NSU in 2010/11, 5% of randomly selected first and final year students were surveyed to determine the prevalence of smoking among NSU students, and 26.7% of participants reported to be smokers (20). A 2007/08 mixed methodology study about the risk factors of cardiovascular diseases among medical students of their final year at NU found that a quarter of participants were smokers (21).

A Global Health Professions Student Survey (GHPSS) conducted among third-year medical students from 2005-2008 cross-nationally (during 2006 in Serbia), using the same tools as we did, revealed that 34.7% of participants in Serbia were smokers (15).

The prevalence of smokers among first-year medical students at the University of Prishtina, Kosova in 2011, was 8.9% for general medicine students (22).

Our study revealed a much higher prevalence of smokers among medical students than in Kosova research, but still lower than the GHPSS results from 2006 indicated.

Studies conducted in Greece (23), Italy (24) and Portugal (25), from 2005-2007, were assessing smoking among medical and non-medical students at university settings. These studies used the same methods and tools as we did. We observed a lower smoking prevalence among BU students than reported in Italy and Greece (30.5% vs. 37.4-46.9%), but higher compared to Portugal's results (21.6%).

Our study found a higher percentage of smokers among students of NMF than in MF (31.1% vs. 26.4%), but the difference was not statistically significant. Higher smoking rates among non-medical students were also found in Italy (40.9-42.9% compared to 20.1% of medical students), Greece (50.2% vs. 35.5%), and Portugal (27.1% vs. 16.3%) (23-25).

Our research showed that smoking prevalence tended to be higher in female students, but this gender difference was not statistically significant (F:31.2% vs. M:29.5%, $p=0.141$). At NSU, a higher percentage of smokers was observed among male students (30% vs. 23.5%) (20), while at NU the distribution was nearly the same between men and women (M:25.4% vs. F:25.2%) (21). Contrary to our findings, higher smoking rates were found among male students in Greece (44% vs. 42%), Italy (38.4% vs. 36.8%) and Portugal (32.8% vs. 10.9%) (23-25).

Smoking prevalence among female students at NMF of BU was higher than in male students (32.0% vs. 29.8%, $p=0.244$), while the results for the MF were opposite (F:25.8% vs. M:27.5%, $p=0.224$). However, the observed gender differences had no statistical significance. In Italy, smoking prevalence among female students at MF was higher (F:21.1% vs. M:18.2%), while at NMF male students had a higher percentage of smokers (M:43.6% vs. F:41.8%) (24).

The reported reason for smoking initiation was mostly peer influence, as 36.5% of all smokers in our research stated this reason as a dominant factor of smoking initiation. Peer influence was also the most common reason for starting smoking in EU countries (79% of all ever-smokers in the EU), as per 2012 European Commission data (26).

We found that 66.2% of smokers among BU students started smoking at high school (before turning 18), and 25.1% even later, at faculties. In Greece, over 50% of smokers among students started smoking after enrolling into faculty (23). In EU countries, according to 2012 data, 70% of ever-smokers started smoking as minors (26).

Non-smokers were more supportive of law on a smoking ban in public places (83.4% vs. 62.1-75.8% smokers and ex-smokers), and the same results were obtained in other studies (14).

62.1% of smokers at BU supported the smoking ban, while 44.3% of smokers tried to quit smoking (MF:52.6% vs. NMF:43.3% [34.9-43.6%]). This is in line with the EU results, where 45% of smokers among European students tried to quit smoking (26). Only 5.8% of students from BU succeeded in quitting. As the majority of smokers had a positive attitude toward smoke-free legislation, while only 12.4% believed that adequate public health training was organized at their faculties, the success rate of smoking cessation could be increased with proper smoking-cessation assistance provided at faculties.

Our research has some limitations, as cross-sectional study design does not allow for causal relationships to be established among variables. Given the large population, we used an opportunity sample for practical reasons.

To minimize sampling bias, we followed the population distribution, and the questionnaires were administered during classes without favouring any particular courses. Regardless of the limitations, our findings provide a valuable reference point for future studies of related topics.

5 CONCLUSION

BU students, including smokers, were overwhelmingly supportive of the smoking ban. A high share of smokers, especially among medical students, did try to quit smoking, but to no avail. To combat a high smoking prevalence among younger populations, a formal education of students about adverse impacts of smoking should be integrated in all active anti-smoking programs. Medical students, as future healthcare professionals, can play an important role in smoking rates reduction among both younger and general populations, if properly trained and educated about smoking prevention and cessation techniques. Professional assistance and counselling across students' community can boost the success rate of smoking cessation among BU students.

CONFLICTS OF INTEREST

The authors declare that no conflicts of interest exist.

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ETHICAL APPROVAL

The survey was preapproved by the Ethics Committee for biomedical research of the Faculty of Pharmacy, University of Belgrade.

REFERENCES

1. World Health Organization. WHO report on the global tobacco epidemic, 2008: the MPOWER package. Geneva: WHO, 2008. Accessed October 7th, 2018 at: http://apps.who.int/iris/bitstream/handle/10665/43818/9789241596282_eng.pdf?sequence=1.
2. World Health Organization. WHO report on the global tobacco epidemic, 2017: monitoring tobacco use and prevention policies. Geneva: WHO, 2017. Accessed October 7th, 2018 at: <http://apps.who.int/iris/bitstream/handle/10665/255874/9789241512824-eng.pdf?sequence=1>.
3. World Health Organization. Tobacco: key facts. Geneva: World Health Organization, 2018. Accessed October 7th, 2018 at: <http://www.who.int/news-room/fact-sheets/detail/tobacco>.
4. European Commission. Tobacco policy. Brussels: European Commission, 2014. Accessed October 7th, 2018 at: https://ec.europa.eu/health/tobacco/overview_en.
5. World Health Organization. Tobacco - health facts: fact sheet 221. Geneva: World Health Organization, 2018. Accessed October 7th, 2018 at: <http://www.who.int/mediacentre/factsheets/fs221/en/>.
6. The Institute of Public Health of Serbia "Dr Milan Jovanović Batut". Results of the National Health Survey of the Republic of Serbia 2013. Belgrade: The Institute of Public Health of Serbia "Dr Milan Jovanović Batut", 2014. Accessed October 7th, 2018 at: <http://www.batut.org.rs/download/publikacije/2013SerbiaHealthSurvey.pdf>.
7. Koprivnikar H, Zupanic T. The use of different tobacco and related products, with and without flavours, among 15-year-olds in Slovenia. *Zdr Varst.* 2017;56:74-81. doi: 10.1515/sjph-2017-0010.
8. World Health Organization Europe. Tobacco control fact sheet Serbia. Geneva: WHO, 2016. Accessed October 7th, 2018 at: http://www.euro.who.int/__data/assets/pdf_file/0008/312596/Tobacco-control-fact-sheet-Serbia.pdf?ua=1.
9. World Health Organization. WHO framework convention on tobacco control. Geneva: WHO, 2005. Accessed October 7th, 2018 at: <http://apps.who.int/iris/bitstream/handle/10665/42811/9241591013.pdf?sequence=1>.
10. Law on the protection of the population from exposure to tobacco smoke. *Official Gazette Rep Serbia.* 2010(30).
11. The law on advertising. *Official Gazette Rep Serbia.* 2016(6).
12. Harvey J, Chadi N, Canadian Paediatric Society, Adolescent Health Committee. Preventing smoking in children and adolescents: recommendations for practice and policy. *Paediatr Child Health.* 2016;21:209-21.
13. Saleiro S, Damas C, Gomes I. Smoking habits and awareness of smoking risks depending on academic background in university students. *Rev Port Pneumol.* 2008;14:231-8. doi: 10.1016/S0873-2159(15)30232-4.
14. Erdogan N, Erdogan I. Smoking at school: views of Turkish university students. *Int J Environ Res Public Health.* 2009;6:36-50. doi: 10.3390/ijerph6010036.
15. Warren CW, Sinha DN, Lee J, Lea V, Jones NR. Tobacco use, exposure to secondhand smoke, and cessation counseling among medical students: cross-country data from the Global Health Professions Student Survey (GHPSS), 2005-2008. *BMC Public Health.* 2011;11:72. doi: 10.1186/1471-2458-11-72.
16. Republički zavod za statistiku. Visoko obrazovanje 2015/2016. Beograd: Republički zavod za statistiku, 2017. Accessed October 7th, 2018 at: <http://publikacije.stat.gov.rs/G2017/Pdf/G20176001.pdf>.
17. Sharpe D. Your chi-square test is statistically significant: now what? *Pract Ass Res Eval.* 2015;20:1-10. Accessed October 7th, 2018 at: <https://pareonline.net/getvn.asp?v=20&n=8>
18. Belgrade Students' Health and Financial Support Society. Results of research on smoking indoors at the University of Belgrade 2008. Accessed March 19th, 2018 at: <http://www.napser.org/files/ZPU%20Rezultati%20istraivanja%20Duvanski%20dim.pdf>.

19. Pekmezovic T, Popovic A, Kistic Tepavcevic D, Gazibara T, Paunic M. Factors associated with health-related quality of life among Belgrade University students. *Qual Life Res.* 2011;20:391-7. doi: 10.1007/s11136-010-9754-x.
20. Bokan D, Bokan D, Rakić D, Budakov N. Prevalence of tobacco smoking among students of the University of Novi Sad. *South East Health Sci J.* 2012;2:94-9.
21. Stojanovic D, Visnjic A, Mitrovic V, Stojanovic M. Risk factors for the occurrence of cardiovascular system diseases in students. *Vojnosanit Pregl.* 2009;66:453-8.
22. Gashi S, Berisha M, Ramadan N, Gashi M, Kern J, Dzakula A, et al. Smoking behaviors in Kosova: results of STEPS survey. *Zdr Varst.* 2017;56:158-65. doi:10.1515/sjph-2017-0021.
23. Alexopoulos EC, Jelastopulu E, Aronis K, Dougenis D. Cigarette smoking among university students in Greece: a comparison between medical and other students. *Environ Health Prev Med.* 2010;15:115-20. doi: 10.1007/s12199-009-0110-0.
24. Lucenteforte E, Vannacci A, Cipollini F, Gori A, Santini L, Franchi G, et al. Smoking habits among university students in Florence: is a medical degree course the right choice? *Prev Med.* 2010;51:429-30. doi: 10.1016/j.ypmed.2010.08.009.
25. Saleiro S, Damas C, Gomes I. Smoking habits and awareness of smoking risks depending on academic background in university students. *Rev Port Pneumol.* 2008;14:231-8. doi: 10.1016/S0873-2159(15)30232-4.
26. European Commission. Attitudes of Europeans towards tobacco, 2012. Accessed October 7th, 2018 at: https://ec.europa.eu/health/sites/health/files/tobacco/docs/eurobaro_attitudes_towards_tobacco_2012_en.pdf.

SEMANTIC AND CULTURAL EQUIVALENCE OF THE WORKING ALLIANCE INVENTORY SHORT-REVISED SCALE FOR THERAPEUTIC ALLIANCE IN FAMILY MEDICINE: LESSONS LEARNED IN SLOVENIA

DOSEGANJE KULTURNE IN JEZIKOVNE USTREZNOSTI LESTVICE ZA OCENJEVANJE TERAPEVTSKEGA ZAVEZNIŠTVA MED ZDRAVNIKOM IN BOLNIKOM V DRUŽINSKI MEDICINI - SLOVENSKE IZKUŠNJE

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ABSTRACT

Introduction: Therapeutic alliance is a term most commonly associated with psychotherapeutic treatment, but recently its use has become increasingly significant in the other fields of medicine. An increasing amount of evidence implies that the quality of the therapeutic alliance between the doctor and patient substantially affects treatment outcomes. A European consensus chose the Working Alliance Inventory - Short Revised (WAI-SR) scale as the most efficient for European primary care. This paper presents the process of establishing the semantic and cultural equivalence of the two WAI-SR scales in Slovene.

Keywords:

family medicine, therapeutic alliance, Delphi consensus procedure

Method: As a part of a larger international project, a group of four experts translated the two WAI SR scales (physician and patient versions) from English into Slovene. Twenty-six Slovenian family medicine doctors participated in the process of obtaining semantic, idiomatic, experiential and conceptual equivalence in translation using a Delphi consensus procedure. Afterward, a cultural equivalence was made to adapt the translations within the national context.

Results: Agreement on translation was achieved after two Delphi rounds. The back-translation and cultural equivalence were accomplished without major problems, with some minor additional linguistic corrections.

Conclusion: A Slovene version of the WAI-SR scale was successfully adapted and is available for further scale validation and research on therapeutic alliance.

IZVLEČEK

Ključne besede:

družinska medicina, terapevtsko zavezništvo, Delphi metode

Uvod: Terapevtsko zavezništvo je pojem, ki se je tradicionalno in običajno povezoval s psihoterapevtsko obravnavo, v zadnjem času pa je njegova uporaba postala pomembna tudi v medicini. Vse več dokazov namreč kaže, da so potek in izidi zdravljenja ter zadovoljstvo bolnikov povezani s kakovostjo odnosa (terapevtskega zavezništva) med zdravnikom in bolnikom. Kot eno od najučinkovitejših orodij za ocenjevanje terapevtskega zavezništva v primarni zdravstveni oskrbi je bila v Evropi z mednarodnim konsenzom izbrana lestvica za ocenjevanje terapevtskega zavezništva med zdravnikom in bolnikom (LTZ, angl. WAI-SR). Lestvica služi ocenjevanju odnosa med zdravnikom in bolnikom z obeh strani, tako zdravnika kot bolnika. Namen dela je bil doseči jezikovno in kulturno ustreznost obeh prevedenih lestvic WAI-SR v slovenščini.

Metode: V okviru večjega mednarodnega projekta je skupina štirih slovenskih strokovnjakov prevedla zdravnikovo in bolnikovo različico lestvice WAI-SR iz angleščine v slovenščino. Skupina je bila sestavljena iz dveh zdravnikov družinske medicine, slovenista in anglista. V postopku doseganja semantične, idiomatske, izkustvene in konceptualne ustreznosti prevoda s pomočjo Delphi metode je sodelovalo 26 slovenskih zdravnikov družinske medicine. Sledila je prilagoditev prevodov za zagotavljanje jezikovne in kulturne ustreznosti lestvice v slovenskem govornem in kulturnem okolju.

Rezultati: Soglasje s prevodom je bilo v skupini 26 sodelujočih zdravnikov družinske medicine doseženo po dveh Delphi krogih. Pretvorba slovenskega prevoda lestvic nazaj v angleški jezik, primerjava osnovnega angleškega besedila in povratnega prevoda v izvorni jezik ter preverjanje kulturne ustreznosti so bili doseženi brez večjih težav, z nekaj manjšimi dodatnimi jezikovnimi popravki.

Zaključek: Predstavljeni proces kaže na pomen iskanja jezikovne in kulturne ustreznosti ocenjevalnih lestvic, ki jih v medicini avtorji marsikdaj zgolj slovenijo ter uporabljajo brez preverjanja ustreznosti - ne samo jezikovne in kulturne, ampak tudi v smislu merskih značilnosti. Izkušnje procesa opozarjajo na potrebno skrbnost in zadržanost pri nekritični rabi najrazličnejših lestvic v medicini, ne da bi avtorji preverili, kaj dejansko ocenjujejo z njimi. Slovenska verzija lestvice WAI-SR je bila uspešno prilagojena in je na voljo tako za nadaljnjo validacijo (na primer konstrukta) kot za raziskave terapevtskega zavezništva.

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1 INTRODUCTION

One of the key characteristics of family medicine is a long-term doctor-patient relationship (1). Research shows that most patients decide to stay with their personal physician, i.e. family medicine doctor, for at least eight years or even longer (2). A personal relationship thus develops between the patient and the physician, and the nature of this relationship has significant effects on prognosis and patient satisfaction (3).

1.1 The Long-Term Doctor-Patient Relationship

The long-term doctor-patient relationship can also be described by the concept of therapeutic alliance. The most commonly-cited definition of this was first articulated by Bordin (4) in 1979; he argued that the construct consists of three components: the bond between the therapist and the patient; therapist-patient agreement on the goals of treatment; and therapist-patient agreement on the tasks of treatment. Therapeutic alliance also involves an assessment of doctor-patient trust, communication, and patient cooperation (5). It thus exceeds the paternalistic doctor-patient relationship and implements a model of shared decision-making, where the relationship is based on mutual trust, understanding, and the doctor's empathy. Scales for assessing therapeutic alliance were first developed and validated in psychotherapy (6), and proved to be a useful tool in assessing psychotherapeutic alliance when dealing with both in- and outpatients (7). The scales have not yet been specifically altered for use outside psychotherapy, but can nonetheless be helpful in the evaluation and improvement of the therapeutic relationship elsewhere (8). Several research studies show that therapeutic alliance is also associated with better treatment results in clinical medicine (9). A study evaluating patient outcomes in cardiac rehabilitation programmes showed that a strong therapeutic alliance could play an important role in achieving favourable results (10). Its use, therefore, also seems to be applicable to family medicine.

1.2 The Assessment of a Therapeutic Alliance

The importance of using validated assessment tools has been receiving growing attention, with researchers becoming more aware that tools and techniques with established validity and reliability produce more consistent and accurate results.

Internationally, several tools have been used to assess therapeutic alliance in previous research (8, 11-15). In Slovenia, different studies have been conducted assessing various doctor-patient relationship attributes, such as empathy (16) or patient satisfaction (2), but no study has

validated or even used the therapeutic alliance scales. This survey is the Slovenian part of an international research study aiming to validate the WAI-SR scale for therapeutic alliance for patients and physicians throughout Europe (8).

1.3 Validation of the Slovenian WAI-SR Scale

A WAI-SR instrument that has been previously validated in one language is not automatically equivalent to the same instrument in another language and/or culture. The equivalence between translated versions of the questionnaire is important for its international comparison.

Slovene is a language spoken by only about two million people. However, scales from other languages still need to be translated and made equivalent to the original language in terms of concepts (the concept must exist in different cultures (17) and semantics, i.e. "equivalence in meaning between the source and the question wording" (18). International research also requires scales to be culturally equivalent, to enable understanding, interpretation and assessment of the subject, that is equal or similar across different cultures. However, cultural factors cannot be seen at the level of the form or meaning of language, and exist only in the background. Since cultural factors are those relating to value systems, geographical situation, traditions, religion, etc., it is important to consider any impact that a culture or way of life can have on wording. The procedure for testing cultural linguistic equivalence consists of the evaluation of the back-translated version, test-retest by bilingual respondents, adaptation of the translated version, and a final cultural check by a principal researcher in the target country (19).

The aim of this study was to obtain a culturally consistent translation of the two WAI-SR scales (one concerning physicians and one concerning patients) and their scoring key. The semantic and cultural equivalence process is also presented.

2 METHOD

2.1 Design of the Study

An international group of researchers was formed under the umbrella of the European General Practice Research Network (EGPRN), led by the University of Brest, consisting of ten national research teams simultaneously working on a translation procedure following the same protocol, aiming to develop a tool available and equivalent in different languages and cultures. In this paper, we present the Slovenian part of the study.

With the aim of obtaining semantic, idiomatic, experiential and conceptual equivalence in translation, both scales and the scoring key were translated by an e-mail with a forward and back translation using a Delphi procedure. Afterward, a cultural equivalence was performed to adapt the translations within the national context, in order to ensure the homogeneity of the scales throughout Europe.

2.2 Participants

A small group of four experts was formed for the forward translation from English to Slovene.

A convenient sample of 30 practising and academic Family Medicine Doctors (FMDs) were invited to participate in the Delphi method to achieve consensus (20). All participants were provided with a written explanation of the aims and procedure of the study, and signed a statement on voluntary participation. Among those thirty invited experts, four did not accept the invitation, with one saying he was too busy, and three not replying.

Two independent English language translators undertook back translation.

2.3 Instrument

The WAI-SR scales are a 12-item questionnaire for the patient and a 10-item questionnaire for the physician, assessing the three main features of the therapeutic alliance between them: goal, tasks, and bond (8). In this scale, the patient or physician rates each item on a 5-point Likert scale from "1 - rarely or never" and "5 - always". The higher the score, the better the therapeutic alliance. The scoring key provides instructions for the evaluation of the scales.

2.4 Procedure

2.4.1 Forward Translation

The group of four experts made a forward translation from English to Slovene of both WAI-SR scales. All the differences in translation were reconciled between them until they reached a consensus.

2.4.2 Validation of the Forward Translation by the Delphi Method

To verify semantic equivalence, both scales were sent to the participants in the Delphi method, which allows a group to elicit judgments through an iterative process, interspersed with controlled feedback of opinions (20). The group evaluated the translation for clarity, common language, and conceptual adequacy. The experts were contacted separately by email to ensure the anonymity and independence of each opinion. Each participant

was asked to validate or reject the translation by rating each statement on a scale from 1 to 9, where 1 meant "no agreement" and 9 meant "full agreement". If they rated a translation with less than 7, they were asked to explain their disagreement and possibly propose a more suitable translation. The principal researcher evaluated the answers.

A successful validation for each statement was obtained when at least 70% of the participants rated it 7 or above. If a statement did not meet this criterion, the principal researcher proposed a new translation taking into account the participants' suggestions. The new translation was again sent to the group for a second Delphi round. The process was repeated until all the statements were successfully validated.

2.4.3 Back Translation

Two licensed translators with no knowledge of the original English version of the WAI-SR scales independently translated the validated items back from Slovene into English. After the independent translation, they were asked to reach a consensus on the translated items. In the event of disagreement, the leader of the Slovenian research team led the consensus procedure until it was achieved for all statements.

2.4.4 Cultural Adaptation

Translation issues were discussed by the research group, which met twice a year for two years. The international collaborative group compared the back-translation to the original English version at a workshop during an EGPRN meeting in Dublin 2017. The team leaders of five countries and an international committee with the principal investigator of the TATA group carried out a cultural check by comparing a back-translation of five languages, including Slovenian, with the original version. The main task was to identify those translated items, whose meaning might have been lost or inappropriately altered in translation. If the problem could not be solved, it was submitted to the local research team to propose a solution.

The whole process is shown in Figures 1 and 2.

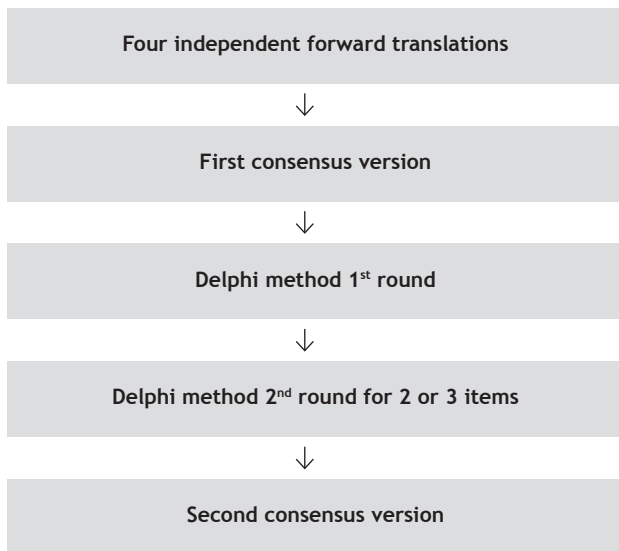


Figure 1. Flowchart of cultural equivalence for WAI SR scales and scoring key.



Figure 2. Flowchart of cultural adaptation for WAI-SR scales and scoring key.

3 RESULTS

3.1 The Sample

The group of four translators who did the forward translation consisted of two FMDs, one linguist, and one psychologist; three women and one man, with a mean age of 53 years (range 43-60). All were fluent in English.

26 experts (FMDs) participated in the Delphi part of the study. Among them, 3/26 were male and 23/26 female; their mean age was 40.7 years (range 27-60) and the mean number of years of working in the practice was 12.3 years (range 1-34). 18/26 experts were involved in teaching, and 19/26 were researchers. Of the whole group, 7/26 participants worked in a solo practice and 17/26 in a group practice, while 2/26 were still trainees; 13/26 worked in a rural or semirural environment.

3.2 WAI-SR Patient Scale

For validation, each item had to be rated at 7 or more by at least 17 participants. The first Delphi round for the WAI-SR patient scale showed acceptable agreement in all but one statement (Q8), where only 12/26 (46%) of the participants rated the translation with 7 or above (Table 1).

Table 1. WAI-SR patient scale Likert scores, mean and median - Round 1 (N=26).

Results	Inst	Ans	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
≥7 (n/26)	23	23	22	23	20	24	23	20	24	12	20	19	20	25
≥7 (%)	88	88	85	88	77	92	88	77	92	46	46	73	77	96
Mean	8.0	8.3	7.7	8.2	7.8	8.6	8.6	7.9	8.7	6.1	8.0	8.0	7.9	8.7
Median	8	9	8	9	9	9	9	8	9	6	9	9	8	9

Legend: N - Number of participants that rated the item ≥7 out of all 26 participants; Inst - instructions; Ans - Likert scale answers; Q - question

In the second Delphi round concerning Q8, the participants proposed 18 alternative translations. We present some of the suggestions in Supplementary material - Table 1. Agreement was reached on a revised translation.

3.3 WAI-SR Physician Scale

The first Delphi round for the WAI-SR Family physician scale showed agreement in all but two statements (Q2, Q10). Q2 was rated as adequate by 15/26 (58%) of participants, but Q10 by only 10/26 (38%) participants (Table 2).

Table 2. WAI-SR physician scale Likert scores, mean and median - Round 1 (N=26).

Results	Inst	Ans	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
≥7 (n/26)	24	25	23	15	20	21	25	23	24	22	22	10
≥7 (%)	92	96	88	58	77	81	96	88	92	85	85	38
Mean	8.2	8.5	8.4	6.7	8.0	7.5	9.0	8.5	9.0	9.0	9.0	6.0
Median	8	9	9	8	9	7.5	9	8.5	9	9	9	6

Legend: N - Number of participants that rated the item ≥7 out of all 26 participants; Inst - instructions; Ans - Likert scale answers; Q - question

Numerous alternative translations were again proposed in the second Delphi round - 6 for Q2 and 5 for Q10. Some of these are presented in Supplementary material - Tables 2 and 3. Again, agreement was reached on a revised translation.

The Slovene version of the translation for both scales was issued after the second Delphi round (Table 3, Supplementary material - Table 4).

Table 3. Mean and median: Patient scale Q8 and Physician scale Q2, Q10 - Round 2.

	Q8 patient scale	Q2 physician scale	Q10 physician scale
Mean	8.2	8.7	8.2
Median	9	9	8.5

3.4 Back-Translation

Consensus was achieved in two rounds of the agreement process between the two professional translators for both WAI SR scales. Consensus on the back-translation of the scoring key was achieved in four rounds.

3.5 International Cultural Equivalence Evaluation

The work on cultural equivalence highlighted three potential problems with translation: In Q10 of the patient scale, "treatment" was translated as "consultation". We concluded that, considering its original use in psychotherapy, the word "treatment" did not relate solely to medical treatment but to the entire process of doctor-patient consultation. For this reason, the translation relates to the entire process of consultation and not only to treatment actions.

Also, in the patient scale, Q12 was originally in the active voice, but was translated to the passive voice in the validated Slovene translation. After the cultural check was carried out, the national team agreed that the use of the active voice was more suitable, since it emphasized the patient's active role in the consultation and corresponded to the "shared decision-making" model (Supplementary material - Table 5).

In Q8 of the physician scale, the discussion on cultural equivalence revealed that there was a difference between 'the common perception of a goal' (as in the original version) and 'common agreement on the goal' (as translated). We consulted the linguist and appropriately altered the validated translation so that the original meaning of the statement was retained (Supplementary material - Table 6).

The final version of the WAI-SR Slovene translation was accepted after the second Delphi round, including these cultural adaptations.

3.6 Validation of the Scoring Key

The scoring key contains instructions concerning the evaluation of the scale. The same procedure was used for the translation of the scoring key as for the WAI-SR items. It was validated in the first Delphi round with Q1, Q2, and Q3 each having one evaluation of <7, and all the others (except the last item) >7. Item 11 was adapted after consulting the author of the scale, AO Horvath, who gave additional instructions.

4 DISCUSSION

4.1 Main Findings

Only two rounds of the Delphi method were needed to achieve a consensus on the translations of all the items. Cultural equivalence of the back-translation was obtained after some minor adaptations were made. The process showed that a simple literal translation was inappropriate, and rigorous efforts must be made to ensure the meaning and intent of the original items are maintained so the scale remains relevant.

4.2 Validation Process and Comparison to other Countries

The equivalence procedure in the translation of the two scales assessing therapeutic alliance was complex and time-consuming, but it served well for the purpose of semantic validation. The same procedure was used to validate and achieve equivalence in the translation of the definition of multi-morbidity (21, 22) and to validate the WAI-SR questionnaire in other countries (23). The translation into Polish showed the feasibility of the procedure, taking only one Delphi round to achieve consensus (23). The advantage of this procedure also lies in the fact that it was simultaneously taking place in several European countries with different linguistic bases, which provided the opportunity to discuss the difficulties national and local research groups met with while translating the original WAI-SR scales.

The Delphi method was used to validate the agreed forward translation and has been shown to be suitable for exploring areas where controversy, debate or a lack of clarity exist. Within this process, translations of WAI-SR scales were actively tested in representatives of the target population or language group to determine whether the respondents understood the questionnaire in the same way as the original. We feel that the use of this method for translation was legitimate, since it provided an accurate consensus technique (24).

Ideally, every questionnaire translation should undergo a cultural equivalence to identify and resolve any inadequate expressions in the translation, as well as to sort out any other discrepancies between the original items and the back-translated ones. The first steps in the process were inspired by the work of Streiner et al. (25). The standardized approach for the cultural adaptation of patient-measured outcomes was confirmed in recent guidelines (26, 27). In this study, we followed the recommendations at all stages: in the first part of cultural adaptation by using the Delphi method, because we recognized this as the best option given the specifics of our language, social and cultural context, and then by the supervision of the researchers led by the University of Brest, who oversaw the adaptation of the questionnaire

and the cultural adaptation based on the back-translation. This was to ensure that the items were translated considering their structure as well as the suitability of their content.

4.3 Limitations

Given that translation is the most common method for preparing instruments for cross-cultural research, we must be alert to the pitfalls that threaten validity.

Firstly, when translating scales such as the WAI-SR, it would be best if the forward translation was carried out by professionals who fit these criteria: familiar with the terminology used in the questionnaire; knowledgeable about the subjects covered; experienced in translating scales from (as here) English; and have Slovene as their native language. The content of the WAI-SR covers the fields of psychology and medicine, and its translation must be understandable by both physicians and patients. In Slovenia, we were unlikely to find a professional translator who would meet all these criteria. Creating a group of two family medicine doctors, a psychologist and a linguist to carry out the forward translation solved this problem.

Secondly, we stated that the experts carrying out the consensus procedure consisted of individuals who were fluent in English. However, the method of evaluating fluency in the language is debatable. Proficiency in English was assessed in two ways: one was self-evaluation, and the other was the number of English publications of each of the participants. The latter, in particular, may not be a powerful tool for showing language fluency; however, it was a pragmatic and feasible solution.

Thirdly, the Delphi group was not representative of the community of Slovenian family medicine doctors (FMDs) - men were underrepresented and the percentage of the academic FMDs involved was higher than the Slovenian average. But considering that the Delphi method is a qualitative one, population representativeness is not necessary. It is more important that all the characteristics of the participants that can influence decisions regarding validation are represented, such as different ages, location of practice, years of experience and involvement in the academic side of family medicine.

Finally, it would have been preferable if the back-translation had been made by an independent translator fluent in Slovene but whose native language was English. Since no such translators were available, we settled for two independent licensed Slovenian translators who had no previous knowledge of the WAI-SR scale.

5 CONCLUSION

At this stage, the WAI-SR and its use in family medicine generally lacks a theoretical background that needs to be discussed and agreed upon in the broader field of family medicine. Given the complexities of patient care in family medicine, the question arises as to whether therapeutic alliance is relatively stable over the course of a relationship between a family doctor and a patient. In addition, if assessing the alliance at one or several points in time, alliance ratings are expected to be associated with morbidity changes over the course of a patient's life, which may fail to capture the short-term impact of alliance on a specific symptom or improvement in their condition. Therefore, the future accuracy of ratings provided by this instrument can be affected by many methodological factors, including the quality of the instrument in terms of validity, reliability, and sensitivity to change. We only described the first phase, where the scale's semantic and cultural equivalence were verified. Further studies will provide results of reliability and item validity analyses. Exploratory principal component analyses are to be conducted to compare response patterns with the hypothesized scale constructs. Four major issues need to be considered in the future: the psychometric properties of the Slovene WAI-SR scale; the appropriateness of the scale for FMDs; practical aspects of scale administration; and the theoretical foundation of scale interpretation within the field of family medicine.

CONFLICT OF INTERESTS

The authors declare that they have no competing interests.

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ETHICAL APPROVAL

The study was approved by the Republic of Slovenia National Medical Ethics Committee at the Ministry of Health, on Dec 15th, 2017, number 0120-397-2016/2.

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ABBREVIATIONS

WAI-SR scale: the Working Alliance Inventory - Short Revised scale

FMDs: Family medicine doctors

REFERENCES

1. Tammes P, Salisbury C. Continuity of primary care matters and should be protected. *BMJ*. 2017;356:j373. doi: 10.1136/bmj.j373.
2. Petek D, Künzi B, Kersnik J, Szecsenyi J, Wensing M. Patients' evaluations of European general practice - revisited after 11 years. *Int J Qual Health Care*. 2011;23:621-8. doi: 10.1093/intqhc/mzr052.
3. Hall MA, Dugan E, Zheng B, Mishra AK. Trust in physicians and medical institutions: what is it, can it be measured, and does it matter? *Milbank Q*. 2001;79:613-39. doi: 10.1111/1468-0009.00223.
4. Bordin ES. The generalizability of the psychoanalytic concept of the working alliance. *Psychother Theory Res Pract*. 1979;16:252-60. doi: 10.1037/h0085885.
5. Huff NG, Nadig N, Ford DW, Cox CE. Therapeutic alliance between the caregivers of critical illness survivors and intensive care unit clinicians. *Ann Am Thorac Soc*. 2015;12:1646-53. doi: 10.1513/AnnalsATS.201507-408OC.
6. McLeod BD. Relation of the alliance with outcomes in youth psychotherapy: a meta-analysis. *Clin Psychol Rev*. 2011;31:603-16. doi: 10.1016/j.cpr.2011.02.003.
7. Munder T, Wilmers F, Leonhart R, Linster HW, Barth J. Working Alliance Inventory-Short Revised (WAI-SR): psychometric properties in outpatients and inpatients. *Clin Psychol Psychother*. 2010;17:231-9.
8. Paap D, Dijkstra PU. Working Alliance Inventory - Short form Revised. *J Physiother*. 2017;63:118. doi: 10.1016/j.jphys.2017.01.001.
9. Ferreira PH, Ferreira ML, Maher CG, Refshauge KM, Latimer J, Adams RD. The therapeutic alliance between clinicians and patients predicts outcome in chronic low back pain. *Phys Ther*. 2013;93:470-8. doi: 10.2522/ptj.20120137.
10. Burns JW, Evon D. Common and specific process factors in cardiac rehabilitation: independent and interactive effects of the working alliance and self-efficacy. *Health Psychol*. 2007; 26:684-92.
11. Luborsky L, Barber JP, Siqueland L, Johnson S, Najavits LM, Frank A, et al The Revised Helping Alliance Questionnaire (HAQ-II): psychometric properties. *J Psychother Pract Res*. 1996;5:260-71.
12. Delsignore A, Rufer M, Moergeli H, Emmerich J, Schlesinger J, Milos G, et al. California Psychotherapy Alliance Scale (CALPAS): psychometric properties of the German version for group and individual therapy patients. *Compr Psychiatry*. 2014;55:736-42. doi: 10.1016/j.comppsy.2013.11.020.
13. Kim SC, Boren D, Solem SL. The Kim Alliance Scale: development and preliminary testing. *Clin Nurs Res*. 2001;10:314-31.
14. Shelef K, Diamond GM. Short form of the revised Vanderbilt therapeutic alliance scale: development, reliability, and validity. *Psychother Res*. 2008;18:33-43. doi: 10.1080/10503300701810801.
15. Saunders SM, Howard KI, Orlinsky DE. The Therapeutic bond scales: psychometric characteristics and relationship to treatment effectiveness. *Psychol Assessment*. 1989;1:323-30.
16. Penšek L, Selič P. Empathy and burnout in Slovenian family medicine doctors: the first presentation of Jefferson Scale of Empathy results. *Zdr Varst*. 2018;57:155-65. doi: 10.2478/sjph-2018-0020.
17. Patrick DL, Wild DJ, Johnson ES, Wagner TH, Martin MA. Cross-cultural validation of quality of life measures. In: Orley J, Kuyken W, editors. *Quality of life assessment: international perspectives*. Heidelberg: Springer Verlag, 1994:19-32.
18. Acquadro C, Jambon B, Ellis D, Marquis P. Language and translation issues. In: Spilker B, editor. *Quality of life and pharmacoeconomics in clinical trials*. 2nd ed. Philadelphia: Lippincott-Raven, 1996:575-85.
19. Herdman M, Fox-Rushby J, Badia X. "Equivalence" and the translation and adaptation of health-related quality of life questionnaires. *Qual Life Res*. 1997;6:237-47.
20. Skulmoski GJ, Hartman FT, Krahn J. The Delphi method for graduate research. *J Inf Technol Educ*. 2007;6:2-21.
21. Lazić ĐK, Le Reste JY, Murgić L, Petriček G, Katič M, Ožvačić-Adžić Z, et al. Say it in Croatian - Croatian translation of the EGPRN definition of multimorbidity using a Delphi consensus technique. *Coll Antropol*. 2014;38:1027-32.
22. Le Reste JY, Nabbe P, Rivet C, Lygidakis C, Doerr C, Czachowski S, et al. The European general practice research network presents the translations of its comprehensive definition of multimorbidity in family medicine in ten European languages. *PLOS One*. 2015;10:e0115796. doi:10.1371/journal.pone.0115796.
23. Le Reste JY, Buczkowski K, Morvan F, Lazic V, Lingner H, Petek D, et al. Translation of a therapeutic alliance scale (The WAI SR) into Polish, TATA EGPRN collaborative study. Abstracts/programme book of the 85th EGPRN meeting, Dublin, 19-22 October 2017. Accessed March 20th, at: <https://www.egprn.org/file/3898d1a2-a2f8-479a-899c-c90a1266e949/2017-oct-dublin-ireland-programme.pdf>.
24. Linstone HA, Turoff M, editors. *The Delphi method: techniques and applications*. 2002. Accessed July 17th, 2018 at: <http://is.njit.edu/pubs/delphibook>.
25. Streiner DL, Norman GR, Cairney J. *Health measurement scales: a practical guide to their development and use*. 5th ed. Oxford, New York: Oxford University Press, 2014.
26. Wild D, Eremenco S, Mear I, Martin M, Houchin C, Gawlicki M, et al. Multinational trials - recommendations on the translations required, approaches to using the same language in different countries, and the approaches to support pooling the data: the ISPOR patient-reported outcomes translation and linguistic validation good research practices task force report. *Value Health*. 2009;12:430-40. doi: 10.1111/j.1524-4733.2008.00471.x.
27. Rabin R, Gudex C, Selai C, Herdman M. From translation to version management: a history and review of methods for the cultural adaptation of the EuroQol five-dimensional questionnaire. *Value Health*. 2014;17:70-6. doi: 10.1016/j.jval.2013.10.006.

SUPPLEMENTARY MATERIAL

Supplementary table 1. Q8 patient scale translation examples.

Q8 patient scale - original statement	Q8 patient scale - forward translation	Q8 patient scale - alternatives
_____ and I agree on what is important for me to work on.	Z _____ se skupaj dogovarjava o tem, kaj je zame pomembno, da počnem.	Z _____ se strinjava, na čem moram delati Z _____ se strinjava/soglašava o tem, kaj je zame pomembno, da počnem. Z _____ se strinjava, kaj je zame pomembno, da izboljšam.

Supplementary table 2. Q2 physician scale translation examples.

Q2 patient scale - original statement	Q2 patient scale - forward translation	Q2 patient scale - alternatives
I am genuinely concerned for _____'s welfare.	Blagostanje _____ je moja osrednja skrb.	Skrbi me pacientovo dobro. Dobrobit _____ je moja osrednja skrb. Moja pristna skrb je dobro počutje _____.

Supplementary table 3. Q10 physician scale translation examples.

Q10 patient scale - original statement	Q10 patient scale - forward translation	Q10 patient scale - alternatives
We agree on what is important for _____ to work on.	Z _____ se skupaj dogovarjava, kaj je zanj(o) pomembno, da počne.	Z _____ se strinjava, na čem mora delati. Z _____ se strinjava o tem, kakšni ukrepi so pomembni. Z _____ se strinjava, kaj je zanj(o) pomembno, da izboljša.

Supplementary table 4. validated translations: Q8 patient scale and Q2, Q10 physician scale - Round 2.

Q8 patient scale - successfully validated translation	Q2 physician scale - successfully validated translation	Q10 physician scale - successfully validated translation
Z _____ se strinjava, kaj je zame pomembno, da izboljšam.	Dobrobit _____ je moja osrednja skrb.	Z _____ se strinjava, kaj je zanj(o) pomembno, da izboljša.

Supplementary table 5. Q12 patient scale cultural equivalence.

Q12 patient scale - original statemet	Q12 patient scale - validated translation	Q12 patient scale - after cultural adaptation
I believe the way we are working with my problem is correct.	Verjamem, da je način obravnave moje težave pravilen.	Verjamem, da mojo težavo obravnavava na ustrezen način.

Supplementary table 6. Q8 physician scale cultural equivalence.

Q8 patient scale - original statemet	Q8 patient scale - validated translation	Q8 patient scale - after cultural adaptation
_____ and I have a common perception of his/her goals	Z _____ se strinjava glede njegovih/njenih ciljev.	Z _____ enako dojemava njegove/njene cilje.

VALIDATION OF THE SLOVENIAN VERSION OF SHORT SENSE OF COHERENCE QUESTIONNAIRE (SOC-13) IN MULTIPLE SCLEROSIS PATIENTS

OVREDNOTENJE SLOVENSKE VERZIJE KRATKEGA VPRAŠALNIKA O OBČUTKU SKLADNOSTI (SOC-13) PRI BOLNIKI Z MULTIPLO SKLEROZO

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ABSTRACT

Aim: To validate the Slovenian version (SOC-13-SVN) of Sense of Coherence 13-item instrument (SOC-13) in Slovenian multiple sclerosis (MS) patients.

Keywords:

multiple sclerosis, Sense of Coherence instrument, reliability, validity, Slovenia

Methods: A consecutive 134 Slovenian MS patients were enrolled in a cross-sectional study in 2013. The reliability of the SOC-13-SVN was assessed for internal consistency by Cronbach's alpha coefficient (α), dimensionality by the confirmatory factor analysis (CFA), and criterion validity by Pearson correlation coefficient (r) between SOC-13-SVN global score and MSQOL-54 composite scores - Mental Health Composite score (MHC) and Physical Health Composite score (PHC).

Results: For the SOC-13-SVN instrument as a whole, internal consistency was high ($\alpha_{\text{total}}=0.88$) while it was low for three subscales ($\alpha_{\text{comprehensibility}}=0.79$; $\alpha_{\text{manageability}}=0.66$; $\alpha_{\text{meaningfulness}}=0.69$). The results of the CFA confirmed a three-factor structure with good fit (RMSEA=0.059, CFI=0.953, SRMR=0.065), however, the correlations between the factors were very high ($r_{\text{comprehensibility/manageability}}=0.938$; $r_{\text{comprehensibility/meaningfulness}}=0.811$; $r_{\text{manageability/meaningfulness}}=0.930$). The criterion validity analysis showed a moderate positive strength of relationship between SOC-13-SVN global score and both MSQOL-54 composite scores (MHC: $r=0.597$, $p<0.001$; PHC: $r=0.437$, $p<0.001$).

Conclusion: Analysis of some psychometric properties confirmed that this instrument is a reliable and valid tool for use in Slovenian MS patients. Despite the three-dimensional structure of the instrument, the use of the global summary score is encouraged due to the low reliability of the subscale scores and high correlations between them.

IZVLEČEK

Namen: Ovrednotiti psihometrične lastnosti slovenske verzije (SOC-13-SVN) kratkega vprašalnika o občutku skladnosti s 13 postavkami (SOC-13) pri bolnikih z multiplo sklerozo (MS).

Glavne besede:

multipla skleroza, občutek skladnosti, zanesljivost, veljavnost, Slovenija

Metode: V presečno raziskavo, ki je potekala leta 2013, je bilo vključenih 134 slovenskih bolnikov z MS. Zanesljivost kot notranjo skladnost SOC-13-SVN smo ocenili s Cronbachovim koeficientom alfa (α), komponentno strukturo s potrditveno faktorsko analizo (PFA) in kriterijsko veljavnost s Pearsonovim korelacijskim koeficientom (r) med celokupno vsoto postavk SOC-13-SVN in dveh vsot postavk vprašalnika o kakovosti življenja pri MS (MSQOL-54) - vsoto postavk duševnega zdravja (MHC) in vsoto postavk telesnega zdravja (PHC).

Rezultati: Analiza SOC-13-SVN je pokazala, da ima instrument kot celota visoko notranjo skladnost ($\alpha_{\text{skupni}}=0,88$), medtem ko je bila notranja skladnost za posamezno podlestvico nizka ($\alpha_{\text{razumljivost}}=0,79$; $\alpha_{\text{upravljalnost}}=0,66$; $\alpha_{\text{smiselnost}}=0,69$). Rezultati PFA so potrdili trikomponentno strukturo z dobrim prileganjem (RMSEA = 0,059, CFI = 0,953, SRMR = 0,065), vendar pa je bila korelacija med komponentami zelo visoka ($r_{\text{razumljivost/upravljalnost}}=0,938$; $r_{\text{razumljivost/smiselnost}}=0,811$; $r_{\text{upravljalnost/smiselnost}}=0,930$). Rezultati analize kriterijske veljavnosti so pokazali zmerno moč povezanosti med celokupno vsoto postavk SOC 13-SVN ter MHC in PHC vsotama postavk MSQOL-54 (MHC: $r=0,597$, $p<0,001$; PHC: $r=0,437$, $p<0,001$).

Zaključek: Analiza nekaterih psihometričnih lastnosti je pokazala, da je SOC-13 SVN zanesljivo in veljavno orodje za uporabo pri slovenskih bolnikih z MS. Čeprav so rezultati potrdili tridimenzionalnost strukture vprašalnika, zaradi nizke zanesljivosti podlestvic in visoke korelacije med njimi priporočamo uporabo orodja kot celote.

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1 INTRODUCTION

Multiple sclerosis (MS) is a chronic neurological disease starting predominantly in the period of early/middle adulthood (1). It affects patients in a complex way, causing minor or greater disability (2). In MS, the effect of disability in daily living is reported to be greater in comparison to other chronic diseases (3, 4). Additionally, MS is considered as a leading cause of non-traumatic disability (e.g. sensory, motoric, coordination, balance or vision problems, cognitive disturbances, and attention/memory deficits) in young adults in Europe (5). These facts pose a challenge to clinicians in terms of how to empower MS patients for coping with their illness over the long-term. Sense of coherence (SOC), the core construct of the salutogenetic model (6, 7), developed by the Antonovsky, an Israeli American sociologist, could play an important role in dealing with the disease (7). According to Calandri et al. (8), SOC seems to mediate the adjustment to MS among recently diagnosed patients.

The SOC was originally defined by Antonovsky as *“a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (i) the stimuli from one’s internal and external environments in the course of living are structured, predictable, and explicable; (ii) the resources are available to one to meet the demands posed by these stimuli; and (iii) these demands are challenges, worthy of investment and engagement”* (6). In this context, he also proposed three dimensions/components of the SOC construct: *comprehensibility* (the ability to understand the situation), *manageability* (the perception of having resources to cope with the situation), and *meaningfulness* (the ability to find meaning in the situation) (6). To measure the SOC construct, the Orientation to Life questionnaire was developed (6). The original version consists of 29 (SOC-29), while the abbreviated version consists of 13 items (SOC-13) (6, 7). The comprehensive systematic review of Eriksson & Lindstrom (9) on more than 470 publications showed that, until 2003, the SOC questionnaires had been translated in at least 33 different languages, while a 2017 update revealed that they had been translated in another 16 languages, and used in more than 48 countries in total (7). Both instruments were validated many times in many different population groups, from general population to various groups of patients (e.g. patients with diabetes, cardiovascular diseases, cancer, rheumatoid arthritis, and schizophrenia). The studies evaluated the reliability, mostly in terms of internal consistency, as well as various aspects of validity, e.g. face, criterion, and construct validity (7, 9). The latter was mainly evaluated in terms of the instrument’s factor structure (7, 9, 10). Exploratory (EFA) and/or confirmatory factor analysis (CFA) procedures

were both applied (7, 10-14), using SPSS software for performing EFA (10, 11), and AMOS (11, 13, 15) or Mplus software (14, 16) for performing CFA procedures, for example.

The Slovenian expert group from the Faculty of Medicine, University of Ljubljana, completed the translation/cultural adaptation of the SOC-29 (SOC-29-SVN) and the SOC-13 (SOC-13-SVN) instruments into the Slovenian language, and made them available for research purposes in 2013 (17). However, they have not been validated in any population group in Slovenia yet.

The newest epidemiological data places Slovenia among the countries with the highest MS prevalence worldwide (>100/100,000) (18). In addition, due to a long lifespan, a disability burden of the Slovenian MS patients is very high nowadays (19). Measuring the level of psychosocial dysfunction of MS patients for focused empowerment for a long-term successful coping with this chronic illness is, therefore, mandatory.

To our knowledge, the SOC instrument has not been assessed among Slovenian MS patients yet and we could not find information on the validation of SOC questionnaires in the population of MS patients in online biomedical bibliographic/full-text databases. As it is very important to know whether an instrument reliably and validly measures what it intends to measure in a specific population, the aim of the present study was to validate the SOC-13-SVN instrument with the objective of assessing some of its psychometric characteristics in the Slovenian MS patients.

2 METHODS

This study was carried out in the frame of a larger research project on the impact of SOC on quality-of-life and a self-perceived health in patients with MS at the Department of Neurology of the University Clinical Centre Maribor (UCCM), Slovenia, in the period of March to December 2013 (20).

2.1 Observed Population

All members of the MS patient population, followed-up at the UCCM, which met the inclusion criteria similar to criteria in other MS quality-of-life studies (i.e. MS diagnosis established according to the McDonald’s criteria (21), age 18+ years, without MS exacerbation in the last month prior to the scheduled neurological examination, and without chronic co-morbidity), were considered eligible for participating in the aforementioned research project and, consequently, in this study (20).

2.2 Study Instrument

2.2.1 Description of the SOC 13 Instrument

The SOC-13 is an instrument with 13 items, each being scored on a seven-point scale (6) (Table 1). The values can be considered in the analysis with their original (original scoring) or reverse values (reverse scoring) (6) (Table 1). The measure given by the SOC-13 instrument is a summary score, obtained by summing the values of individual responses to all 13 items, ranging from 13-91 points, with higher scores indicating a stronger SOC.

Table 1. Sense of Coherence 13-item instrument: items, their placement within three dimensions and scoring (6).

Item No.	Question*	Dimension	Scoring
Item_1	Do you have the feeling that you don't really care about what goes on around you? (1=Very seldom or never to 7=Very often)	Me	R
Item_2	Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well? (1=Never happened to 7=Always happened)	C	R
Item_3	Has it happened that people whom you counted on disappointed you? (1=Never happened to 7=Always happened)	Ma	R
Item_4	Until now your life has had: (1=No clear goals or purpose at all to 7=Very clear goals and purpose)	Me	O
Item_5	Do you have the feeling that you're being treated unfairly? (1=Very often to 7=Very seldom or never)	Ma	O
Item_6	Do you have the feeling that you are in an unfamiliar situation and don't know what to do? (1=Very often to 7=Very seldom or never)	C	O
Item_7	Doing the things, you do every day is: (1=A source of deep pleasure and satisfaction to 7=A source of pain and boredom)	Me	R
Item_8	Do you have very mixed-up feelings and ideas? (1=Very often to 7=Very seldom or never)	C	O
Item_9	Does it happen that you have feelings inside you would rather not feel? (1=Very often to 7=Very seldom or never)	C	O
Item_10	Many people - even those with a strong character - sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past? (1=Never to 7=Very often)	Ma	R
Item_11	When something happened, have you generally found that: (1=You overestimated or underestimated its importance to 7=You saw things in the right proportion)	C	O
Item_12	How often do you have the feeling that there's little meaning in the things you do in your daily life? (1=Very often to 7=Very seldom or never)	Me	O
Item_13	How often do you have feelings that you're not sure you can keep under control? (1=Very often to 7=Very seldom or never)	Ma	O

Legend: *=the questions from the questionnaire are reprinted with the permission of the copyright holder; C=comprehensibility; Ma=manageability; Me=meaningfulness; O=original; R=reverse

2.2.2 Translation to Slovenian Language

The translation process was performed at the Chair of Public Health, Faculty of Medicine, University of Ljubljana, in the period of September 2012 to March 2013, after obtaining the written permission from the copyright holders of the original SOC-13. The translation was carried out by a specially established group for this

task, consisting of well-qualified translators (two medical doctors, both specialists in public health, one medical nurse, and one medical sociologist, all with extensive experience in translating medical texts) and a medical student. Back-translation was carried out by a professional linguist with a university degree in English who had never seen the SOC-13 English version. The group followed

all the rules of quality translation. Final solutions were accepted with a full agreement of all group members in a final SOC-13-SVN version (17).

2.3 Instrument Administration and other Data Acquisition

Participants completed the SOC-13-SVN in the presence of a neurology resident and MS nurse. Assistance in reading/writing/explanation was provided if required.

Along with the SOC-13-SVN, the socio-demographic data (gender: male, female; age; education: primary, secondary, college or higher; employment status: employed, unemployed, retired; marital status: single, married/cohabiting; area of living: rural, urban) were also collected. The clinical data, i.e. MS duration in years, a disease course (primary progressive, secondary progressive, relapsing-remitting), clinical worsening of MS in the past year prior to the neurological examination, excluding the period of 30 days prior to the examination (a relapse of relapsing-remitting type of MS or an increase of the EDSS score by 1 point in progressive type of MS; yes, no), the immunomodulatory therapy (yes, no), and the EDSS score, were extracted from the patients' medical records.

Acceptability of the SOC-13-SVN was assessed by calculating a percentage of missing data.

2.4 Psychometric Validation

The expectation-maximization technique was used to replace the missing values (22) and the descriptive statistics were utilized to describe the study participants' characteristics.

The instrument's reliability was assessed using the internal consistency method. First, the Cronbach's alpha coefficient (α) was calculated for each of the three subscales. Then, these values were combined into the reliability of the total score as described in Nunnally & Bernstein (23).

In order to assess the factor structure of the instrument, the CFA was conducted. The robust maximum likelihood estimator (MLM) was used. The criteria for the fit measures were a root mean squared error of approximation (RMSEA) <0.060 , a comparative fit index (CFI) >0.950 , and a standardized root mean squared residual (SRMR) <0.080 (24). Akaike information criterion (AIC) was used for model comparison.

Criterion validity was assessed by calculating the Pearson correlation coefficient between the SOC-13 summary score, the Multiple Sclerosis Quality of Life (MSQOL-54) instrument composite scores (physical (PHC) and the mental health composite (MHC) scores) (25).

The statistical analysis was performed with the SPSS software, version 21.0 (SPSS Inc., Chicago, IL, USA), except for the factor analysis in which the lavaan package (26) in the R environment (27) was used.

3 RESULTS

3.1 Study Participants Characteristics

Out of 207 MS patients initially considered for inclusion, 57 did not meet the inclusion criteria: 55 (96.5%) had comorbidity and two (3.5%) a recent exacerbation of MS. In total, 134/150 eligible patients participated in the study (response rate: 134/150; 89.3%), while 16 refused.

Among the participants, there were 42 males (31.3%) and 92 (68.7%) females. Mean age was 43.2 ± 11.1 years (range: 21-72 years). All other participants' characteristics are presented in Table 2.

The mean SOC-13 summary score was 67.8 (13.3; min: 28; max: 91). The characteristics of the individual item values distribution are displayed in Table 3.

3.2 Missing Values Analysis

The percentage of missing data was generally low. For 7 items (53.8%) there were no missing data. In the other 6 items the range of missing data was 0.7-3.0% (1 or 0.7% in 3 items, 2 or 1.5% in 1 item, 3 or 2.2% in 1 item, and 4 or 3.0% in 1 item). The highest percentage of missing data was recorded in Item_8 (detailed item description is given in Table 1).

Table 2. Characteristics of the multiple sclerosis (MS) patients group for validation of Slovenian version of the Sense of Coherence 13-item instrument (n=134).

Characteristic	Category	No. (%) / Median; Min-Max; Q1-Q3
Education	Primary	16 (11.9)
	Secondary	94 (70.1)
	College or higher	24 (17.9)
Employment status	Employed	63 (47.0)
	Unemployed	18 (13.4)
	Retired	53 (39.6)
Marital status	Single	44 (32.8)
	Married/cohabiting	90 (67.2)
Area of living	Rural	80 (59.7)
	Urban	54 (40.3)
Disease duration (years)		8; 0-33; 4-12.25
Disease course	Primary progressive	6 (4.5)
	Secondary progressive	23 (17.2)
	Relapsing-remitting	105 (78.4)
Clinical worsening of the disease*	No	83 (61.9)
	Yes	51 (38.1)
Immunomodulatory therapy	No	42 (31.3)
	Yes	92 (68.7)
EDSS		3; 0-8; 1.625-4.5

Legend: Q1 - the first quartile; Q3 - the third quartile; *- clinical worsening of the disease in the past year prior to the neurological examination, excluding the period of 30 days prior to the examination (a relapse of relapsing-remitting type of MS or an increase of the EDSS score by 1 point in progressive type of MS); EDSS - Expanded Disability Status Scale score

Table 3. Characteristics of the distribution of values of items of the Sense of Coherence 13-item instrument in the validation study in multiple sclerosis patients (n=134).

Item	Mean	Standard Deviation	Median	Interquartile range
Item_1	5.6	1.6	6	4.44-7
Item_2	4.7	1.7	5	3-6
Item_3	4.8	1.7	5	4-6
Item_4	5.7	1.4	6	5-7
Item_5	5.3	1.7	6	4-7
Item_6	5.4	1.6	6	4-7
Item_7	5.4	1.3	6	4-6
Item_8	4.9	1.7	5	4-6.25
Item_9	5.0	1.8	6	4-6.25
Item_10	5.0	1.6	5	4-6
Item_11	5.0	1.5	5	4-6
Item_12	5.7	1.5	6	5-7
Item_13	5.0	1.7	5	4-6.25

3.3 Psychometric Validation

3.3.1 Reliability

For the instrument as a whole, internal consistency was high ($\alpha_{total}=0.88$) while it was low for three subscales ($\alpha_{comprehensibility}=0.79$; $\alpha_{manageability}=0.66$; $\alpha_{meaningfulness}=0.69$).

3.3.2 Factor Structure

In the CFA, three factor analysis models were defined and tested: the one-factor model, the three-factor model, and a modified three-factor model with correlated uniquenesses. In the third model, we allowed correlated residuals for the Item_2 (*comprehensibility* dimension) and the Item_3 (*manageability* dimension), as well as for the Item_4 (*manageability* dimension) and the Item_13 (*meaningfulness* dimension) (a detailed description of the items is given in Table 1). The statistical properties of these three models are presented in Table 4. The first two models did not fit well, although the fit of the three-factor model was slightly better compared to the one-factor model. The former model was also to be preferred according to AIC. However, the modified three-factor model exhibited a good fit and was to be clearly preferred according to AIC (Table 4).

The Table 5 presents raw (with standard errors) and standardized factor loadings for the modified three-factor model. All loadings were reasonably high, although some items appeared to be better measures of their respective constructs. The correlations between the factors were very high: 0.938 between *comprehensibility* and *manageability* dimensions, 0.811 between *comprehensibility* and *meaningfulness* dimensions, and 0.930 between *manageability* and *meaningfulness* dimensions.

3.3.3 Criterion Validity

The analysis showed a moderate positive strength of relationship between SOC-13 score and both MSQOL-54 composite scores (MHC score: $r=0.597$; PHC score: $r=0.437$). In both cases, the association was highly statistically significant ($p<0.001$).

Table 4. Comparison of three factor analysis models in the Slovenian version of the Sense of Coherence 13-item instrument validation study in multiple sclerosis patients (n=134).

Item	χ^2	df	p	AIC	RMSEA	CFI	SRMR
1-factor	190.63	65	<0.001	6055.38	0.120	0.786	0.084
3-factor	177.10	62	<0.001	6045.75	0.118	0.804	0.083
Modified 3-factor	87.68	60	0.011	5931.90	0.059	0.953	0.065

Legend: AIC=Akaike information criterion; RMSEA=root mean squared error of approximation, CFI=comparative fit index; SRMR=standardized root mean squared residual

Table 5. Factor loadings for the final model in the Slovenian version of the Sense of Coherence 13-item instrument validation study in multiple sclerosis patients (n=134).

Item	Item	Loading (SE)	Standardized loading
Comprehensibility	Item_2	0.804 (0.148)	0.476
	Item_6	1.185 (0.126)	0.726
	Item_8	1.451 (0.107)	0.834
	Item_9	1.370 (0.125)	0.763
	Item_11	0.730 (0.140)	0.505
Manageability	Item_3	0.693 (0.140)	0.421
	Item_5	0.820 (0.149)	0.479
	Item_10	0.740 (0.163)	0.467
	Item_13	1.325 (0.112)	0.787
Meaningfulness	Item_1	0.506 (0.134)	0.319
	Item_4	0.890 (0.124)	0.658
	Item_7	0.806 (0.105)	0.623
	Item_12	1.266 (0.142)	0.855

4 DISCUSSION

Based on the results of this study, we can conclude that the SOC-13-SVN successfully passed the evaluation for cultural equivalence as well as fulfilled the necessary psychometric criteria for being used in the Slovenian MS patients' population.

The results of the reliability analysis are consistent with the results reported in other similar studies. In particular, the reliability of the total score obtained in our study is in the upper part of the values range of this measure obtained in other similar studies (range 0.70-0.93) (9, 10-12, 15, 16, 28-34). Taking the small number of items into account, it can be considered to be reasonably high and close to the value recommended when making decisions about individuals (23).

Analysis of the factor structure has confirmed a three-factor structure of the SOC-13-SVN with good fit. The multidimensionality shown in our study is consistent with the results of a systematic review of Eriksson & Lindstrom (9), who concluded that the SOC seems to be a multidimensional construct. According to that review, factor analysis in a few studies confirmed the unidimensional model, while in others this failed, and two-factor, three-factor, and five-factor models of structure were found (9). However, our three-factor model was modified. Correlated residuals were allowed for two pairs of items, since the items in both pairs have something in common, regardless of whether they belong to different dimensions. In the first pair (Item_2, Item_3), both items address participants' expectations about people who could help them in distress, while in the second pair (Item_4, Item_13), both items are focused on the management of life situations. These results are in line with Antonovsky who stated that items, although theoretically pertaining to one dimension, share elements with items from other dimensions (6). Despite the three-dimensional structure, the use of the single total score is encouraged in our study. The first reason is the high correlations between dimensions and low reliability of the subscale scores were found in our study and the second that the one-factor model was advocated by Antonovsky himself, since the questionnaire was not intended to measure dimensions individually (6, 28).

The criterion validity results were also consistent with the results of other similar studies, which used quality-of-life instruments for assessing this aspect of validity (range 0.51-0.77) (9).

Finally, if we make a rough comparison of the SOC-13 summary score mean value obtained in our MS patients, this almost coincides with the results of the only similar study that we found, i.e. the study of Broersma et al. (67.5 ± 13.3) (35).

This study has some limitations. First, a relatively small number of participants were included in the present study, however, the number was still sufficient to permit fair conclusions. Next, one could argue that no method of measurement of stability of the instrument over time, e.g. the test-retest method, was used in the present study. However, the reliability of any patient-reported outcome measure can be evaluated using measurement stability methods and/or measurement equivalence methods. The latter were developed in the social science research for the situations in which it is not possible to perform repeated measurements because the measured phenomenon changes or could change over time (36). As we assumed, based on results of previous studies (37-39), that the phenomenon measured in our study could change over time so, due to specificities of the observed group, only the measures of equivalence were used (36). Finally, not all aspects of validity were analysed in this study, however, we decided to report only usually reported results as in similar studies (9, 10-12, 15, 16, 28-34).

The study also has some important strengths. The most important is that this study provided novel knowledge about the psychometric properties of SOC-13 instrument when evaluated in MS patients. Given the results of this study, MS patients could join a number of population groups and settings in which the SOC is or was assessed (7). Moreover, new opportunities are opening toward a more personalized medicine approach in terms of integrating health promotion approaches (i.e. by using SOC for increasing/strengthening interventions (40, 41)) for disease management in MS patients.

There are still many challenges in researching the use of SOC-13 in MS patients. It is necessary first to check the dynamics/stability of the SOC in time, especially in those subgroups with more rapidly evolving and/or a more severe form of MS, as well as in those with comorbidity. In the latter group, the SOC has to a certain extent already been studied in MS patients with depressive symptoms (42). Additionally, with a focus on studying the properties of the SOC-13-SVN, further evaluation is needed. Our work can be continued by working on a larger dataset and analysing additional aspects of validity.

5 CONCLUSION

The rigorously performed translation process provided a good quality translation of the SOC-13 to Slovenian language. Analysis of its psychometric properties proved that this instrument is a reliable tool for use in Slovenian MS patients.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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ETHICAL CONSIDERATIONS

The study was approved by the Medical Ethics Committee of Slovenia on July 17, 2012 (approval No. 24k/07/12).

REFERENCES

- World Health Organisation. Neurological disorders: public health challenges. Geneva: WHO, 2006.
- Benito-Leon J, Manuel Morales J, Rivera-Navarro J, Mitchell A. A review about the impact of multiple sclerosis on health-related quality of life. *Disabil Rehabil*. 2003;25:1291-303. doi: 10.1080/09638280310001608591.
- Hermann BP, Vickrey B, Hays RD, Cramer J, Devinsky O, Meador K, et al. A comparison of health-related quality of life in patients with epilepsy, diabetes and multiple sclerosis. *Epilepsy Res*. 1996;25:113-8.
- Murphy N, Confavreux C, Haas J, Konig N, Roullet E, Sailer M, et al. Quality of life in multiple sclerosis in France, Germany, and the United Kingdom. Cost of Multiple Sclerosis Study Group. *J Neurol Neurosurg Psychiatry*. 1998;65:460-6.
- Pugliatti M, Rosati G, Carton H, Riise T, Drulovic J, Vecsei L, et al. The epidemiology of multiple sclerosis in Europe. *Eur J Neurol*. 2006;13:700-22. doi: 10.1111/j.1468-1331.2006.01342.x.
- Antonovsky A. *Unraveling the mystery of health: how people manage stress and stay well*. San Francisco: Jossey-Bass, 1987.
- Mittelmark MB, Sagy S, Eriksson M, Bauer GF, Pelikan JM, Lindstrom B, et al, editors. *The handbook of salutogenesis*. Heidelberg: Springer, 2017.
- Calandri E, Graziano F, Borghi M, Bonino S. Coping strategies and adjustment to multiple sclerosis among recently diagnosed patients: the mediating role of sense of coherence. *Clin Rehabil*. 2017;31:1386-95. doi: 10.1177/0269215517695374.
- Eriksson M, Lindstrom B. Validity of Antonovsky's sense of coherence scale: a systematic review. *J Epidemiol Community Health*. 2005;59:460-6. doi: 10.1136/jech.2003.018085.
- Jakobsson U. Testing construct validity of the 13-item Sense of Coherence Scale in a sample of older adults. *Open Geriatr Med J*. 2011;4:6-13. doi: 10.2174/1874827901104010006.
- Naaldenberg J, Tobi H, van den Esker F, Vaandrager L. Psychometric properties of the OLQ-13 scale to measure sense of coherence in a community-dwelling older population. *Health Qual Life Outcomes*. 2011;9:37. doi: 10.1186/1477-7525-9-37.
- Sardu C, Mereu A, Sotgiu A, Andriassi L, Jacobson MK, Contu P. Antonovsky's Sense of Coherence scale: cultural validation of SOC questionnaire and sociodemographic patterns in an Italian population. *Clin Pract Epidemiol Ment Health*. 2012;8:1-6. doi: 10.2174/1745017901208010001.
- Soderhamn O, Holmgren L. Testing Antonovsky's sense of coherence (SOC) scale among Swedish physically active older people. *Scand J Psychol*. 2004;45:215-21. doi: 10.1111/j.1467-9450.2004.00397.x.
- Bonacchi A, Miccinesi G, Galli S, Chiesi F, Martire M, Guazzini M, et al. The dimensionality of Antonovsky's sense of coherence scales: an investigation with Italian samples. *TPM*. 2012;19:115-34. doi: 10.4473/TPM19.2.4.
- Ferguson S, Davis D, Browne J, Taylor J. Examining the validity and reliability of Antonovsky's sense of coherence scale in a population of pregnant Australian women. *Eval Health Prof*. 2015;38:280-9. doi: 10.1177/0163278715578558.
- Saravia JC, Iberico C, Yearwood K. Validation of sense of coherence (SOC) 13-item scale in a Peruvian sample. *J Behav Health Soc Issues*. 2014;6:35-44. doi: 10.5460/jbhsi.v6.2.43847.
- Zaletel-Kragelj L, Pahor M, Mihelic-Zajec A, Farkas-Lainscak J, Cvirn C, Vrhunec B. Translation of the questionnaire "Sense of Coherence - Orientation to Life Questionnaire" in the Slovenian language (in Slovenian). Ljubljana: University of Ljubljana, Faculty of Medicine, Chair of Public Health, 2015.
- Multiple Sclerosis International Federation. *Atlas of MS 2013: mapping multiple sclerosis around the world*. London: Multiple Sclerosis International Federation, 2013.
- Vidmar G, Burger H, Marincek C. Time trends in ability level and functional outcome of stroke and multiple sclerosis patients undergoing comprehensive rehabilitation in Slovenia. *Zdr Varst*. 2011;50:24-33. doi: 10.2478/v10152-010-0025-6.
- Stern B, Hojs Fabjan T, Renner-Sitar K, Zaletel-Kragelj L. Validation of the Slovenian version of Multiple Sclerosis Quality of Life (MSQOL-54) instrument. *Zdr Varst*. 2017;56:260-7. doi: 10.1515/sjph-2017-0035.
- Polman CH, Reingold SC, Banwell B, Clanet M, Cohen JA, Filippi M, et al. Diagnostic criteria for multiple sclerosis: 2010 revisions to the McDonald criteria. *Ann Neurol*. 2011;69:292-302. doi: 10.1002/ana.22366.
- Song Q, Shepperd M. Missing data imputation techniques. *Int J Bus Int Data Min*. 2007;2:249-60. doi: 10.1504/IJBIDM.2007.015485.
- Nunnally JC, Bernstein IH. *Psychometric theory*. 3rd ed. New York: McGraw-Hill, 1994.
- Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling*. 1999;6:1-55. doi: 10.1080/10705519909540118.
- Vickrey BG, Hays RD, Harooni R, Myers LW, Ellison GW. A health-related quality of life measure for multiple sclerosis. *Qual Life Res*. 1995;4:187-206.
- Rosseel Y. lavaan: an R package for structural equation modeling. *J Stat Softw*. 2012;48:1-36. doi: 10.18637/jss.v048.i02.
- R Foundation. The R project for statistical computing. Accessed November 27th, 2018 at: <http://www.R-project.org/>.
- Antonovsky A. The structure and properties of the sense of coherence scale. *Soc Sci Med*. 1993;36:725-33.
- Mahammadzadeh A, Poursharifib H, Alipoura A. Validation of Sense of Coherence (SOC) 13-item scale in Iranian sample. *Proc Soc Behav*. 2010;5:1451-5. doi: 10.1016/j.sbspro.2010.07.306.
- Rohani C, Khanjari S, Abedi HA, Oskouie F, Langius-Eklof A. Health index, sense of coherence scale, brief religious coping scale and spiritual perspective scale: psychometric properties. *J Adv Nurs*. 2010;66:2796-806. doi: 10.1111/j.1365-2648.2010.05409.x.

31. Tyagi A, Kumar S, Sethi AK, Dhaliwal U. Factors influencing career choice in anaesthesiology. *Indian J Anaesth.* 2012;56:342-7. doi: 10.4103/0019-5049.100814.
32. Moksnes UK, Haugan G. Validation of the Orientation to Life Questionnaire in Norwegian adolescents, construct validity across samples. *Soc Indic Res.* 2014;119:1105-20. doi: 10.1007/s11205-013-0536-z.
33. Spadoti Dantas RA, Silva FS, Ciol MA. Psychometric properties of the Brazilian Portuguese versions of the 29- and 13-item scales of the Antonovsky's Sense of Coherence (SOC-29 and SOC-13) evaluated in Brazilian cardiac patients. *J Clin Nurs.* 2014;23:156-65. doi: 10.1111/jocn.12157.
34. Rajesh G, Eriksson M, Pai K, Seemanthini S, Naik DG, Rao A. The validity and reliability of the sense of coherence scale among Indian university students. *Glob Health Promot.* 2016;23:16-26. doi: 10.1177/1757975915572691.
35. Broersma F, Oeseburg B, Dijkstra J, Wynia K. The impact of self-perceived limitations, stigma and sense of coherence on quality of life in multiple sclerosis patients: results of a cross-sectional study. *Clin Rehabil.* 2018;32:536-45. doi: 10.1177/0269215517730670.
36. Ferligoj A, Leskošek K, Kogovšek T. Methodological notes 10. Reliability and validity of measurement (in Slovenian). Ljubljana: University of Ljubljana, FDV, 1995.
37. Karlsson I, Berglin E, Larsson PA. Sense of coherence: quality of life before and after coronary artery bypass surgery - a longitudinal study. *J Adv Nurs.* 2000;31:1383-92.
38. Forsberg A, Backman L, Svensson E. Liver transplant recipients' ability to cope during the first 12 months after transplantation - a prospective study. *Scand J Caring Sci.* 2002;16:345-52.
39. Snekkevik H, Anke AG, Stanghelle JK, Fugl-Meyer AR. Is sense of coherence stable after multiple trauma? *Clin Rehabil.* 2003;17:443-53. doi: 10.1191/0269215503cr630oa.
40. Kahonen K, Naatanen P, Tolvanen A, Salmela-Aro K. Development of sense of coherence during two group interventions. *Scand J Psychol.* 2012;53:523-7. doi: 10.1111/sjop.12020.
41. Super S, Wagemakers MA, Picavet HS, Verkooijen KT, Koelen MA. Strengthening sense of coherence: opportunities for theory building in health promotion. *Health Promot Int.* 2016;31:869-78. doi: 10.1093/heapro/dav071.
42. Gottberg K, Einarsson U, Fredrikson S, von Koch L, Holmqvist LW. A population-based study of depressive symptoms in multiple sclerosis in Stockholm county: association with functioning and sense of coherence. *J Neurol Neurosurg Psychiatry.* 2007;78:60-5. doi: 10.1136/jnnp.2006.090654.

PERCEPTIONS TOWARDS HEALTHY DIET OF THE PORTUGUESE ACCORDING TO AREA OF WORK OR STUDIES

DOJEMANJE ZDRAVE PREHRANE PORTUGALCEV GLEDE NA NJIHOVO PODROČJE DELA ALI ŠTUDIJA

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ABSTRACT

Keywords:

food areas, healthy diet, nutrition knowledge, perceptions, survey, Portugal

Introduction: A healthy diet is crucial for the maintenance of health. Therefore, the aim of this work is to evaluate the perceptions towards a healthy diet among the participants with work or studies in areas related to diet and nutrition and those who did not.

Methods: Anonymous questionnaire data was collected in a cross-sectional study on a non-probabilistic sample of 902 participants living in Portugal.

Results: The results showed that the participants' perceptions were, in general, compliant with a healthy diet. However, significant differences were found between gender ($p=0.004$), between the different civil state groups ($p=0.016$), between the participants who were responsible for buying their own food and those who were not and also regarding the living environment. The variable area of work or studies also showed significant differences ($p=0.001$), so that people who had work or studies related to agriculture obtained a higher score. Regarding this variable, the mean values of nutrition and agriculture areas were not statistically different between them, but were statistically different from the mean values of psychology and health areas. The participants who had work or studies in areas showing diet and nutrition-related issues achieved a higher mean score (0.72 ± 0.35) when compared to the participants who did not (0.58 ± 0.30).

Conclusion: However, despite the results, it is important to continue developing campaigns that better communicate nutritional aspects, so that people can increase their knowledge on this subject.

IZVLEČEK

Ključne besede:

področje prehrane, zdrava prehrana, znanje o prehrani, dojemanje prehrane, vprašalniki, Portugalska

Uvod: Zdrava prehrana je ključnega pomena za ohranjanje zdravja. Zato je cilj te študije oceniti dojemanje zdrave prehrane med v raziskavi sodelujočimi zaposlenimi in študenti, ki so profesionalno povezani s področjem prehrane, in tistimi, ki to niso.

Metode: Anonimni podatki iz vprašalnika so bili zbrani v medsektorski študiji z verjetnostnim vzorčenjem 902 sodelujočih, ki prebivajo na Portugalskem.

Rezultati: Rezultati so pokazali, da je dojemanje zdrave prehrane med sodelujočimi v študiji na splošno v skladu z zdravo prehrano. Pokazale pa so se izrazite razlike med spoloma ($p = 0,004$), med različnimi skupinami glede na zakonski stan ($p = 0,016$), med sodelujočimi, ki so odgovorni za nakup lastne hrane, in tistimi, ki to niso, ter glede na bivalno okolje. Različna področja dela ali študija so prav tako pokazala izrazite razlike ($p = 0,001$), kar pomeni, da imajo osebe, ki so zaposlene na področju kmetijstva ali študirajo kaj v zvezi s prehrano, na tem področju boljše rezultate. Na podlagi te spremenljivke se povprečne vrednosti iz področja kmetijstva statistično ne razlikujejo med seboj, vendar se statistično razlikujejo od povprečnih vrednosti s področja psihologije in zdravstva. Sodelujoči, ki so profesionalno kakorkoli povezani s prehrano, so dosegli višje povprečne rezultate ($0,72 \pm 0,35$) v primerjavi z ostalimi ($0,58 \pm 0,30$).

Zaključek: Kljub tem rezultatom je pomembno, da nadaljujemo s promocijo zdrave prehrane in ljudi izobražujemo in ozaveščamo o pomenu zdrave prehrane.

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1 INTRODUCTION

Healthy eating is one of the major factors that contributes to preventing people becoming overweight or obese, as well as a number of non-communicable chronic diseases (NCDs), such as heart diseases, type II diabetes and cancer (1). Eating patterns should consist of various combinations of foods that may differ in macronutrient, vitamin, and mineral compositions. Therefore, in order to follow a healthy diet it is important to emphasise the intake of vegetables, fruits, and whole grains, and to include the consumption of low-fat dairy products, poultry, fish, legumes, non-tropical vegetable oils and nuts. On the other hand, the intake of sweets, sugar-sweetened beverages and red meats should be limited (2).

According to the World Health Organization (3), smoking, physical inactivity, unhealthy diet, and alcohol are strongly associated and causally linked to the incidence of most NCDs. However, choosing to have a healthy diet is not a simple task, because people's food choices constitute more than a simple matter about food nutritional value (4). People's food choices are influenced by many factors, namely biological, health, emotional, social, convenience, price, ethical concerns and nutrition knowledge, among others (5, 6). Nutritional knowledge is influenced by different sociodemographic characteristics, such as age, gender, level of education, and socio-economic status (7). According to the Social Cognitive Theory (8), knowledge is one of the important determinants that contributes to change behaviour. Several studies suggested that there is a positive association between higher nutrition knowledge and the adoption of healthier dietary patterns (9, 10), as well as lower rates of obesity (11-13). However, not all studies have found an association between nutrition knowledge and healthier eating habits (14). Nevertheless, increasing people's nutrition knowledge is still an important health strategy (15). Since the information about Portuguese nutrition knowledge is limited, it is crucial to perform more studies in this area in order to develop and implement more effective programs to encourage the choice of a healthier diet.

This study is included in the multinational project entitled "Psycho-social motivations associated with food choices and eating practices (EATMOT)" which intends to perform research about the different psychological and social motivations that determine people's eating patterns in relation to their choices or eating habits.

The main goal of this particular study is to compare the perceptions towards a healthy diet between the participants who had work or studies in areas that addressed diet and nutrition-related issues and those who did not have. The study also analyses in what way other sociodemographic factors could influence the participants' perceptions about a healthy diet.

2 MATERIALS AND METHODS

2.1 Instrument

For this study, a questionnaire was purposely created to take into consideration a literature review of other existing instruments (16-22). The questionnaire included two parts destined to collect information about several important issues:

Part I - Sociodemographic data (1. Age; 2. Gender; 3. Highest level of education completed; 4. Living environment; 5. Civil state; 6. Present professional activity; 7. Area of the professional activity or studies; 8. "Are you responsible for buying the food you eat?");

Part II - Perceptions about a healthy diet (1. "A healthy diet is based on calorie count"; 2. "We should never consume sugary products"; 3. "Fruit and vegetables are very important for a practice of healthy eating"; 4. "A healthy diet should be balanced, varied and complete"; 5. "We can eat everything, as long as it is in small quantities"; 6. "I believe that food produced in a biological way is healthier" and 7. "We should never consume fat products").

In order to measure the perceptions towards a healthy diet, a scale ranging from -2 to +2 was used, which can be interpreted as follows: [-2.0 ; -1.5] perceptions not at all compliant with a healthy diet; [-1.5 ; -0.5] perceptions not compliant with a healthy diet; [-0.5 ; 0.5] perceptions poorly compliant with a healthy diet; [0.5 ; 1.5] perceptions compliant with a healthy diet; [1.5 ; 2.0] perceptions fully compliant with a healthy diet. Then, an average of the scores obtained for all the items included in part II of the questionnaire was calculated.

2.2 Data Collection

A descriptive cross-sectional study on a non-probabilistic sample of 902 participants was undertaken. The data was collected from September 2017 to January 2018, among the Portuguese population. The questionnaires were applied online, after informed consent, only to adults (aged 18 or over). All ethical issues were verified when formulating and applying the questionnaire, which was approved by the Ethical Committee with reference no. 04/2017.

2.3 Statistical Analysis

For exploratory analysis of the data, several basic descriptive statistical tools were used, for example, the mean and standard deviation. In all tests, the level of significance considered was 5% ($p < 0.05$) and for all data analyses the SPSS software from IBM Inc. (version 24) was used.

In order to compare the means of two groups, the Student's t-test for independent samples was used and for the comparison of the means of three or more groups one-way ANOVA was used. In the case of ANOVA, to assess the differences between groups the post-hoc Tukey HSD test was used. The Tukey's test, also known as the Tukey's HSD (Honestly Significant Difference) test is a statistical test to find out which means are significantly different from each other, and consists of a single-step multiple comparison procedure, coupled to ANOVA (23). In this test, the difference between means is evaluated to see whether or not it is greater than the standard error (24-26).

3 RESULTS AND DISCUSSION

3.1 Sample Characterization

Table 1 summarises the demographical data for the sample being studied. This work involved 902 participants aged a minimum of 19 years and a maximum of 80 years, being on average 42 ± 13 years, from which 63.1% were women and 36.9% were men. The average age of men, 44 ± 14 years, was higher than that of women, 41 ± 13 years. As for age, the participants were classified into categories according to: young adults ($18 \leq \text{age} \leq 30$), corresponding to 23.9%; average adults ($31 \leq \text{age} \leq 50$), accounting for 47.3%; senior adults ($51 \leq \text{age} \leq 64$), representing 23.2%; and finally elderly (≥ 65), which accounted for 5.5% of the sample.

Concerning the level of education, 71.6% of the participants had a university degree, 28.4% had completed secondary school, and none had the primary school as the highest level of education achieved.

Regarding the civil state, most of the participants were married or lived together as a marital couple (63.3%), 23.5% were single, 7.0% were divorced or separated and 6.2% were widowed.

As for the living environment, 88.9% of the participants lived in an urban area, 6.5% lived in rural areas and 4.5% lived in a suburban area.

Regarding the profession, most of the participants were employed (77.7%), 10.8% were students, 4.3% were working students, 4.0% were retired and 3.2% were unemployed.

Table 1. Sociodemographical characterization.

Sociodemographic data		Percentage (%)
Age	18y ≤ age ≤ 30y	23.9
	31y ≤ age ≤ 50y	47.3
	51y ≤ age ≤ 64y	23.2
	Age ≥ 65y	5.5
Gender	Women	63.1
	Men	36.9
Highest level of education	Primary school	0.0
	Secondary school	28.4
	University degree	71.6
Living environment	Rural	6.5
	Urban	88.9
	Suburban	4.5
Civil state	Single	23.5
	Married/Living together	63.3
	Divorced/Separated	7.0
	Widow	6.2
Profession	Employed	77.7
	Unemployed	3.2
	Student	10.8
	Retired	4.0
	Working student	4.3
Area of studies or work	Nutrition	3.7
	Food	5.3
	Agriculture	2.9
	Sport	1.0
	Psychology	1.2
	Health	7.8
	Others	78.2

Concerning the participants' professional activity or field of studies, the majority of the participants, 78.2%, did not have any professional activity or field of studies related to any of the options suggested (nutrition, food science, agriculture, sport, psychology, activities related to other health areas), 7.8% had a professional activity or field of studies related to other health areas, 5.3% had a professional activity or field of studies related to food, 3.7% had a professional activity or field of studies related to nutrition, 2.9% had a professional activity or field of studies related to agriculture, 1.2% had a professional activity or field of studies related to psychology and only 1.0% had an activity or studies in the sport area. In general, 20.6% of the participants had a professional activity or field of studies related to areas that addressed diet and nutrition-related issues, against 79.4% who did not. When seen by gender, a higher percentage of women, 24.6%, had a professional activity or field of studies related to that area when compared to men (15.3%).

When the participants were asked if they were responsible for buying their own food, 97.2% answered yes against only 2.8% that answered no, having a similar percentage for both men and women, 97.0% and 97.4%, respectively.

3.2 Perceptions Towards a Healthy Diet

3.2.1 Individual's Characteristics

For the sample at study, the mean score for the participants' perceptions towards a healthy diet was equal to 0.61 ± 0.31 , meaning that, in general, the participants' perceptions were compliant with a healthy diet.

Table 2 presents the results for the relations between an individual's characteristics and their perceptions towards a healthy diet and, as it can be observed, the mean scores were similar for all age groups and were between 0.5 and 1.0, which means that for those participants the perceptions were compliant with a healthy diet. The results of the ANOVA test revealed that there were no significant differences in the perceptions towards healthy eating among age groups. This finding is consistent with another study, in which it was also shown that nutritional knowledge was not associated with age (27).

Regarding gender, it was found that both men and women had perceptions compliant with a healthy diet, with a higher mean score for women (0.63 ± 0.33) when compared to men (0.57 ± 0.28). As was expected, there were found to be significant differences between genders. Previous studies also suggested that women tended to have a higher nutritional knowledge than men (28, 29).

As for the civil state, all groups had mean values between 0.5 and 1.5, corresponding to perceptions compliant with a healthy diet in all cases. The results of the ANOVA test showed that there were significant differences between the civil state groups. In fact, living arrangements and marital status have been shown to have a significant effect on a person's health and mortality (30) and, generally, married people tend to have better health profiles than other people, including those who are divorced, separated or widowed (31-33).

Table 2. Relations between an individual's characteristics and their perceptions towards a healthy diet (scale from -2=perceptions not at all compliant with a healthy diet to +2=perceptions fully compliant with a healthy diet).

Variable		Mean±SD	p
Age group	18y≤ age ≤30y	0.61±0.31a	0.485 ¹
	31y≤ age ≤50y	0.61±0.31a	
	51y≤ age ≤64y	0.61±0.33a	
	Age≥65y	0.54±0.26a	
Gender	Women	0.63±0.33	0.004 ²
	Men	0.57±0.28	
Civil state	Single	0.66±0.33a	0.016 ¹
	Married/Living together	0.60±0.31a	
	Divorced/Separated	0.55±0.31a	
	Widowed	0.55±0.21a	
Highest level of education	Secondary school	0.61±0.31	0.952 ²
	University	0.61±0.31	
Is responsible for buying the food	Yes	0.60 ±0.31	0.000 ²
	No	0.88±0.30	
Living environment	Rural	0.83±0.35b	0.000 ¹
	Urban	0.58±0.30a	
	Suburban	0.86±0.29b	

¹ANOVA for comparison of 3 or more groups (Level of significance 5%).

Mean values with the same letter are not statistically different ($p < 0.05$).

²Student's t-test for independent samples for comparison of 2 groups (Level of significance 5%).

Regarding the level of education, it was observed that there were no significant differences between the participants who had a university degree and those who had secondary school as their terminal education. In both cases, the mean score was equal to 0.61 ± 0.31 , meaning that for those participants the perceptions were compliant with a healthy diet. This finding is not consistent with the ones obtained in previous studies, where it was found that a higher level of education usually corresponds to a better nutritional knowledge (27, 34).

The results of the Student's t-test showed that there were significant differences between the participants who were responsible for buying their own food and the participants who were not, with the participants who were not responsible being the ones that obtained the highest mean score (0.88 ± 0.30). However, in both cases the participants' perceptions were compliant with a healthy diet.

Concerning the living environment, with a higher mean score came the participants who lived in suburban areas (0.86 ± 0.29), followed by the participants who lived in rural areas (0.83 ± 0.35) and finally the ones who lived in urban areas (0.58 ± 0.30), meaning that for those participants the perceptions were compliant with a healthy diet. Furthermore, there were found to be significant differences in the perceptions towards healthy eating among the participants that lived in different areas.

3.2.2 Professional Characteristics

Table 3 presents the relations between professional characteristics and the perceptions towards a healthy diet and, as can be observed, the scores obtained for the perceptions towards a healthy diet according to the professional status were 0.62 ± 0.29 for students, 0.61 ± 0.31 for employed participants, 0.61 ± 0.36 for working students, 0.59 ± 0.39 for unemployed participants and 0.56 ± 0.26 for retired, which means that the participants in all of these professional groups had perceptions compliant with a healthy diet. However, no significant differences were found. According to scientific evidences, an unhealthy diet and adverse effects on health are generally associated with lower incomes, lower education or working in lower status (35, 36). Others studies suggested that students are only slightly aware of nutrition issues and their knowledge and attitudes are average (37).

The results also revealed that the participants who had work or studies in areas where diet and nutrition-related issues are addressed had a higher mean score than the participants who did not have (0.72 ± 0.35 and 0.58 ± 0.30 , respectively). As it was expected, significant differences were found between these two groups concerning the perceptions towards a healthy diet. Nevertheless, in both cases the participants' perceptions were compliant with a healthy diet.

Table 3. Relations between professional characteristics and the perceptions towards a healthy diet (scale from -2=perceptions not at all compliant with a healthy diet to +2=perceptions fully compliant with a healthy diet).

Variable		Mean±SD	p-value
Professional status	Employed	0.61±0.31a	0.878 ¹
	Unemployed	0.59±0.39a	
	Student	0.62±0.29a	
	Retired	0.56±0.26a	
	Working student	0.61±0.36a	
Work or studies related to food areas	Yes	0.72±0.35	0.000 ²
	No	0.58±0.30	
Area of studies or work	Nutrition	0.83±0.33b	0.000 ¹
	Food	0.80±0.28ab	
	Agriculture	0.84±0.37b	
	Sport	0.63±0.36ab	
	Psychology	0.56±0.40a	
	Health	0.55±0.32a	
	Others	0.58±0.30ab	

¹ANOVA for comparison of 3 or more groups (Level of significance 5%). Mean values with the same letter are not statistically different ($p < 0.05$).

²Student's t-test for independent samples for comparison of 2 groups (Level of significance 5%).

As for the area of studies or work, the participants who had work or studies related to agriculture were the ones obtaining the highest score (0.84 ± 0.37), followed by the participants who had work or studies related to nutrition (0.83 ± 0.33), the participants who had work or studies related to food (0.80 ± 0.28), the participants who had work or studies related to sport (0.63 ± 0.36), the participants who had work or studies related to other areas (0.58 ± 0.30), the participants who had work or studies related to psychology (0.56 ± 0.40) and finally the participants who had work or studies related to health areas (0.55 ± 0.32). Nevertheless, in all cases the participants' perceptions were compliant with a healthy diet. Furthermore, significant differences were found among the areas of study/work. More specifically, the mean values of nutrition and agriculture areas were statistically different from the mean values of psychology and health areas. Kris-Etherton et al. (38) reviewed the status of nutrition education for healthcare professionals, namely physicians, in the United States, United Kingdom, and also Australia. They concluded that most healthcare professionals are not adequately trained to address diet and nutrition-related issues with their patients. On the contrary, according to the results of the study by Alissa et al. (39), most medical students are aware about the importance of a healthy diet. In another study by Peltzer et al. (40), it was observed that there was no association between risk awareness and health risk behaviour among health science students and there was an inverse association among non-health science students.

4 CONCLUSION

This study allowed for the obtaining of important results about people's perceptions towards a healthy diet in a sample of the Portuguese population, namely, in general, the participants' perceptions were compliant with a healthy diet. There were no significant differences in healthy diet perceptions' scores regarding age group, level of education, and professional status. On the other hand, there were significant differences among gender, civil state, the fact that the participants were responsible for buying their own food or not, the living environment and the area of studies or work.

Regarding the area of work/studies, the highest score achieved was for the participants who had work or studies in agriculture areas and the lowest for the ones who had work/study in health areas. The mean values obtained for nutrition and agriculture areas were not statistically different between them, but they were statistically different from the scores obtained for psychology and health areas.

Overall, the results suggested that the participants who had work or studies in areas where diet and nutrition-related issues are addressed are more aware about some nutritional aspects of their diet than the participants who did not.

However, there were no mean scores equal or higher than 1.50, which means that in none of the cases the participants' perceptions were fully compliant with a healthy diet. Therefore, it is crucial to continue developing health promotion projects that allow for increasing people's nutrition knowledge.

CONFLICTS OF INTEREST

The authors declare that no conflicts of interest exist.

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ETHICAL APPROVAL

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REFERENCES

- Schermel A, Mendoza J, Henson S, Dukeshire S, Pasut L, Emrich TE, et al. Canadians' perceptions of food, diet, and health - a national survey. *Plos One*. 2014;9:e86000. doi: 10.1371/journal.pone.0086000.
- Eckel RH, Jakicic JM, Ard JD, Jesus JM de, Miller NH, Hubbard VS, et al. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2014;63(25 Part B):2960-84. doi: 10.1016/j.jacc.2013.11.003.
- Burden of mortality, morbidity and risk factors. In: World Health Organization. *Global status report on noncommunicable diseases*. Geneva: WHO, 2011:176.
- Sun Y-HC. Health concern, food choice motives, and attitudes toward healthy eating: the mediating role of food choice motives. *Appetite*. 2008;51:42-9. doi: 10.1016/j.appet.2007.11.004.
- Cunha LM, Cabral D, Moura AP, de Almeida MDV. Application of the food choice questionnaire across cultures: systematic review of cross-cultural and single country studies. *Food Qual Prefer*. 2018;64:21-36. doi: 10.1016/j.foodqual.2017.10.007.
- Kullen CJ, Iredale L, Prvan T, O'Connor HT. Evaluation of general nutrition knowledge in Australian military personnel. *J Acad Nutr Diet*. 2016;116:251-8. doi: 10.1016/j.jand.2015.08.014.
- Barreiro-Hurlé J, Gracia A, de-Magistris T. Does nutrition information on food products lead to healthier food choices? *Food Policy*. 2010;35:221-9. doi: 10.1016/j.foodpol.2009.12.006.

8. Bandura A, National Inst of Mental Health. Prentice-Hall series in social learning theory. Social foundations of thought and action: a social cognitive theory. Englewood Cliffs: Prentice-Hall, 1986.
9. Bukenya R, Ahmed A, Andrade JM, Grigsby-Toussaint DS, Muyonga J, Andrade JE. Validity and reliability of general nutrition knowledge questionnaire for adults in Uganda. *Nutrients*. 2017;9:172. doi: 10.3390/nu9020172.
10. Hendrie GA, Coveney J, Cox D. Exploring nutrition knowledge and the demographic variation in knowledge levels in an Australian community sample. *Public Health Nutr*. 2008;11:1365-71. doi: 10.1017/S1368980008003042.
11. Bonaccio M, DiCastelnuovo A, Costanzo S, De Lucia F, Olivieri M, Donati MB, et al. Nutrition knowledge is associated with higher adherence to Mediterranean diet and lower prevalence of obesity: results from the Moli-sani study. *Appetite*. 2013;68:139-46. doi: 10.1016/j.appet.2013.04.026.
12. De Vriendt T, Matthys C, Verbeke W, Pynaert I, De Henauw S. Determinants of nutrition knowledge in young and middle-aged Belgian women and the association with their dietary behaviour. *Appetite*. 2009;52:788-92. doi: 10.1016/j.appet.2013.04.026.
13. Grosso G, Mistretta A, Turconi G, Cena H, Roggi C, Galvano F. Nutrition knowledge and other determinants of food intake and lifestyle habits in children and young adolescents living in a rural area of Sicily, South Italy. *Public Health Nutr*. 2013;16:1827-36. doi: 10.1017/S1368980012003965.
14. Jones AM, Lamp C, Neelon M, Nicholson Y, Schneider C, Wooten Swanson P, et al. Reliability and validity of nutrition knowledge questionnaire for adults. *J Nutr Educ Behav*. 2015;47:69-74. doi: 10.1016/j.jneb.2014.08.003.
15. Hartmann C, Keller C, Siegrist M. Compensatory beliefs, nutrition knowledge and eating styles of users and non-users of meal replacement products. *Appetite*. 2016;105:775-81. doi: 10.1016/j.appet.2016.07.013.
16. Aikman SN, Crites SL, Fabrigar LR. Beyond affect and cognition: identification of the informational bases of food attitudes. *J Appl Soc Psychol*. 2006;36:340-82. doi: 10.1111/j.0021-9029.2006.00011.x.
17. Jackson B, Lynne Cooper M, Mintz L, Albino A. Motivations to eat: scale development and validation. *J Res Personal*. 2003;37:297-318. doi: 10.1016/S0092-6566(02)00574-3.
18. Lindeman M, Väänänen M. Measurement of ethical food choice motives. *Appetite*. 2000;34:55-9. doi: 10.1006/appe.1999.0293.
19. Renner B, Sproesser G, Strohbach S, Schupp HT. Why we eat what we eat: The Eating Motivation Survey (TEMS). *Appetite*. 2012;59:117-28. doi: 10.1016/j.appet.2012.04.004.
20. Roininen K, Lähteenmäki L, Tuorila H. Quantification of consumer attitudes to health and hedonic characteristics of foods. *Appetite*. 1999;33:71-88. doi: 10.1006/appe.1999.0232.
21. Steptoe A, Pollard TM, Wardle J. Development of a measure of the motives underlying the selection of food: the food choice questionnaire. *Appetite*. 1995;25:267-84. doi: 10.1006/appe.1995.0061.
22. van Strien T, Frijters JER, Bergers GPA, Defares PB. The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *Int J Eat Disord*. 1986;5:295-315.
23. Guiné RPF, Almeida IC, Correia AC, Gonçalves FJ. Evaluation of the physical, chemical and sensory properties of raisins produced from grapes of the cultivar Crimson. *J Food Meas Charact*. 2015;9:337-46. doi: 10.1007/s11694-015-9241-8.
24. Guiné RPF, Henriques F, Barroca MJ. Influence of drying treatments on the physical and chemical properties of cucumber. *J Food Meas Charact*. 2014;8:195-206. doi: 10.1007/s11694-014-9180-9.
25. Rodrigues Â, Correia P, Guiné R. Physical, chemical and sensorial properties of healthy and mixture breads in Portugal. *J Food Meas Charact*. 2014;8:70-80. doi: 10.1007/s11694-013-9166-z.
26. Santos SCRVL, Guiné RPF, Barros A. Effect of drying temperatures on the phenolic composition and antioxidant activity of pears of Rocha variety (*Pyrus communis* L.). *J Food Meas Charact*. 2014;8:105-12. doi: 10.1007/s11694-014-9170-y.
27. Carrillo E, Varela P, Fiszman S. Influence of nutritional knowledge on the use and interpretation of Spanish nutritional food labels. *J Food Sci*. 2012;77:H1-8. doi: 10.1111/j.1750-3841.2011.02479.x.
28. Gracia A, Loureiro M, Nayga RM. Do consumers perceive benefits from the implementation of an EU mandatory nutritional labelling program? *Food Policy*. 2007;32:160-74. doi: 10.1016/j.foodpol.2006.04.002.
29. Misra R. Knowledge, attitudes, and label use among college students. *J Am Diet Assoc*. 2007;107:2130-4. doi: 10.1016/j.jada.2007.09.001.
30. Robards J, Evandrou M, Falkingham J, Vlachantoni A. Marital status, health and mortality. *Maturitas*. 2012;73:295-9. doi: 10.1016/j.maturitas.2012.08.007.
31. Elwert F, Christakis NA. Widowhood and race. *Am Sociol Rev*. 2006;71:16-41. doi: 10.1177/000312240607100102.
32. Kang J, Kim J, Lee M-A. Marital status and mortality: does family structure in childhood matter? *Soc Sci Med*. 2016;159:152-60. doi: 10.1016/j.socscimed.2016.05.010.
33. Mineau GP, Smith KR, Bean LL. Historical trends of survival among widows and widowers. *Soc Sci Med*. 1982. 2002;54:245-54.
34. MacArthur RL, Wang YH, Feng X. Influence of age and education on nutritional knowledge and dietary choices among Chinese consumers in Shenyang, China. *Malayan J Nutr*. 2016;22:17-28.
35. Mayén A-L, Marques-Vidal P, Paccaud F, Bovet P, Stringhini S. Socioeconomic determinants of dietary patterns in low- and middle-income countries: a systematic review. *Am J Clin Nutr*. 2014;100:1520-31. doi: 10.3945/ajcn.114.089029.
36. Tang KL, Rashid R, Godley J, Ghali WA. Association between subjective social status and cardiovascular disease and cardiovascular risk factors: a systematic review and meta-analysis. *BMJ Open*. 2016;6. doi: 10.1136/bmjopen-2015-010137.
37. Lowry R, Galuska DA, Fulton JE, Wechsler H, Kann L, Collins JL. Physical activity, food choice, and weight management goals and practices among U.S. college students. *Am J Prev Med*. 2000;18:18-27. doi: 10.1016/S0749-3797(99)00107-5.
38. Kris-Etherton PM, Akabas SR, Douglas P, Kohlmeier M, Laur C, Lenders CM, et al. Nutrition competencies in health professionals' education and training: a new paradigm. *Adv Nutr*. 2015;6:83-7. doi: 10.3945/an.114.006734.
39. Alissa EM, Alsawadi H, Zedan A, Alqarni D, Bakry M, Hli NB. Knowledge, attitude and practice of dietary and lifestyle habits among medical students in King Abdulaziz University, Saudi Arabia. *Int J Nutr Food Sci*. 2015;4:650. doi: 10.11648/j.ijnfs.20150406.18.
40. Peltzer K, Pengpid S, Yung TKC, Aounallah-Skhiri H, Rehman R. Comparison of health risk behavior, awareness, and health benefit beliefs of health science and non-health science students: an international study. *Nurs Health Sci*. 2016;18:180-7. doi: 10.1111/nhs.12242.

ACCEPTANCE OF SEASONAL INFLUENZA VACCINATION AMONG SLOVENIAN PHYSICIANS, 2016

SPREJEMLJIVOST CEPLJENJA PROTI SEZONSKI GRIPI MED SLOVENSKIMI ZDRAVNIKI, 2016

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ABSTRACT

Keywords:

influenza, vaccinations,
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Introduction: Vaccination against seasonal influenza is recommended for all healthcare workers including physicians in Slovenia to protect vulnerable individuals and reduce transmission of influenza viruses. The aim of our study is to determine the uptake of seasonal influenza vaccination among Slovenian physicians, to identify factors associated with that vaccination and assess their attitudes and beliefs regarding vaccination and vaccine-preventable diseases.

Methods: A cross-sectional survey was performed among physician members of the Slovenian Medical Chamber. The link to the anonymous web-based questionnaire was sent to 8,297 physicians. We estimated the overall proportion of physicians who vaccinate against influenza, while the possible associations with collected explanatory variables were explored in univariate analyses.

Results: The response rate to the survey was 10.8%. 75.9% (95% CI: 73.1-78.7%) physicians vaccinate themselves against influenza (regularly or occasionally) and 24.1% (95% CI: 21.2-26.8%) do not vaccinate (not any more or never). In univariate analysis only, the area of work was statistically significant when associated with vaccinating against influenza ($p=0.002$). Among physicians who expressed some misconceptions regarding vaccination and vaccine-preventable diseases (it is better to overcome disease naturally as vaccines pose a higher risk than disease) the proportion of vaccinated against influenza was low (43.2%; 95% CI: 27.9-58.4%, 27.3%; 95% CI: 7.1-47.5%).

Conclusion: Not trusting in vaccination or professional recommendations regarding vaccination and some misconceptions regarding vaccination and vaccine-preventable diseases may influence the decision to be vaccinated against seasonal influenza among Slovenian physicians.

IZVLEČEK

Ključne besede:

sezonska gripa,
cepljenje, zdravniki,
Slovenija

Uvod: Cepljenje proti sezonski gripi je priporočljivo za zaščito ranljivih posameznikov in zmanjšanje prenosa virusov influence za vse zdravstvene delavce v Sloveniji, vključno z zdravniki. Namen raziskave je bil med slovenskimi zdravniki ugotoviti delež cepljenih proti sezonski gripi, določiti dejavnike, povezane s tem cepljenjem ter oceniti njihov odnos in prepričanja glede cepljenja in bolezni, ki jih preprečujemo s cepljenjem.

Metode: Izvedena je bila presečna raziskava med zdravniki, ki so člani Zdravniške zbornice Slovenije. Link do anonimnega spletnega vprašalnika je bil poslan 8.297 zdravnikom. Ocenili smo skupni delež zdravnikov, ki se cepijo proti gripi, morebitno povezanost z izbranimi pojasnjevalnimi spremenljivkami smo proučili z univariatnimi analizami.

Rezultati: Stopnja odgovora v raziskavi je bila 10,8 %, 75,9 % (95 % CI: 73,1-78,7 %) zdravnikov se cepi proti gripi (redno ali občasno), 24,1 % (95 % CI: 21,2-26,8 %) pa se jih ne cepi (ne več ali nikoli). V univariatni analizi se je le področje dela izkazalo za statistično značilno povezano s cepljenjem proti sezonski gripi ($p = 0,002$). Med zdravniki, ki so izrazili nekatera napačna prepričanja v zvezi s cepljenjem in boleznimi, ki jih preprečujemo s cepljenjem (bolje je bolezen preboleti po naravni poti, cepiva predstavljajo večje tveganje kot bolezen), je bil delež cepljenih proti influenci nizek (43,2 %; 95 % CI: 27,9-58,4 %, 27,3 %; 95 % CI: 7,1-47,5 %).

Zaključek: Nezaupanje v cepljenje ali v strokovna priporočila glede cepljenja ter nekatera napačna prepričanja v zvezi s cepljenjem in boleznimi, ki jih preprečujemo s cepljenjem, lahko vplivajo na odločitev o cepljenju proti sezonski gripi med slovenskimi zdravniki.

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1 INTRODUCTION

In Europe, influenza occurs in regular annual epidemics in the winter season. Seasonal influenza epidemics are associated with high morbidity and mortality. Severe illness and complications are more common in certain risk groups, which include those with chronic medical conditions and individuals 65 years of age and above (1-3). Vaccination is the main public health intervention for preventing influenza (3). To protect vulnerable individuals and reduce influenza virus transmission, vaccination is also recommended for healthcare workers.

Immunization protects healthcare workers themselves, and their patients from nosocomial influenza infections. In addition, influenza can disrupt health services and impact healthcare organizations financially. Immunization can reduce staff absences, offer cost savings and provide economic benefits (5). It has also been shown that physicians' knowledge, attitudes and behavior regarding influenza vaccination have a significant impact on the decision-making process of their patients (6).

According to the Slovenian national immunization program for employees, vaccination against influenza is performed based on a safety statement with workplace risk assessment, among persons who are exposed to an infection with seasonal influenza virus or can transmit infection to others through their work, in particular for healthcare professionals, including physicians (7). Vaccination providers reported that only about 3,600 health workers were vaccinated against influenza in Slovenia in the 2016/17 season; based on this data, it is estimated that the vaccination uptake for healthcare workers in this season was only around 10% (8). There is no information on the vaccination uptake among individual profiles of health professionals, including physicians, from this routine monitoring data. Studies in Slovenia aiming at explaining predictors for vaccinating against seasonal influenza and also other vaccinations among healthcare workers (including physicians) and among the general population are very scarce (9-12).

The aim of our study is to determine the uptake of seasonal influenza vaccination among Slovenian physicians, to identify factors associated with this vaccination and assess their attitudes and beliefs regarding vaccination and vaccine-preventable diseases.

2 METHODS

2.1 Study Population and Data Collection

We conducted a cross-sectional survey among Slovenian physicians, who are members of the Slovenian Medical Chamber. Membership of the Medical Chamber is

compulsory by law in Slovenia for all physicians working at all levels in public or private healthcare. Data for the current analysis was collected in December and January 2016 as a part of a large interdisciplinary study project about vaccination scepticism in Slovenia. In December 2016, an invitation letter the link to the anonymous web-based questionnaire was sent out by e-mail to all 8,297 physicians listed at the time of the study in the registry of the Slovenian Medical Chamber.

We developed the questionnaire after reviewing the literature and pilot-tested it for clarity, length and face validity among several physicians at the National Institute of Public Health. The vaccination status against seasonal influenza was examined with the question "Were you ever vaccinated against seasonal influenza?" and four possible answers "yes, regularly", "yes, occasionally", "yes, but not anymore" and "never". In addition to these responses, individual participants' age, gender, health region and size of place (by number of inhabitants) where workplace is located, area of work, level of healthcare (primary, secondary or tertiary) and previous history of side effects after vaccination were recorded. To assess the attitudes and beliefs toward vaccination in general and vaccine-preventable diseases, the participants were asked of the extent to which they agreed with the given statements and their responses were collected with a five-point scale: completely disagree, mostly disagree, neither disagree nor agree, mostly agree and completely agree.

2.2 Statistical Analysis

Statistical analyses were performed using the STATA package version 10.0 (Stata Statistical Software: release 10.0 College Station, TX: Stata Corporation). The responses to questions on seasonal influenza vaccination status were dichotomised, so that participants who regularly or occasionally vaccinate were coded as vaccinate ("1") and participants who do not vaccinate anymore or were never vaccinated were coded as do not vaccinate ("0"), to examine associations between influenza vaccination status and collected explanatory variables (socio-demographic factors, history of side effects after previous vaccinations, attitudes and beliefs toward vaccination and vaccine-preventable diseases). We estimated the overall proportion of Slovenian physicians who vaccinate or do not vaccinate against seasonal influenza with 95% confidence intervals (CI). Possible associations between influenza vaccination status and collected explanatory variables were explored in a univariate analyses by calculating odds ratios (OR) with 95% CI estimates and/or Pearson's chi-square tests for significance. The level of statistical significance was set at $p < 0.05$.

3 RESULTS

Web-based questionnaires were filled in by 897 out of 8,297 Slovenian physicians (response rate 10.8%). The median age of participants was 41 years (range 25-85 years) and 71.4% were female (Table 1). Most of them (43.5%) were working in the Ljubljana health region, followed by Maribor (13.7%), Celje (9.0%), Kranj (7.5%), Novo mesto (7.0%), Koper (6.8%), Nova Gorica (5.3%), Murska Sobota (3.39) and Ravne (3.2%). According to the area of work, respondents were working in family or general medicine (23.5%), pediatrics or school medicine (17.9%) and internal medicine or infectious diseases (10.8%), while remaining participants (47.8%) listed other areas (mostly gynecology, anesthesiology, psychiatry, and surgery). Almost half of the physicians (42.3%) who participated in the study, performed most of their work at the primary level of healthcare, 29.7% at secondary level, and 28.1% at tertiary level.

Out of 894 physicians who reported on their vaccination status against seasonal influenza, 75.9% (95% CI: 73.1-78.7) vaccinate against influenza (regularly or occasionally) and 24.1% (95% CI: 21.2-26.8%) do not vaccinate (not anymore or never). The reasons why they vaccinate themselves were (multiple answers possible) because the free vaccination was offered 32.6% (95% CI: 29.1-36.1%), because of the recommendation to vaccinate 23.7% (95% CI: 20.5-27.0%), for personal protection 83.4% (95% CI: 80.7-86.3%), to protect patients and family members 73.6% (95% CI: 70.4-77.0%) and other (influenza vaccine safe and effective, having complications after influenza,

no absence from work due to illness...) 3.8% (95% CI: 2.4-5.3%). Physicians who do not vaccinate against influenza stated the following reasons: fear of side effects of the influenza vaccine 11.6% (95% CI: 7.3-15.9%), doubt in the effectiveness of influenza vaccine 37.2% (95% CI: 30.7-43.7%), not feeling threatened by the disease 47.9% (95% CI: 41.2-54.6%), not having enough information about influenza vaccination 6.0% (95% CI: 2.8-9.2%), having problems after influenza vaccination 10.7% (95% CI: 6.5-14.9%) and others (never having influenza before, having contraindications for influenza vaccination - autoimmune disease, allergy to egg white, short-term effectiveness of the vaccine and because it is necessary to be vaccinated every year, vaccination organised at an inappropriate time, working with mostly healthy patients...) 19.5% (95% CI: 14.2-24.9%).

Influenza vaccination status according to demographic characteristics and history of side effects after previous vaccinations of participants is shown in Table 1. In a univariate analysis only area of work was statistically significant associated with vaccinating against influenza among Slovenian physicians ($p=0.002$). Physicians who worked in family or general medicine had 1.66 (95% CI: 0.81-1.79) higher odds to vaccinate themselves against influenza, those from paediatrics or school medicine has 2.01 (95% CI: 1.25-3.24) higher odds to vaccinate and those from internal medicine or infectious diseases has 2.52 (95% CI: 1.35-4.73) higher odds to vaccinate in comparison to physicians working in other areas of medicine.

Table 1. Seasonal influenza vaccination status according to demographic characteristics and history of side effects after vaccination, Slovenian physicians, 2016.

Characteristic	All		Vaccinated*			OR	95% CI	p
	N	%	N	%	95% CI			
All	894	100.0	679	75.9	73.1-78.7			
Gender								
Male	253	28.6	190	75.1	69.7-80.5	1		0.649
Female	632	71.4	483	76.5	73.2-79.9	1.08	0.77-1.52	
Age (years)								
25-34	305	34.9	239	78.4	73.7-83.0	1		0.605
35-44	187	21.4	138	73.8	67.4-80.2	0.78	0.51-1.20	
45-54	166	18.0	123	74.5	67.8-81.3	0.81	0.52-1.26	
55-64	150	17.2	112	74.7	67.6-81.7	0.81	0.51-1.29	
≥65	65	7.4	52	81.2	71.4-91.1	1.20	0.60-2.37	
Health region								
Celje	80	9.0	59	73.7	63.9-83.6	0.22	0.04-1.03	0.092
Koper	60	6.8	48	80.0	69.6-90.4	0.31	0.06-1.53	
Kranj	67	7.5	56	84.8	76.0-93.7	0.43	0.09-2.15	
Ljubljana	386	43.5	290	75.3	71.0-79.6	0.23	0.05-1.02	
Maribor	122	13.7	87	71.3	63.2-79.4	0.19	0.04-0.89	
MurskaSobota	35	3.9	31	88.6	77.5-100.0	0.60	0.10-3.59	
Nova Gorica	47	5.3	33	70.2	56.6-83.8	0.18	0.03-0.93	
Novo mesto	62	7.0	45	73.8	62.4-85.1	0.22	0.04-1.10	
Ravne	28	3.2	26	93.0	82.7-100.0	1		
Place of work - size								
<2,000 inhabitants	28	3.1	19	67.7	49.4-86.3	1		0.720
2,000-10,000 inhabitants	171	19.3	133	77.8	71.5-84.1	1.66	0.69-3.98	
10,000-100,000 inhabitants	291	32.8	219	75.8	70.8-80.7	1.48	0.64-3.43	
>100,000 inhabitants	398	44.8	303	76.3	72.1-80.5	1.53	0.67-3.49	
Area of work								
Family/general medicine	207	23.5	155	74.9	68.9-80.8	1.19	0.81	0.002
Paediatrics/school medicine	158	17.9	131	83.4	77.6-89.3	2.01	-1.79	
Internal med./infectious diseases	95	10.8	82	86.3	79.3-93.3	2.52	1.25-3.24	
Other	421	47.8	300	71.4	68.1-75.8	1	1.35-4.73	
Level of healthcare								
Primary	363	42.3	275	75.8	71.3-80.2	1		0.438
Secondary	255	29.7	189	74.4	69.0-79.8	0.93	0.64-1.35	
Tertiary	241	28.1	190	79.2	74.0-84.3	1.22	0.82-1.80	
Had side effects after previous vaccination								
No	670	75.9	504	75.6	72.3-78.8	1		0.670
Yes	213	24.1	164	77.0	71.3-82.7	1.08	0.74-1.59	

*regularly or occasionally against seasonal influenza

CI: confidence interval; OR: odds ratio; p: p value.

Number of individuals vary according to the number of missing values for individual variables.

Table 2 shows the association between seasonal influenza vaccination status and attitudes and beliefs toward vaccination and vaccine-preventable diseases. The proportion of participants who agreed to given statements and vaccinate themselves against influenza differed significantly from participants who disagreed. Among physicians who agreed with statements that they trust in vaccines and vaccinations or that they trust in

professional recommendations regarding vaccination, the proportion of those who vaccinate against influenza was higher (79.6%; 95% CI: 76.8-82.4% and 78.8%; 95% CI: 76.0-81.6%) than among those who expressed distrust (14.3%; 95% CI: 0.5-28.1% and 13.0%; 95% CI: 0-28.0%). Among physicians who agreed with the statements that it is better to overcome disease naturally, that they are afraid of vaccines' side effects and that vaccines pose a higher

risk than disease, the proportion of those who vaccinate themselves against influenza was lower (43.2%; 95% CI: 27.9-58.4%, 49.1%; 95% CI: 36.0-62.3% and 27.3%; 95% CI:

7.1-47.5) than among those who expressed disagreement with dose statements (80.3%; 95% CI: 77.4-83.1%, 80.7%; 95% CI:77.9-83.6% and 78.6%; 95% CI:75.8-81.4%).

Table 2. Seasonal influenza vaccination status according to attitudes and beliefs toward vaccination and vaccine-preventable diseases, Slovenian physicians, 2016.

	All		Vaccinated*			p
	N	%	N	%	95% CI	
I fully trust professional recommendations regarding vaccination.						
agree	825	93.6	650	78.8	76.0-81.6	<0.001
undecided	33	4.1	17	51.5	33.5-69.5	
disagree	23	2.6	3	13.0	0.0-28.0	
I fully trust in vaccination and vaccines.						
agree	804	91.3	640	79.6	76.8-82.4	<0.001
undecided	49	5.6	27	55.1	40.7-69.5	
disagree	28	3.2	4	14.3	0.5-28.1	
By vaccinating the majority, we significantly contribute to the protection of those who cannot be vaccinated.						
agree	839	95.4	660	78.7	75.9-81.4	<0.001
undecided	21	2.4	2	9.5	0.0-23.2	
disagree	19	2.2	6	31.6	8.5-54.6	
It's far better to overcome the disease naturally than to be vaccinated.						
agree	44	5.0	19	43.2	27.9-58.4	<0.001
undecided	96	10.8	56	58.3	48.3-68.4	
disagree	745	84.2	598	80.3	77.4-83.1	
Because of the way the vaccine works, they will never be completely safe.						
agree	409	46.3	297	72.6	68.3-76.9	0.001
undecided	139	15.7	97	69.8	62.0-77.5	
disagree	336	38.0	278	82.7	78.7-86.8	
I'm afraid of vaccination because I'm afraid of the side effects of vaccines.						
agree	59	6.7	29	49.1	36.0-62.3	<0.001
undecided	75	8.6	38	50.7	39.0-62.2	
disagree	743	84.7	600	80.7	77.9-83.6	
Vaccination poses a higher risk to the health of the vaccinated person than a disease that can be prevented by vaccination.						
agree	22	2.5	6	27.3	7.1-47.5	<0.001
undecided	27	3.1	9	33.3	14.3-52.3	
disagree	836	94.5	657	78.6	75.8-81.4	
It is very important that all healthcare workers are regularly vaccinated against influenza.						
agree	588	66.6	548	93.2	91.1-95.2	<0.001
undecided	152	17.2	72	47.4	39.3-55.4	
disagree	143	16.2	51	35.7	27.7-43.6	
The influence of the pharmaceutical industry on the decision-making bodies on vaccines is very high in Slovenia.						
agree	129	14.6	66	51.2	42.4-59.9	<0.001
undecided	296	33.4	214	72.3	67.7-77.4	
disagree	460	52.0	393	85.4	82.2-88.7	

*regularly or occasionally against seasonal influenza

CI: confidence interval; p: p value.

Number of individuals vary according to the number of missing values for individual variables.

4 DISCUSSION

Three quarters of Slovenian physicians who participated in our study reported that they regularly or occasionally vaccinate themselves against seasonal influenza. Physicians who worked in family/general medicine, paediatrics/school medicine or internal medicine/infectious diseases were more likely to vaccinate themselves against seasonal influenza in comparison to physicians working in other areas of medicine. There was a higher proportion of vaccinated against influenza among physicians who expressed trust in vaccination or professional recommendations regarding vaccination. However, among physicians who expressed some misconceptions regarding vaccination and vaccine-preventable diseases, the proportion of vaccinated against influenza was low.

Our study showed that around 75% of physicians who participated in our study reported that they regularly (52%) or occasionally (23%) vaccinate themselves against seasonal influenza. Our results are comparable to the results of the first national survey conducted in 2010 among Slovenian doctors and dentists assessing their uptake of pandemic and seasonal influenza vaccine, where 42% of physicians reported that they were vaccinated against pandemic and seasonal influenza in the last season, and 10% only against seasonal influenza (9). If we compare these results to the results of routine monitoring of seasonal influenza vaccination coverage among healthcare workers in Slovenia, showing that only about 10% of them vaccinate every season (8), we can conclude that the vaccination coverage among physicians is higher than among other profiles of healthcare workers. Therefore, other profiles should be included in similar studies, especially nurses, most of whom have an even higher level of contact with patients. The vaccination coverage of healthcare workers is also not optimal in other European countries. According to the report from the European Center for Disease Control in 2014, 17 countries provided data on vaccination coverage among healthcare workers that ranged from 5.7% to 54.4% (median 26.9%).

Among the examined demographic characteristics, only area of work was statistically significant when associated with vaccinating against seasonal influenza in our study. For comparison, in a similar study among Slovenian physicians and dentists from 2010, acceptance of the pandemic and seasonal influenza vaccine was determined by higher age, being an internal medical trainee or specialist, working in a hospital, performing any kind of vaccination, and having a chronic disease. Like in our study, those who declined vaccination believed that they did not need to be vaccinated, had safety concerns and were afraid of side effects (9). Another study performed among the Slovene general population aged 18 and over showed that, in addition to common predictors, a decision in

favor of the seasonal and pandemic influenza vaccinations were related to age, gender, chronic illnesses, working in healthcare, trust in media news, and vaccination side-effects in someone close. It was also related to trust in vaccine safety and professional information in favor of vaccination, and the decision of someone close to vaccinate (10).

Among the physicians included in our study, some expressed distrust in vaccination or professional recommendations regarding vaccination and some expressed certain misconceptions regarding vaccination and vaccine-preventable diseases. Among these, the proportion of vaccinated against influenza was lower. This is supported with scientific evidence that vaccination is a safe and effective measure that undeniably saves lives and remains one of the most important measures for reducing the burden of communicable diseases (13). For the individual, the risk of damage due to vaccination is significantly lower than the risk of complications due to vaccine-preventable disease (14, 15). There is a lack of acceptance of vaccines by the general population, but physicians also report doubts about risks and usefulness of vaccines or low vaccine acceptance among themselves (16). Physicians with such doubts may hesitate to recommend vaccination to their patients (17). Therefore, the confidence of physicians in the efficacy and safety of vaccines and vaccinations is very important. The gaps were identified in the initial training and the continuous medical education of physicians regarding vaccination in Slovenia and Europe (16, 18, 19). Education on the effectiveness and safety of vaccination should be one of the priority public health measures for improving knowledge and eliminating barriers to vaccination among physicians (16).

The limitations of our study include validity constraints of self-reported information, while declaration or desirability biases cannot be excluded. Unfortunately, attitudes and beliefs were not measured specifically for influenza and influenza vaccination but for vaccination and vaccine-preventable diseases in general. The main limitation of our study was the low response rate that limits the generalisability of the results. The anonymity of responders prevented us from sending a reminder letter to the non-responders. There is the possibility of selection bias, if more physicians with a positive opinion on vaccination who vaccinate more were more likely to respond to the survey. If such bias exists, it may lead to an overestimation of the proportion of Slovenian physicians who vaccinate themselves against seasonal influenza.

5 CONCLUSION

Not trusting in vaccination or professional recommendations regarding vaccination and certainly some misconceptions regarding vaccination and vaccine-preventable diseases may influence the decision to be vaccinated against seasonal influenza among Slovenian physicians. It is important that healthcare workers themselves, especially physicians, trust in vaccination and are its promoters, as they can significantly influence beliefs and behaviors associated with the vaccinations of their patients. It is also important for physicians to vaccinate regularly against seasonal influenza because they protect themselves, their family members and their patients against infection.

CONFLICT OF INTEREST

The authors declare that they have no financial, professional or personal conflicting interests related to this article.

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ETHICAL APPROVAL

The Republic of Slovenia National Medical Ethics Committee approved the project proposal for the study (Consent number: 127/03/14).

REFERENCES

1. Učakar V, Sočan M, Trilar KP. The impact of influenza and respiratory syncytial virus on hospitalizations for lower respiratory tract infections in young children: Slovenia, 2006-2011. *Influenza Respir Viruses*. 2013;7:1093-102. doi: 10.1111/irv.12134.
2. Sočan M, Prosenc K, Učakar V, Berginc N. A comparison of the demographic and clinical characteristics of laboratory-confirmed influenza B Yamagata and Victoria lineage infection. *J Clin Virol*. 2014;61:156-60. doi: 10.1016/j.jcv.2014.06.018.
3. Paules C, Subbarao K. Influenza. *Lancet*. 2017;390:697-708. doi: 10.1016/S0140-6736(17)30129-0.
4. European Centre for Disease Prevention and Control. Seasonal influenza vaccination in Europe. Vaccination recommendations and coverage rates in the EU Member States for eight influenza seasons: 2007-2008 to 2014-2015. Stockholm: ECDC, 2017. doi: 10.2900/15361.
5. Music T. Protecting patients, protecting healthcare workers: a review of the role of influenza vaccination. *Int Nurs Rev*. 2012;59:161-7. doi: 10.1111/j.1466-7657.2011.00961.x.
6. Nichol KL, Zimmerman R. Generalist and subspecialist physicians' knowledge, attitudes, and practices regarding influenza and pneumococcal vaccinations for elderly and other high-risk patients: a nationwide survey. *Arch Intern Med*. 2001;161:2702-8.
7. Pravilnik o določitvi Programa cepljenja in zaščite z zdravili za leto 2018. Uradni list RS. 24(13.4.2018):3635.
8. Učakar V, Jeraj I, Vitek Grgič M. Analiza izvajanja cepljenja v Sloveniji v letu 2016. Accessed April 2nd, 2018 at: http://www.nijz.si/sites/www.nijz.si/files/uploaded/porocilo_cepljenje2016.pdf
9. Sočan M, Erčulj V, Lajovic J. Knowledge and attitudes on pandemic and seasonal influenza vaccination among Slovenian physicians and dentists. *Eur J Public Health*. 2013;23:92-7. doi: 10.1093/eurpub/cks006.
10. Podlesek A, Rožkar S, Komidar L. Some factors affecting the decision on non-mandatory vaccination in an influenza pandemic: comparison of pandemic (H1N1) and seasonal influenza vaccination. *Zdr Varst*. 2011;50:227-38. doi: 10.2478/v10152-011-0002-8.
11. Grdadolnik U, Sočan M. The impact of socio-economic determinants on the vaccination rates with rotavirus and human papilloma virus vaccine. *Zdr Varst*. 2016;55:43-52. doi: 10.1515/sjph-2016-0007.
12. Grgič-Vitek M, Klavs I. Low coverage and predictors of vaccination uptake against tick-borne encephalitis in Slovenia. *Eur J Public Health*. 2012;2:182-6. doi: 10.1093/eurpub/ckr018.
13. Andre FE, Booy R, Bock HL, Clemens J, Datta SK, John TJ, et al. Vaccination greatly reduces disease, disability, death and inequity worldwide. *Bull World Health Organ*. 2008;86:140-6.
14. Kraigher A, Učakar V. Surveillance of adverse events following immunization against pandemic influenza in Slovenia in season 2009/10. *Vaccine*. 2010;28:5467-72. doi: 10.1016/j.vaccine.2010.05.066.
15. Kwong JC, Vasa PP, Campitelli MA, Hawken S, Wilson K, Rosella LC, et al. Risk of Guillain-Barré syndrome after seasonal influenza vaccination and influenza health-care encounters: a self-controlled study. *Lancet Infect Dis*. 2013;13:769-76. doi: 10.1016/S1473-3099(13)70104-X.
16. Herzog R, Álvarez-Pasquin MJ, Díaz C, Del Barrio JL, Estrada JM, Gil Á. Are healthcare workers' intentions to vaccinate related to their knowledge, beliefs and attitudes?: a systematic review. *BMC Public Health*. 2013;13:154. doi: 10.1186/1471-2458-13-154.
17. Verger P, Fressard L, Collange F, Gautier A, Jestin C, Launay O, et al. Vaccine Hesitancy among general practitioners and its determinants during controversies: a national cross-sectional survey in France. *EBioMedicine*. 2015;2:891-7. doi: 10.1016/j.ebiom.2015.06.018.
18. Vorsters A, Tack S, Hendrickx G, Vladimirova N, Bonanni P, Pistol A, et al. A summer school on vaccinology: responding to identified gaps in pre-service immunisation training of future health care workers. *Vaccine*. 2010;28:2053-9. doi: 10.1016/j.vaccine.2009.12.033.
19. Jeraj I, Učakar V. Stališča, znanje in prakse študentov medicine do cepljenja. *eNBOZ*. 2017;16:4-11. Accessed April 24th, 2017 at: http://www.nijz.si/sites/www.nijz.si/files/uploaded/enboz_december.pdf

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Journal: **Zdravstveno varstvo (ZV) ISSN 0351-0026 (print edition) / Slovenian Journal of Public Health (SJPH) ISSN 1854-2476 (electronic edition)**

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example for master theses, doctor theses:

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Naslov v angleškem in slovenskem jeziku naj bo kratek in natančen, opisen in ne trdilen (povedi v naslovih niso dopustne). Navedena naj bodo imena piscev z natančnimi akademskimi in strokovnimi naslovi ter popoln naslov ustanove, inštituta ali klinike, kjer je delo nastalo. Avtorji morajo izpolnjevati pogoje za avtorstvo. Prispevati morajo k zasnovi in oblikovanju oz. analizi in interpretaciji podatkov, rokopis morajo intelektualno zasnovati oz. ga kritično pregledati, strinjati se morajo s končno različico rokopisa. Samo zbiranje podatkov ne zadostuje za avtorstvo.

IZVLEČEK IN KLJUČNE BESEDE

Izveček v angleškem in slovenskem jeziku naj bo pri znanstvenem in metodološkem članku strukturiran in naj ne bo daljši od 250 besed v angleščini in 400 besed v slovenščini, izvlečki ostalih člankov so lahko nestrukturirani. Izveček naj vsebinsko povzema in ne le našteva bistvene vsebine dela. Izogibajte se kraticam in okrajšavam. Napisan naj bo v 3. osebi.

Izvleček znanstvenega članka naj povzema namen dela, osnovne metode, glavne izsledke in njihovo statistično pomembnost ter poglobitve sklepe (struktura IMRC - Introduction, Methods, Results, Conclusions).

Navedenih naj bo 3-10 ključnih besed, ki nam bodo v pomoč pri indeksiranju. Uporabljajte izraze iz MeSH - Medical Subject Headings, ki jih navaja Index Medicus.

KATEGORIJA PRISPEVKA

Kategorijo prispevka predlaga z vnosom v ustrezno polje avtor sam, končno odločitev pa sprejme urednik na osnovi predlogov recenzentov. Objavljamo izvirne znanstvene članke, metodološke članke, sistematične pregledne znanstvene članke in vabljeni uvodniki.

REFERENCE

Avtorjem priporočamo, da pregledajo objavljene članke na temo svojega rokopisa v predhodnih številkah naše revije (za obdobje zadnjih pet let).

Vsako navajanje trditve ali dognanj drugih morate podpreti z referenco. Reference naj bodo v besedilu navedene po vrstnem redu, tako kot se pojavljajo. Referenca naj bo navedena na koncu citirane trditve. Reference v besedilu, slikah in tabelah navedite v oklepaju z arabskimi števkami ((1), (2, 3), (4-7)). Reference, ki se pojavljajo samo v tabelah ali slikah, naj bodo oštevilčene tako, kot se bodo pojavile v besedilu. Kot referenc ne navajajte izvlečkov in osebnih dogovorov (slednje je lahko navedeno v besedilu). Seznam citirane literature dodajte na koncu prispevka. Literaturo citirajte po priloženih navodilih, ki so v skladu s tistimi, ki jih uporablja ameriška National Library of Medicine v Index Medicus. Uporabljajte numerično citiranje. Imena revij krajšajte tako, kot določa Index Medicus (popoln seznam na naslovu URL: <http://www.nlm.nih.gov>).

Navedite imena vseh avtorjev, v primeru, da je avtorjev šest ali več, navedite prvih šest avtorjev in dodajte et al.

Če ima članek/knjiga DOI številko, jo mora avtor navesti na koncu reference.

PRIMERI ZA CITIRANJE LITERATURE

primer za knjigo:

1. Anderson P, Baumberg P. Alcohol in Europe. London: Institute of Alcohol Studies, 2006.
2. Mahy BWJ. A dictionary of virology. 2nd ed. San Diego: Academic Press, 1997.

primer za poglavje iz knjige:

3. Urlep F. Razvoj osnovnega zdravstva v Sloveniji zadnjih 130 let. In: Švab I, Rotar-Pavlič D, editors. Družinska medicina. Ljubljana: Združenje zdravnikov družinske medicine, 2002:18-27.
4. Goldberg BW. Population-based health care. In: Taylor RB, editor. Family medicine. 5th ed. New York: Springer, 1999:32-6.

primer za članek iz revije:

5. Florez H, Pan Q, Ackermann RT, Marrero DG, Barrett-Connor E, Delahanty L, et al. Impact of lifestyle intervention and metformin on health-related quality of life: the diabetes prevention program randomized trial. J Gen Intern Med. 2012;27:1594-601. doi: 10.1007/s11606-012-2122-5.

primer za članek iz revije, kjer avtor ni znan:

6. Anon. Early drinking said to increase alcoholism risk. Globe. 1998;2:8-10.

primer za članek iz revije, kjer je avtor organizacija:

7. Women's Concerns Study Group. Raising concerns about family history of breast cancer in primary care consultations: prospective, population based study. Br Med J. 2001;322:27-8.

primer za članek iz suplementa revije z volumnom in s številko:

8. Shen HM, Zhang QF. Risk assessment of nickel carcinogenicity and occupational lung cancer. Environ Health Perspect. 1994;102(Suppl 2):275-82.
9. de Villiers TJ. The role of menopausal hormone therapy in the management of osteoporosis. Climacteric. 2015; 18(Suppl 2):19-21. doi: 10.3109/13697137.2015.1099806.

primer za članek iz zbornika referatov:

10. Sugden K, Kirk R, Barry HC, Hickner J, Ebell MH, Ettenhofer T, et al. Suicides and non-suicidal deaths in Slovenia: molecular genetic investigation. In: 9th European Symposium on Suicide and Suicidal Behaviour. Warwick: University of Oxford, 2002:76.

primer za magistrske naloge, doktorske disertacije in Prešernove nagrade:

11. Shaw EH. An exploration of the process of recovery from heroin dependence: doctoral thesis. Hull: University of Hull, 2011.

primer za elektronske vire:

12. EQ-5D, an instrument to describe and value health. Accessed January 24th, 2017 at: <https://euroqol.org/eq-5d-instruments/>.

TABELE

Tabele v angleškem jeziku naj bodo v besedilu prispevka na mestu, kamor sodijo. Tabele naj sestavljajo vrstice in stolpci, ki se sekajo v poljih. Tabele oštevilčite po vrstnem redu, vsaka tabela mora biti citirana v besedilu. Tabela naj bo opremljena s kratkim angleškim naslovom. V legendi naj bodo pojasnjene vse kratice, okrajšave in nestandardne enote, ki se pojavljajo v tabeli.

SLIKE

Slike morajo biti profesionalno izdelane. Pri pripravi slik upoštevajte, da gre za črno-beli tisk. Slikovno gradivo naj bo pripravljeno:

- črno-belo (ne v barvah!);
- brez polnih površin, namesto tega je treba izbrati šrafure (če gre za stolpce, t. i. tortice ali zemljevide);
- v linijskih grafih naj se posamezne linije prav tako ločijo med samo z različnim črtkanjem ali različnim označevanjem (s trikotniki, z zvezdicami...), ne pa z barvo;
- v grafih naj bo ozadje belo (tj. brez ozadja).

Črke, številke ali simboli na sliki morajo biti jasni, enotni in dovolj veliki, da so berljivi tudi na pomanjšani sliki.

Ročno ali na pisalni stroj izpisano besedilo v sliki je nedopustno.

Vsaka slika mora biti navedena v besedilu. Besedilo k sliki naj vsebuje naslov slike in potrebno razlago vsebine. Slika naj bo razumljiva tudi brez branja ostalega besedila. Pojasniti morate vse okrajšave v sliki. Uporaba okrajšav v besedilu k sliki je nedopustna. Besedila k slikam naj bodo napisana na mestu pojavljanja v besedilu.

Fotografijam, na katerih se lahko prepozna identiteta bolnika, priložite pisno dovoljenje bolnika.

MERSKE ENOTE

Naj bodo v skladu z mednarodnim sistemom enot (SI).

KRATICE IN OKRAJŠAVE

Kraticam in okrajšavam se izogibajte, izjema so mednarodno veljavne oznake merskih enot. V naslovih in izvlečku naj ne bo kratic. Na mestu, kjer se kratica prvič pojavi v besedilu, naj bo izraz, ki ga nadomešča, polno izpisan, v nadaljnjem besedilu uporabljano kratico navajajte v oklepaju.

UREDNIŠKO DELO

Prispelo gradivo z javnozdravstveno tematiko mednarodnega pomena posreduje uredništvo po tehnični brezhibnosti v strokovno recenzijo trem mednarodno priznanim strokovnjakom. Recenzijski postopek je dvojno slep. Po končanem uredniškem delu vrnemo prispevek korespondenčnemu avtorju, da popravke odobri in upošteva. Popravljen čistopis vrne v uredništvo po spletni aplikaciji Editorial Manager. Uredništvo dopušča obravnavo največ treh revizij. Če tretja revizija rokopisa ne upošteva vseh pripomb recenzentov, se rokopis umakne iz uredniškega postopka. Sledi jezikovna lektura, katere stroške krije založnik. Med redakcijskim postopkom je zagotovljena tajnost vsebine prispevka. Avtor dobi v pogled tudi prve, t. i. krtačne odtise, vendar na tej stopnji upoštevamo samo še popravke tiskarskih napak. Krtačne odtise je treba vrniti v treh dneh, sicer menimo, da avtor nima pripomb.

V uredništvu se trudimo za čim hitrejši uredniški postopek. Avtorji se morajo držati rokov, ki jih dobijo v dopisih, sicer se lahko zgodi, da bo članek odstranjen iz postopka.

Morebitne pritožbe avtorjev obravnava uredniški odbor revije.

Za objavo članka prenese avtor avtorske pravice na Nacionalni inštitut za javno zdravje kot založnika revije (podpiše Pogodbo o avtorstvu in avtorskih pravicah). Kršenje avtorskih in drugih sorodnih pravic je kaznivo.

Prispevkov ne honoriramo in tudi ne zaračunavamo stroškov uredniškega postopka.

Avtor dobi izvod tiskane revije, v kateri je objavljen njegov članek.