ZDRAVSTVENO VARSTVO

ZDRAV VAR 2014 • LETNIK 53 • ŠTEVILKA 4

IZVIRNI ZNANSTVENI ČLANKI

CODEN ZDVAFY • UDK 613 / 614 + 628 • ISSN 0351 - 0026

NIJZ Nacionalni inštitut za javno zdravje

nacionalni inštitut za javno zdravje
national institute of public health
Trubarjeva 2, si-1000 ljubljana

Zdravstveno varstvo
ISSN 0351-0026

IF(2013)=0,732

Izdajatelj/Publisher:
Nacionalni inštitut za javno zdravje
Direktor: Ivan Eržen

Odgovorni unednik/Editor in Chief:
Igor Švab

Izvršna urednica/Executive Editor:
Saša Zupanič

Lektoriranje slovenščine/Proofreading for Slovenian:
Optimus Lingua, storitve, d. o. o.

Lektoriranje angleščine/Proofreading for English:
Alkemist, prevajalske storitve, d. o. o.

Prevajanje anglelščine/English translation
Poliglotka, prevajanje, izobraževanje in poslovne storitve d. o. o.

Naslov uredništva/Adress of the Editorial Office:
Zdravstveno varstvo - Slovenian Journal of Public Health, Trubarjeva 2, 1000 Ljubljana, p.p. 260

Elektronski naslov uredništva/E-mail Address:
Zdrav.Var@nijz.si

Domača stran na internetu/Internet Home Page:
http://www.nijz.si/zv
in
http://www.degruyter.com/view/j/sjph

Transakcijski račun/Current Account:
011006000043188, UJP

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Revija Zdravstveno varstvo je pri Ministrstvu za kulturo RS vpisana v razvid medijev pod zaporedno številko 608.

Izid revije je finančno podprla ARRS iz sredstev državnega proračuna iz naslova razpisa za sofinanciranje domačih znanstvenih periodičnih publikacij.

Letna naročnina z DDV/Year subscription rates with taxes included:
delovne organizacije/institutions: 40,46 EUR
študenti/students: 20,23 EUR
tujina/for abroad: 53,86 EUR
Naročniška služba: zdrav.var@nijz.si

Gradivo navaja predvsem poglede avtorjev, za katere ni nujno, da se ujemajo z načelnimi stališči stroke oziroma uredniškega odbora.

Naklada: 350
Likovna oprema ovitka: Jurij Kocbek
Grafično oblikovanje in prelom: Studio Signum d. o. o.
Tisk: Grafika 3000 d. o. o.

SICKNESS PRESENCE AMONG DISABLED WORKERS AT THE UNIVERSITY MEDICAL CENTRE LJUBLJANA

PREZENTIZEM MED INVALIDI V UNIVERZITETENEM KLINIČNEM CENTRU LJUBLJANA

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Received/Prispelo: 19. 12. 2013
Accepted/Sprejeto: 19. 6. 2014

Original scientific article/Izvirni znanstveni članek
UDC/UDK 616:331.442-056.26

ABSTRACT

Objectives. The aim of the article is to investigate the differences in sickness present and non-sickness present in the group of disabled health care professionals.

Methods. Data were gathered from all disabled health care professionals suffering from invalidity of category II or III who were identified in the research among all health care professionals at the University Medical Centre Ljubljana and who were employed there in the period between 1 January 2010 and 31 December 2010. Each employee obtained a questionnaire composed of three standardized international questionnaires.

Results. There were 248 disabled workers of the II. and III. category of invalidity among the participants. Disabled sickness present reported to have more chronic diseases than disabled non-sickness present (OR = 57.0; 95% CI = 24.4-133.2), lower salary when on sick leave (OR = 13.1; 95% CI = 5.7- 30.2) and poor self-rated health (OR = 5.8; 95% CI = 2.7-12.3).

Conclusions. The prerequisite for sickness presence among disabled workers is their chronic bad health. It is also formally recognized with the degree of disability. Economic factors are among the most important to direct disabled workers towards sickness presence. The results indicate that workplaces are not adapted to disabled workers in regard to their limitations.

Keywords:
Sickness presence, health care professionals, disabled workers

IZVLEČEK

***Namen**. Osnovni namen članka je raziskati razlike med prezentisti in neprezentisti znotraj skupine zdravstvenih delavcev invalidov.*

***Metode**. V raziskavi so sodelovali vsi invalidi II. in III. kategorije, ki so zaposleni v Univerzitetnem kliničnem centru Ljubljana in ki smo jih identificirali v raziskavi, ki je zajela vse zaposlene zdravstvene delavce UKC Ljubljana v obdobju med 1.1. 2010 in 31.12.2010. Izpolnili so vprašalnik, sestavljen iz treh standardiziranih mednarodnih vprašalnikov.*

***Rezultati**. Med preiskovanci je bilo 248 invalidov II. in III. kategorije. Invalidi prezentisti so navajali več kroničnih bolezni kot invalidi neprezentisti (RO = 57.0; 95 % IZ = 24.4-133.2), nižji osebni dohodek ob bolniškem staležu (RO = 13.1; 95 % IZ = 5.7-30.2) in slabšo samooceno zdravstvenega stanja (RO = 5.8; 95 % IZ = 2.7-12.3).*

***Zaključek**. Osnova za prezentizem pri delovnih invalidih je kronična okvara njihovega zdravja, ki je tudi formalno priznana s stopnjo invalidnosti. Ekonomski dejavniki so poleg bolezni najpomembnejši dejavniki tveganja za prezentizem pri invalidih. Iz rezultatov je mogoče sklepati, da delovna mesta invalidnim delavcem niso prilagojena v tolikšni meri, da bi povsem ustrezala njihovim omejitvam zaradi bolezni.*

Ključne besede:
prezentizem, zdravstveni delavci, invalidi

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1 INTRODUCTION

The assessment of workers' health is usually carried out by the following indicators: injuries at work, occupational diseases, sick leave and disability. Most frequently, sick leave is used, which represents temporary absence from work due to disease and/or injury (1). However, in 2000 a new phenomenon defined as sickness presence started to be researched. Sickness presence is the presence of workers at work when they feel so sick that they could be on sick leave (2-6). The data on sick leave show that 30–40% of employees were not on sick leave during a one--year period observed (7, 8). A varied group ranging from employees who are actually healthy and do not have any health-related problems to those who feel sick but work nevertheless belong to this group. The latter are supposed to have a lower social status, fixed-term employment or are threatened with dismissal from work, more demanding and responsible work, can arrange work by themselves and those who have low possibility of replacement at work (2, 3, 6, 8–11). The researchers estimate that there are higher odds for sickness presence in educational and medical institutions (2, 8). It is described that the level of sickness presence among health care professionals is associated with time pressure (8, 9, 12, 13), lack of personnel or the inability to replace a co-worker at work (8, 12), work experience and (dis)satisfaction with work (13).

Permanent damage to health and the resulting inability to work are called work-related disability (hereafter referred to as disability), which is recognized by law if the chances of the insured person to get or retain his/her workplace and to advance professionally are decreased due to the changes in his/her health status that cannot be reversed by means of treatment or medical rehabilitation (14). If the worker was classified into disability category II or III in the process of establishing disability, the remaining workability was assessed, which means that he/she can be employed in another workplace that suits his/her level of education or he/she can undergo the process of occupational rehabilitation resulting in full-time work in another workplace or else he/she can do particular work at least part-time (14). Formally, the law protects disabled workers and requires that the employer is obliged to adapt the workplace to suit the limitations of the disabled in order to prevent further damage to their health (15, 16). There are no data on how successful the return of workers to a suitably adapted working environment is and to what extent such relocations of disabled people actually prevent damage to their health.

The available literature does not provide data on the extent of sickness presence among the disabled, which would indirectly show the suitability of the workplaces adapted for the disabled. Therefore, aiming at providing scientific evidence for focused preventive occupational medicine actions in the sub-population of disabled workers, the objective of our study was to assess the prevalence of sickness presence among disabled workers at the University Medical Centre Ljubljana (UMC Ljubljana).

2 METHODS

The study was designed as a cross-sectional study.

2.1 Participants

Out of 5865 health care professionals who were in a continuous employment relationship at the UMC Ljubljana in the period between 1 January 2010 and 31 December 2010, the following employees were excluded: those who were on sick leave and/or maternity leave for more than six months, all those who were employed at the UMC Ljubljana for fewer than twelve months in the observed period and those employed in technical services. In the remaining group of health care professionals, all the disabled workers were selected, totaling 389.

The study included the following groups of employees classified as being disabled: employees who were assessed by the Invalidity Committee of the Pension and Disability Insurance Institute of the Republic of Slovenia as "the disabled of category II" if their workability for their occupation was decreased by 50% or more or as "the disabled of category III" if they were no longer able to work full-time with or without prior occupational rehabilitation but could carry out certain work at least part-time or if their workability for their occupation was decreased by less than 50% or if they could still work in their profession full-time but were not capable of working in the workplace to which they were assigned (14).

2.2 Observed phenomenon

The observed phenomenon was sickness presence. In our study, the sickness present were defined as the disabled workers who were present at work at least two or more times in 2010 when they felt sick and the non-sickness present were defined as the disabled workers who were never or who were present at work at most once when they felt sick (2).

2.3 Research tools and course of study

For the purpose of our study, a questionnaire was prepared consisting of 57 questions taken from three international standardized and validated questionnaires (2, 17-20). The questionnaire contained questions related to demographic factors (sex, age, education, children, smoking, recreation, net salary, some important life events such as death of next of kin or friend, independence of a child, disease of next of kin, change in the workplace, change in the employment status of a partner, loan, change of a flat, holidays), factors connected with work (workplace, psychical and physical workload, shift work), psycho-social factors (creativity, possibility of education, influence on work organization, superiors' and co-workers' support, time pressure, possibility of replacement, lower salary when on sick leave), factors that describe health status (diseases by groups by organ systems) and factors that describe one's own assessment of workability (sickness absence, barriers

and work impairment, anticipated certainty about one's own workability in the following year).

The questionnaires were distributed to all disabled workers at the UMC Ljubljana in the second half of January 2011 with the help of senior nursing officers. We enclosed an envelope for the answer and a cover letter. The questionnaires were numbered by means of codes. Informed consent was signed by all participants who answered the questionnaire. Sealed envelopes with answered questionnaires were collected in special boxes by senior nursing officers and the couriers took them to the Clinical Institute of Occupational, Traffic and Sports Medicine (CIOTSM). The participants could also return them by themselves to the CIOTSM. The Organ of the UMC Ljubljana, No. 2, 2011, published an article describing the study and its aims in order to additionally encourage employees to answer the questionnaire. All those whose answers had not been received by the end of April 2011 were sent the questionnaires once again in May 2011 together with a request to answer them.

2.4 Statistical analysis

Besides descriptive statistical methods, the statistical analysis also used the methods for the analysis of the association of sickness presence with the selected risk factors for sickness presence: sex (male, female), age (50 years or more, less than 50 years), education (secondary or less, higher or university), children (no, yes), smokers (no, yes), net salary < EUR 1000 (no, yes), death of next of kin or friend (no, yes), disease of next of kin (no, yes), work (health care professionals, managerial or administrative work), working life (20 years or more, fewer than 20 years), high psychical workload (no, yes), high physical workload (no, yes), night work (no, yes), no possibility of education (no, yes), low superiors' support (no, yes), low co-workers' support (no, yes), time pressure (no, yes), dissatisfaction at work (no, yes), poor self-rated health (no, yes), musculoskeletal disorders (no, yes), cardiovascular diseases (no, yes), respiratory diseases (no, yes), mental and behavioral disorders (no, yes), gastrointestinal diseases (no, yes), endocrine diseases (no, yes), chronic diseases (no, yes), no possibility of replacement (no, yes), lower salary when on sick leave (no, yes), on sick leave $\geq$ twice (no, yes), work impairment (no, yes) and not sure about workability next year (no, yes). Logistic regression was chosen as univariate as well as multivariate analysis. The multivariate model included all the variables that were in a statistically significant association with the dependent variable in the univariate model and that were considered the most sensible to be included in the multivariate model from a professional perspective.

The SPSS program, version 20.0, was used to perform the statistical analysis, which was carried out at the CIOTSM.

2.5 Ethical aspects of the study

The study was approved by the National Medical Ethics Committee of the Republic of Slovenia on 11 January 2011.

3 RESULTS

The questionnaire was answered in full by 248 health care professionals – disabled workers out of the total number of 389 disabled workers employed at the UMC Ljubljana (63.8%).

Among the 248 disabled workers, 183 were sickness present (73.8%) and 65 were non-sickness present (26.2%). Among the selected risk factors that were included in the univariate logistic regression, there was the strongest association between sickness presence and the presence of chronic disease and lower salary when on sick leave (Table 1).

Table 1. Estimates of sickness presence according to the selected risk factors among 248 disabled workers at the University Medical Centre Ljubljana, 2010, and the results of the univariate logistic regression.

Risk factor	Category	N_{SP}	(%)	OR	*95 % CI limits*		p
					Lower	Upper	
Sex	Male	9/16	56.3	1.00			
	Female	174/232	75.0	2.33	0.82	6.55	0.107
Age	50 years or more	84/115	73.0	1.00			
	Less than 50 years	99/133	74.4	1.10	0.61	1.89	0.804
Education	Higher or university	43/65	66.1	1.00			
	Secondary or less	145/183	79.2	2.77	1.48	4.99	0.001
Children	No	22/43	51.2	1.00			
	Yes	161/205	78.5	3.49	1.76	6.93	< 0.001
Smokers	No	119/170	70.0	1.00			
	Yes	64/78	82.1	1.96	1.01	3.81	0.047
Net salary < 1000 EUR	No	35/58	60.3	1.00			
	Yes	148/190	77.9	2.32	2.36	4.34	< 0.001
Death of next of kin or friend	No	124/177	70.1	1.00			
	Yes	59/71	83.1	2.10	1.05	4.22	0.037

Risk factor	Category	N_{SP}	(%)	OR	*95 % CI limits*		p
					Lower	Upper	
Disease of next of kin	No	155/216	71.8	1.00			
	Yes	28/32	87.5	2.76	0.93	8.18	0.068
Work	Managerial or administrative work	5/14	35.7	1.00			
	Health care professionals	60/169	35.5	1.01	0.35	2.92	0.991
Working life	Fewer than 20 years	165/216	76.4	1.00			
	20 years or more	18/32	56.3	2.50	1.16	5.56	0.018
High psychical workload	No	94/137	68.6	1.00			
	Yes	89/111	80.2	1.85	1.03	2.70	0.041
High physical workload	No	123/177	69.5	1.00			
	Yes	60/71	84.5	2.40	1.17	4.91	0.017
Night work	No	170/231	73.6	1.00			
	Yes	13/17	76.5	1.16	0.37	3.71	0.795
No possibility of education	No	94/139	67.6	1.00			
	Yes	89/109	81.7	2.13	1.17	3.89	< 0.001
Low superiors' support	No	124/176	70.5	1.00			
	Yes	59/72	81.9	1.90	0.96	3.77	0.064
Low co-workers' support	No	145/203	71.4	1.00			
	Yes	38/45	84.4	2.17	0.92	5.14	0.078
Time pressure	No	49/68	72.1	1.00			
	Yes	134/180	74.4	1.14	0.60	2.13	0.703
Dissatisfaction at work	No	123/180	68.3	1.00			
	Yes	60/68	88.2	3.48	1.56	7.75	0.002
Poor self-rated health	No	95/151	62.9	1.00			
	Yes	88/97	90.7	5.76	2.69	12.34	< 0.001
Musculoskeletal disorders	No	34/70	48.6	1.00			
	Yes	149/178	83.7	5.44	2.12	10.01	< 0.001
Cardiovascular diseases	No	95/149	63.8	1.00			
	Yes	88/99	88.9	4.55	2.24	9.25	<0.001
Respiratory diseases	No	119/173	68.8	1.00			
	Yes	64/75	85.3	2.64	1.29	5.40	0.008
Mental and behavioural disorders	No	40/81	49.4	1.00			
	Yes	143/167	85.6	6.11	3.31	11.28	< 0.001
Gastrointestinal diseases	No	123/175	70.3	1.00			
	Yes	60/73	82.2	1.95	0.98	3.86	0.055
Endocrine diseases	No	115/169	68.0	1.00			
	Yes	68/79	86.1	2.90	1.42	5.93	0.003
Chronic disease	No	11/62	17.7	1.00			
	Yes	172/186	92.5	56.96	24.36	133.17	< 0.001
No possibility of replacement	No	92/138	66.7	1.00			
	Yes	91/110	82.7	2.40	1.30	4.40	0.005
Lower salary when on sick leave	No	71/129	55.0	1.00			
	Yes	112/119	94.1	13.07	5.65	30.24	< 0.001
On sick leave $\geq$ twice	No	91/135	67.4	1.00			
	Yes	92/113	81.4	2.12	1.17	3.84	0.013
Work impairment	No	38/62	61.3	1.00			
	Yes	145/186	78.0	2.23	1.21	4.14	0.011
Not sure about work ability next year	No	84/135	62.2	1.00			
	Yes	99/113	87.6	4.29	2.22	8.30	< 0.001

Legend: N_{SP} = number of the disabled sickness present in the group; N_{cat} = number of the disabled in the category
Abbreviations: OR – odds ratio; CI – confidence interval

The results of the multivariate analysis are similar to those of the univariate analysis. The variables that had been statistically significant in the univariate analysis were also statistically significant in the multivariate analysis, namely chronic diseases (OR = 31.0, 95% CI 11.0-87.2; p < 0.001), lower salary when on sick leave (OR = 7.0, 95% CI 2.1-22.8; p = 0.001) and poor self-rated health (OR = 4.2, 95% CI 1.1-15.9; p = 0.035).

4 DISCUSSION

To our knowledge, this is the first study to deal with sickness presence in the disabled. The response of the disabled workers was higher than that of all health care professionals, amounting to 57.6% (21). The share of sickness present disabled workers was larger than we could have expected in comparison to the results of the studies among health care professionals and among public employees, where the share of sickness present ranges between 18% and 65% (2-5, 12, 21). The share was higher than expected especially because the operative part of the decision of the invalidity commission that relieves the workers of some of the work enables the disabled to carry out work in accordance with their remaining psychophysical abilities and consequently they are not supposed to "work when sick". The observed groups of the disabled of invalidity categories II and III, including both sickness present and non-sickness present, do not differ in terms of sex and age, but they do differ in the following characteristics: disabled workers – sickness present with chronic diseases have higher odds for sickness presence in comparison with disabled workers – non-sickness present. They primarily suffer from mental and behavioral as well as musculoskeletal disorders. When they are really sick, people start to behave differently due to the following reasons: the changed economic circumstances together with the economic crisis after 2009 and a decreased likelihood of permanent employment with the possibility of dismissal and a decrease in salary during sick leave. A significant decrease in sick leave was observed in the area of mental and behavioral disorders at the level of the entire state, and we believe that it is this decrease that indicates sickness presence (22). Mental and behavioral disorders have also been presented in other studies as one of the main causes of sickness presence (23, 24). Disabled workers – sickness present enumerate more medical conditions than disabled workers – non-sickness present, and, consequently, they experience their health as poor and they are on sick leave more often. Despite the fact that the disabled workers should be assigned to a suitable workplace due to chronic damage to health, they often say they work while sick. Indirectly, a question can be posed whether the workplace is really suitable as regards the disability assessment (25). A new workplace should suit the worker's remaining psychophysical abilities. Sickness present disabled workers report higher physical and psychical workloads than disabled workers – non-sickness present. Contrary to expectations, they also have to replace their co-workers more often than disabled workers – non-sickness present, although their invalidity status prohibits that explicitly.

Disabled workers - sickness present belong to the socially weaker class with a lower level of education and lower salaries, and they are mostly smokers. Besides chronic diseases among disabled workers – sickness present, fear of lower salary shows the highest odds for sickness presence. They perceive themselves as being dissatisfied with work. Since they are dissatisfied with work, their availability for work is low and consequently their productivity decreases (26). Disabled workers – sickness present are supported neither by their superiors nor by their co-workers. Disabled workers – sickness present claim that their chances for education are slimmer. Since they have a lower level of education than disabled workers – non-sickness present, additional education for them means at best secondary education, which is sufficient only for physically demanding work in the health sector. Disabled workers – sickness present mostly suffer from musculoskeletal disorders, which is why physical work is not suitable for them, and, consequently, such additional education does not represent a solution to this problem. We should, however, not ignore the fact that disabled workers – sickness present assess their health as poor, which is an additional reason why they do not have motivation for additional education (25, 27).

Despite the fact that the responsiveness of the participants was good and comparable to other studies on sickness presence, this study has its limitations. The test subjects took part in research on a voluntary basis, which is why not all the disabled workers were included, but their response was better than that of all health care professionals. It is possible that they have problems and as is generally well-known, people with problems respond more often than those without problems. As regards the circumstances in Slovenia, the response was good, and we cannot find any reason why less than 40% of the non-respondents could be considered so different from the respondents that the results of this study cannot be evaluated as reliable.

This study is important for occupational medicine, because it poses two questions and expects occupational medicine to answer them. The first question concerns the importance of sickness presence as the possible new indicator of workers' health, and the second question concerns the suitability of the workplaces that have already been adapted; the second more indirect question addresses the suitability of determining workability in the course of the invalidity procedure. Further research should be aimed at the question of what kind of risk sickness presence represents for future health and disability.

5 CONCLUSION

Disabled workers represent a large group among employed health care professionals. Among them, the sickness present represents the majority despite the fact that all disabled workers with a formal invalidity decision are relieved of some work in accordance with their diagnosis. It is obvious that besides chronic diseases, economic risk factors represent the greatest risk for sickness presence among disabled workers. It would therefore be sensible to invest money in work-oriented rehabilitation and re-

training of the disabled in such a way as to increase their chances of employment in a suitable workplace that would be adapted to their specific needs. This is how their economic vulnerability would be decreased. Presently, the disabled workers as well as employers are not particularly motivated towards education. Disabled workers of category II or III frequently become disabled workers of category I and thus a burden on the Pension and Disability Insurance Institute; they can even become unemployed, which represents an even greater risk for the deterioration of their health status.

CONFLICT OF INTEREST

The authors declare that no conflict of interest exist.

FUNDING

As a tertiary project, the study was co-financed by the Health Insurance Institute of Slovenia (Project No. 20110043).

ETHICAL APPROVAL

Received from the National Medical Ethics Committee of the Republic of Slovenia on 24 January 2011.

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RISK FACTORS ASSOCIATED WITH OVERWEIGHT AMONG ADOLESCENTS IN SERBIA

DEJAVNIKI TVEGANJA, POVEZANI S PREKOMERNO TELESNO TEŽO PRI MLADOSTNIKIH V SRBIJI

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Received/Prispelo: 23. 11. 2013
Accepted/Sprejeto: 19. 6. 2014

Original scientific article/Izvirni znanstveni članek
UDC/UDK 613.2-053.2(497.11)

ABSTRACT

Introduction. The pandemic of obesity in adolescents is one of the challenges of public health.

Aim. The aim of this study was to examine the association of overweight with demographic, socioeconomic and lifestyle factors among Serbian adolescents.

Method. A cross-sectional study of 2139 adolescents aged 10 to 19 years was carried out. Data used in this study were from the 2006 Health Survey. In accordance with the international sex- and age-specific Body Mass Index cut-off points, all participants were classified as being normal weight or overweight, including obese. The association between the risk factors and overweight were examined using a multivariate logistic regression model.

Results. The study showed that 28.9% of boys and 17.0% of girls were overweight, while 14.5% of boys and 8.1% of girls were obese. Boys were more likely to be overweight/obese, compared with girls. Being younger ($p< 0.01$ for 14 to 15 years) and ($p< 0.01$, for 16 to 19 years), engaging in physical activities that last less than 7 hours a week, in such a manner that they breathe quickly and become sweaty, ($p< 0.01$) and skipping breakfast ($p< 0.05$) were risk factors significantly associated with overweight among adolescents. No significant association was found with wealth index.

Conclusion. These findings should be an integral part of further preventive interventions, especially oriented towards younger adolescents, who are physically inactive, have a habit of skipping breakfast and are boys.

Keywords:
Overweight, risk factors, adolescents

IZVLEČEK

***Namen**. Pandemija debelosti pri mladostnikih predstavlja enega večjih izzivov za javno zdravje.*

***Cilj**. Cilj te raziskave je bil preveriti povezanost prekomerne telesne teže med srbskimi mladostniki z demografskimi in s socialno-ekonomskimi dejavniki ter z dejavniki, ki so povezani z načinom življenja.*

***Metoda**. Narejena je bila presečna študija z 2.139 mladostniki, ki so bili stari od 10 do 19 let. Za podatke v tej študiji so bile uporabljene vrednosti iz Health Survey 2006. Glede na mednarodno sprejete vrednosti indeksa telesne mase, povezane z odgovarjajočim spolom in starostjo, so bili vsi udeleženci uvrščeni v skupine z normalno težo, s prekomerno telesno težo in z debelostjo. Za ugotavljanje povezave med dejavniki tveganja in prekomerno telesno težo je bila uporabljena statistična metoda multivariantne logistične regresije.*

***Rezultati**. Raziskava je pokazala, da je imelo 28,9% fantov in 17,0% deklet zvišano telesno težo, in sicer je bilo 14,5% fantov in 8,1% deklet debelih. V primerjavi z dekleti so bili fantje debelejši ali so imeli zvišano telesno težo. Za naslednje dejavnike tveganja smo ugotovili statistično pomembno povezavo s prekomerno telesno težo med mladostniki (starost 14-15 let ($p<0,01$) in 16-19 let ($p<0,01$)), ukvarjanje s telovadbo, ki povzroča hitro dihanje in potenje manj kot 7 ur dnevno($p< 0,01$), ter vsakodnevno izogibanje zajtrku ($p< 0,05$). Na drugi strani ni statistično pomembne povezave med zvišano telesno težo/debelostjo in indeksom družinskega bogastva.*

***Zaključek**. Ugotovitve naše študije bi lahko imele vpliv na preventivne ukrepe, ki bi bili posebej usmerjeni v mladostnike moškega spola, ki ne zajtrkujejo in se ne ukvarjajo z redno telesno aktivnostjo.*

Ključne besede:
prekomerna telesna teža, dejavniki tveganja, mladostniki

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1 INTRODUCTION

The World Health Organization (WHO) defines adolescents as young people aged 10 to 19 years (1). Adolescents are usually viewed as a healthy population, since the routine health statistics data in the Republic of Serbia show the lowest rates of morbidity and mortality in this age group, so the health condition analysis is based on the health-oriented approach rather than the disease-oriented approach (2).

The risk factors referred to in the literature that are responsible for the occurrence of overweight and obesity in children and adolescents are hereditary and developmental factors, social and cultural environment factors, eating habits, the way of managing free time, physical activities and sports participation (3).

Overweight is caused by an imbalance between energy intake (calories originating from food) and energy expenditure (calories needed for basal metabolism and physical activities). In everyday practice, nutrition level is estimated on the basis of body weight and height and the calculation of the Body Mass Index (BMI). BMI is the most convenient way of measuring relative obesity; it can be easily calculated, relatively cheaply obtained, is highly acceptable by participants, which is particularly important for adolescents who may be reluctant during measuring, and it is correlated with percentage of body fat. BMI is more accurate when measurement is done by a trained person rather than self-reported. There is low observer error, low measurement error and good reliability and validity. However, BMI may not be a sensitive measure of body fat in people who have extreme muscular or disproportional body build or stunting growth. As a result of its advantages compared to other indirect methods, it is commonly used for population surveys (4).

BMI measure of overweight and obesity in children and adolescents is more complicated than for adults, because an ideal BMI for a child changes as they grow older and it differs between boys and girls. For children and adolescents, aged 2 to 20 years, value of BMI (index) is gender and age specific (4). Three international references are widely used to assess overweight and obesity in children and adolescents: the International Obesity Task Force (IOTF) criteria, the United States Centers for Disease Control and Prevention (CDC) growth charts and the World Health Organization (WHO) criteria (5).

The IOTF reference for children and adolescents 2–18 years old was developed in 2005 from a database of 192,727 children from birth to 25 years from six countries. Age and sex specific cut-off points that are extrapolated from the adult BMI cut-offs are 25 kg/m2 and 30 kg/m2 for overweight and obesity respectively. However, it has low sensitivity for diagnosing overweight and obesity compared with the other methods where body fat was taken as the gold standard and does not provide month-specific cut-off points (5).

The CDC growth reference for children 2–20 years old was issued in 2000 and developed using five national health examination surveys conducted between 1963 and 1994 in the United States of America. This growth reference defines children as at risk of overweight and obesity if their BMI exceeds the 85th and 95th percentiles in most routine assessments. Despite the fact that the CDC system is frequently used internationally, it was designed using only information from the United States with the objective of documenting obesity trends in that country (5).

The WHO Reference 2007 is a reconstruction of the 1977 National Center for Health Statistics (NCHS)/WHO reference. It uses the original NCHS data set supplemented with data from the WHO child growth standards sample for under-fives. The WHO classification is the only system designed using data from before the obesity epidemic, and it might be the most appropriate for countries where the prevalence of childhood obesity is still relatively low (5).

However, there is not a clear consensus on which classification system should be used to diagnose overweight and obesity (5).

The prevalence of overweight children and adolescents is growing around the world in both developed and developing countries. The increase in prevalence of obesity in children is particularly registered in the developed countries of North America and Europe, i.e. it has been 0.5% to 1% per year over the last two decades. Overweight and obesity are found in 20-30% of children and adolescents in the European Region of the WHO. The highest prevalence of overweight or obesity is registered in the countries of Southern Europe (6).

Given that overweight and obesity in adolescents are maintained into adulthood and associated with morbidity and increased risk of premature mortality from coronary heart disease, atherosclerosis and certain types of malignant disease, WHO indicates obesity as one of the most important public health problems (4).

The aims of this study were 1) to determine the prevalence of overweight and obesity and 2) to identify risk factors (demographic and socio-economic characteristics, eating habits, the way of managing free time and conducting physical activities) associated with the overweight in adolescents aged 10 to 19 years in the Republic of Serbia.

2 METHOD

2.1 The population included in the research

This research is a cross-sectional study on a sample of 2139 adolescents aged 10 to 19 years. In the research, the database from the «Health Survey of the citizens of the Republic of Serbia» study (without any data for Kosovo and Metohija) from 2006, conducted by the Ministry of Health of the Republic of Serbia, was used. A two-stage stratified sample was used. The main strata in the sample were six geographic regions: Vojvodina, Belgrade, Western Serbia, Central Serbia and Southeastern Serbia. In order to analyze further, each stratum was divided into urban and rural. In the first stage of sampling, 675 EAs (Enumeration Areas) from the Census of 2002 in Serbia were selected on the basis of Pro-

bability Proportional Sampling. After updating within each EA, a selection was made that included 10 households and 3 replacement households from the household list, using Simple Random Sampling without Replacement. In this way, 7673 selected households were made a sampling frame and observation units were all members of the selected households. Out of the 7673 households randomly selected for the sample, 6156 were interviewed. The household response rate was 86.5%. In selected households, 2139 adolescents aged 10 to 19 years were identified (7-16).

2.2 Instrument

Two types of questionnaires have been used for data collection: face-to-face questionnaire (a version for each child and adolescent aged 7 to 19 years, living in the household) and household questionnaire. Ten questions that were related to demographic characteristics, socio-economic status, physical activities and dietary habits of adolescents of the 81 questions from a face-to-face questionnaire were used. Socio-economic status was measured by calculating the demographic and health survey wealth index (wealth index) on the basis of answers to 9 questions from the household questionnaire that included 30 questions. The questionnaires correspond to the standard questionnaires used in this type of research (for example, World Health Organization 2002 Health Survey) (17). The surveys were conducted by trained interviewers. The process of data collection was standardized in order to ensure data quality. Considering that each household was carefully selected, the obligation of the interviewers was to interview all household members (17).

2.3 Measuring body height and weight

The trained health care workers, a nurse-technician or physician, measured body height and weight using an altimeter and medical metric scales with decimal numbers. The instructions for the measurement procedure are in accordance with the European Health Risk Monitoring (EHRM) Recommendation for indicators, international collaboration, protocol and manual of operations for chronic disease risk factors surveys. The calibration of the instruments occurred at the beginning and the end of each examining day. The scale was balanced with both sliding weights at zero and the balance bar aligned. The scale was checked using the standardized weights, and calibration was corrected if the error was greater than 0.2 kg. The height rule was checked with standardized rods and corrected if the error was greater than 2 mm (18). The percentages of adolescents who were not measured were 2.9% for weight and 1.9% for height (17). Based on these data, BMI was calculated by dividing the body weight (kg) by the body height squared (m^2).

CDC growth charts were used to calculate BMI-for-age and sex for the population of children and adolescents. The points of intersection for identifying children and adolescents in relation to nourishment level were recommended. The interval between the 15th and 85th percentiles identifies people with normal body weight, while those with a BMI value higher or equal to the 85th percentile are overweight (between 85 and 95 have a high risk of obesity, and obese are those whose level is higher than or equal to 95) (19).

2.4 Demographic characteristics and socio-economic status of the respondents

The data on demographic characteristics and socio-economic status of the respondents have been separated from the database as independent variables: age, sex, type of settlement, household wealth index - Demographic and Health Survey Wealth Index (Wealth Index), family structure and success in school. The independent variables have been coded as follows: sex (1 - male, 2 - female), age (1 - from 10 to 13 years old, 2 - 14 to 15 years old, 3 - 16 to 19 years old), type of settlement (1 - rural, 2 - urban area), family income (1 - poorest, 2 - poorer, 3 – middle class, 4 - richer, 5 – richest), family structure (1-complete, 2-incomplete) and success in school (1 - not attending school, 2 - repeated a grade or sufficient, 3 - good, 4 - very good or excellent). The socio-economic status of adolescents was measured by calculating household wealth index, which was calculated on the basis of the answers to the questions referring to the ownership of various durable goods (the number of bedrooms per household; the materials the floor, roof and walls of the house were made of; the type of water supply and sanitation; the type of heating fuels; owning a color television, cell phone, refrigerator, washing machine, dishwasher, computer, air conditioner, central heating and car). Quintiles were used for a tabular Demographic and Health Survey analysis of wealth index, and the quintiles were based on the household population apportionment (five categories of 20%) (17).

2.5 Free time and physical activities of the respondents

The data referring to the manner in which adolescents spend free time and conduct physical activities were gathered based on the responses to the question of how much time daily or weekly they spend watching television, doing homework, sleeping and engaging in physical exercise so that they breathe quickly and become sweaty. The independent variables have been coded as follows: watching television (1 - less than 1 h/day, 2 - 1 h to 2 h, 3 - more than 3 h), doing homework (1 - less than 1 h/day, 2 - 1 h to 2 h, 3 - more than 3 h/day), the frequency of physical activities that cause them to breathe quickly or become sweaty during a week (1 - almost every day, 2 - 3 times a week, 3 - less than 3 times a week), engaging in physical activities that makes you breathe quickly or become sweaty (1 - more than 7 h/week, 2 - from 2 h to 6 h/week, 3 - less than 1 h/week) and sleeping at night on weekdays (1 - less than 4 h, 2 - from 5 h to 8 h, 3-more than 9 h/day).

2.6 Eating habits

The data concerning eating habits of adolescents were based on the responses to the question of how many times

a week they eat breakfast and how often, during the previous week, they consumed fresh vegetables, fruits, sweets, sweet beverages and snacks. The independent variables were coded as follows: eating breakfast (1 - every day, 2 - sometimes, 3 – never), consumption of vegetables and fruits (1 – 6 to 7 times/week, 2 – 3 to 5 times/week, 3 – 1 to 2 times/week, 4 – none) and consumption of candies or confectionery, sugar - sweetened beverages and snacks (1 - none, 2 - 1 to 2 times, 3 - 3 to 5 times, 4 - 6 to 7 times/week).

2.7 Statistical analysis

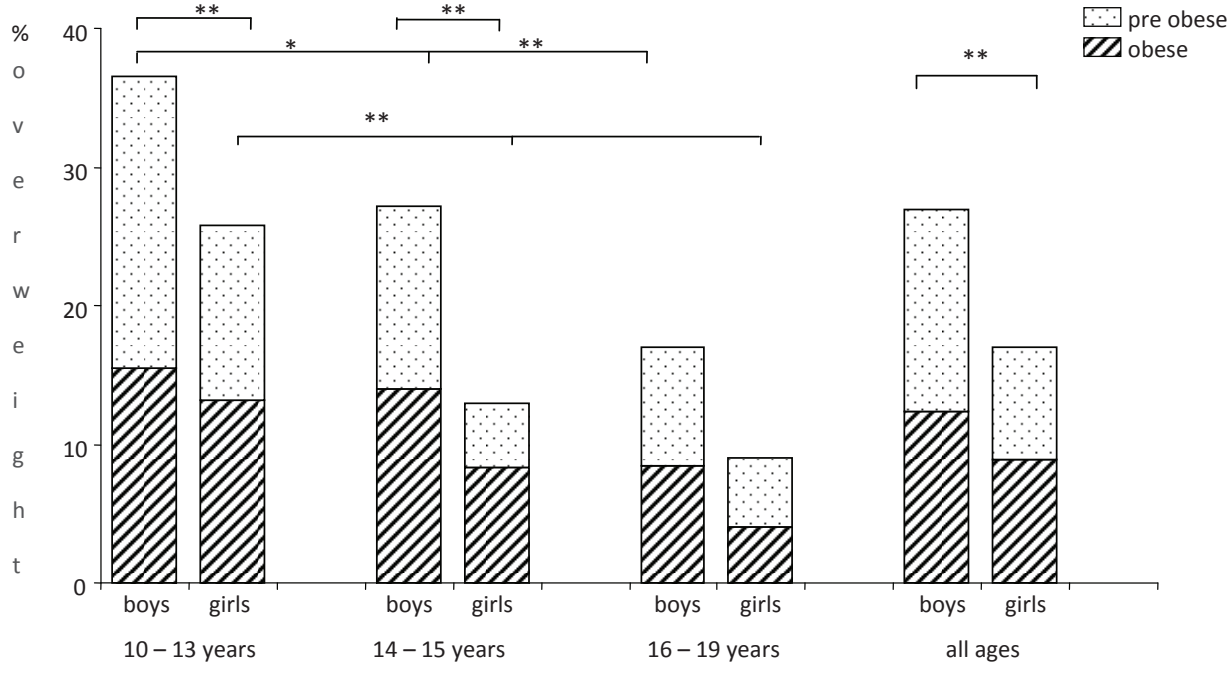
For assessing statistical significance of differences in the prevalence of overweight/obesity, a nonparametric test (x^2 test) was used. The multiple logistic regression model was used to determine the association of overweight/obesity with the selected variables (demographic characteristics and socio-economic status, physical activities, the way of managing free time and eating habits). The odds ratio (ORs) with a 95% confidence interval (CI) was adjusted by age and sex for each category.

The statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) ver.15.0 software package, with a minimum significance level of $p<0.05$.

3 RESULTS

Figure 1 shows the prevalence of overweight and obesity according to the age and sex categories. Nearly one fifth of the adolescents aged 10 to 19 years were overweight, of which 11.3% adolescents were obese. Specifically, 28.9% of boys and 17.0% of girls were overweight, while 14.5% of boys and 8.1% of girls were obese. The prevalence of overweight and obesity significantly decreased with the increase of the age category in males, while it significantly decreased in girls only between the first two age categories. Also, a statistically significant difference in the prevalence between the sexes within the age category of 10 to 13 years and 14 to 15 years was observed, with boys showing a higher prevalence of overweight and obesity than girls.

Table 1 shows the association between the selected demographic and socio-economic characteristics of the respondents with the occurrence of overweight and obesity in adolescents. Multivariate logistic regression models showed a significant association of prevalence of overweight (including obesity) with sex and age in adolescents. Adolescents who were younger (OR = 0.58 or OR = 0.55 for adolescents 14 to 15 years old and OR = 0.34 or OR = 0.30 for adolescents 16 to 19 years old) and boys (OR= .55 or OR =.51) had a significantly higher risk of being overweight



Significant difference* P < 0.05
Significant difference ** P < 0.01

Figure 1. The prevalence of overweight (including obesity) among adolescents aged 10 to 19 years, Serbia.

Table 1. Association between the demographic and socio-economic characteristics with the occurrence of overweight and obesity in Serbian adolescents aged 10-19 years.

	Number of participants (%)			Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)†
	Total n=2139	Normal weight n=1385	Overweight/obese n=470		
Sex					
Boys	1077	651(47.0 %)	290 (61.7 %)	1	1
Girls	1062	734 (53.0 %)	180 (38.3 %)	**0.55(0.44-0.68)****	**0.51 (0.40-0.65)****
Total	2139	1385	470		
Age					
10 - 13	873	503 (36.3 %)	270 (57.4 %)	1	1
14 - 15	468	308 (22.2 %)	96 (20.4 %)	**0.58 (0.44-0.76)****	**0.55 (0.41-0.73)****
16 - 19	798	574 (41.4 %)	104 (22.1 %)	**0.34 (0.26-0.44)****	**0.30 (0.22-0.41)****
Total	2139	1385	470		
Setllement					
Non-urban	1153	616 (44.5 %)	228 (48.5 %)	1	1
Urban	986	769 (55.5 %)	242 (51.5 %)	0.80 (0.62-1.02)	0.80 (0.62-1.04)
Total	2139	1385	470		
Wealth index					
Poorest	378	250 (18.1 %)	84 (17.9 %)	1	1
Poorer	460	298 (21.5 %)	86 (18.3 %)	0.88 (0.61-1.25)	1.01 (0.70-1.46)
Middle class	431	272 (19.6 %)	107 (22.8 %)	1.24 (0.87-1.75)	1.45 (1.01-2.08)
Richer	496	320 (23.1 %)	114 (24.3 %)	1.12 (0.78-1.60)	1.27 (0.87-1.84)
Richest	374	245 (17.7 %)	79 (16.8 %)	1.08 (0.72-1.63)	1.28 (0.84-1.96)
Total	2139	1385	470		
Family structure					
Complete	207	137 (10.2 %)	43 (9.3 %)	1	1
Incomplete	1873	1210 (89.8 %)	417 (90.7 %)	1.00 (0.70-1.45)	1.00 (0.68-1.46)
Total	2080	1347	460		
School success					
Not attending school	236	163 (12.4 %)	37 (8.1 %)	1	1
Repeated or sufficient	43	29 (2.2%)	7 (1.5 %)	1.15 (0.46-2.86)	0.75 (0.29-1.93)
Good	446	276 (21.0 %)	106 (23.2 %)	1.82 (1.17-2.85)	1.03 (0.63-1.67)
Very good or excellent	1310	844 (64.35 %)	306 (67.1 %)	1.70 (1.12-2.56)	0.91 (0.56-1.46)
Total	2035	1312	456		

†Adjusted for sex and age
*Significantly different from reference group *(P < 0.05)*
**Significantly different from reference group *(P < 0.01)*

than older adolescents and girls. No significant association with the wealth index was found.

When observing the association between the selected variables of the physical activities and the way of managing free time with the occurrence of overweight and obesity in adolescents, a statistically significant association of prevalence of overweight (including obesity) with variable of the physical activities lasting less than 7 hours a week, in such a way that you breathe quickly and become sweaty can be noticed. Specifically, the adolescents who spent physical activities less than 7 hours a week (OR = 25.04 or OR = 25.70 for physical activities 2 to 6 hours/a week; OR = 22.93 or OR = 21.35 for physical activities less than 1 hours/a week) were at risk in comparison with those who conducted physical activities more than 7 hours a week (Table 2).

Table 3 presents the association of the selected variables regarding specific eating habits with the occurrence of overweight and obesity. Specifically, we noted a statistically significant association for only one variable and only after adjusting for age and sex. Namely, the adolescents who skipped breakfast had a significantly higher risk of becoming overweight/obesity compared with those who had breakfast every day.

4 DISCUSSION

The prevalence of overweight children and adolescents is growing around the world in both developed and developing countries. The results of our study, which showed that 22.0% of adolescents aged 10 to 19 years (26.9% boys and 17.0% girls) were overweight and that 11.3% of them (14.5% boys and 8.1% girls) were obese, indicated that Serbia is among the countries with high prevalence. Specifically, among European countries, the highest prevalence has been found in Southern European countries, particularly in Greece (44.4% boys and 37.7% girls aged 10 to 12 years), Malta (38.9% boys and 30.1% girls aged 10 to 11 years) and Cyprus (37.5% boys and 34.1% girls aged 10 to

Table 2. Association between the variables of the physical activities and the way of managing free time with the occurrence of overweight and obesity in Serbian adolescents aged 10-19 years.

	Number of participants (%)		Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)†
	Normal weight	Overweight/obese		
Television				
< 1 hr/day	215 (16.2 %)	66 (14.6 %)	1	1
1 – 2 hr/day	517 (39.0 %)	201 (44.4 %)	1.43 (.98-2.11)	1.42 (.96-2.10)
> 2 hr/day	593 (44.8 %)	186 (41.1 %)	1.27(.87-1.87)	1.27 (.86-1.88)
Homework				
< 1 hr/day	367 (29.7 %)	134 (31.0 %)	1	1
1 – 2 hr/day	491 (39.8 %)	194 (44.9 %)	1.13 (.84-1.52)	1.21 (.89-1.65)
> 2 hr/day	376 (30.5 %)	104 (24.1 %)	.73 (.52-1.03)	.86 (.60-1.23)
Physical activities				
almost every day	354 (26.2 %)	134 (28.9 %)	1	1
3 times a week	339 (25.1 %)	127 (27.4 %)	.80 (.58-1.10)	1.02 (.73-1.42)
less than 3 times a week	659 (48.7 %)	202 (43.6 %)	1.00 (.74-1.36)	1.14 (.83-1.56)
Physical activities				
> 7 hr/a week	63 (6.1 %)	28 (7.5 %)	1	1
2 – 6 hr/a week	444 (43.2 %)	169 (45.2 %)	**25.04 (3.43-182.92)****	**25.70 (3.50-188.71)****
< 1 hr/a week	521 (50.7 %)	177 (47.3 %)	**22.93 (3.14-167.50)****	**21.35 (2.91-156.65)****
Sleeping				
< 4 hr/day	12 (.9 %)	4 (.9 %)	1	1
5-8 hr/day	1049 (76.7 %)	336 (71.7 %)	.62 (.18-2.15)	.62 (.17-2.31)
> 9 hr/day	307 (22.4 %)	129 (27.5 %)	.99 (.28-3.52)	.85 (.23-3.17)

†Adjusted for sex and age
*Significantly different from reference group *(P < 0.05)*
**Significantly different from reference group *(P < 0.01)*

12 years). Also, Slovenia is among the European countries with high prevalence (31.7% boys and 22.5% girls aged 10 to 12 years) (20).This is confirmed by the data of a national study with a sample of 2474 adolescents aged 15 to 16 years (17.1% boys and 15.4% girls were overweight and 6.2% boys and 3.8% girls were obese) (21). Data from the survey examined excess weight and obesity in a population of Slovenian boys and girls aged seven to eighteen from 1991 to 2011 and revealed that obesity is growing at higher rates than excess weight, as it was almost three times higher among both sexes over just 20 years (overweight boys 13.3% in 1991 vs. 19.9% in 2011; overweight girls 12.0% vs. 17.2%; obese boys 2.7% vs. 7.5%; obese girls 2.1% vs. 5.5%) (22).

Our data have shown a statistically significant association between age and sex with the overweight. A declining trend in the prevalence of overweight with age is contrary to the survey data in developed countries, where either stable (23, 24) or positive trends (25) have been registered. In contrast, three Brazilian studies have shown the same trend as our study (26-28).

A greater prevalence of overweight in boys compared to girls is consistent with the research results (29-32), while some studies have found no statistically significant difference when it comes to sexes (33, 34).

There is a lot of literature that has demonstrated socioeconomic inequalities in obesity among children in both high- and low-income countries – however, the direction of this association differs by economic context (35-43). Sobal and Stunkard's review of the literature on the relationship between socioeconomic status and obesity included 144 studies published before 1989 with data on cross-sectional associations between SES and obesity in women, men and children from developed and developing countries. For girls and boys respectively, inverse associations were found in 40 studies, no associations in 35 and positive associations in 25 (42). Similarly, Shrewsbury and Wardle's review of 45 cross-sectional studies from 1990-2005 from developed and developing countries found that socioeconomic factors were inversely associated with adiposity in 19 studies, there was no association in 12 studies and in 14 studies there was a mixture of no associations and inverse associations across subgroups. Generally, in high-income countries, there is a strong inverse association between socioeconomic factors and obesity, whereas socioeconomic status and obesity are directly associated in low-income countries (43). A Slovenian national study showed a statistically significant association between high income families and the habit of consuming fresh fruits 1 or more times per day and engaging in physical activities 60 minutes per day, every day of the week (44). Health Behavior in School-aged Children study 2009/2010 in Slovenia showed that increased prevalence of overweight/obesity was significantly associated with low family affluence for girls and boys (45). The only study that associated socioeconomic factors with overweight/obesity in Serbia found a connection between high family income and female obesity (46). Our study did not find a statistically significant association between wealth index and the occurrence of overweight/obesity in adolescents.

Table 3. Association between the variables regarding eating habits with overweight and obesity in Serbian adolescents.

	Number of participants (%)		Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)†
	Normal weight	Overweight/obese		
Breakfast				
Every day	1201 (86.8 %)	406 (86.6 %)	1	1
Sometimes	168 (12.1 %)	60 (12.8 %)	.66 (.19-2.35)	.94(.26-3.44)
Never	14 (1.0 %)	3 (.6 %)	1.13 (.82-1.56)	**1.43 (1.02-2.01)***
Vegetables				
6 to 7 times/week	680 (49.3 %)	240 (51.5 %)	1	1
3 to 5 times/week	396 (28.7 %)	137 (29.4 %)	1.33 (.80-2.21)	1.30 (.77-2.20)
1 to 2 times/week	224 (16.3 %)	59 (12.7 %)	.81 (.56-1.17)	.71 (.49-1.04)
None	78 (5.7 %)	30 (6.4 %)	.99 (.75-1.30)	.88 (.66-1.17)
Fruits				
6 to 7 times/week	683 (49.7 %)	246 (52.6 %)	1	1
3 to 5 times/week	432 (31.4 %)	148 (31.6 %)	.72 (.38-1.35).	.67 (.35-1.28)
1 to 2 times/week	193 (14.0 %)	56 (12.0 %)	.85 (.58-1.25)	.94 (.64-1.40)
None	66 (4.8 %)	18 (3.8 %)	.95 (.73-1.24)	1.02 (.77-1.35)
Sweets				
None	112 (8.1 %)	34 (7.3 %)	1	1
1 to 2 times/week	409 (29.7 %)	145 (31.0 %)	1.46 (.76-2.82)	1.15 (.71-1.86)
3 to 5 times/week	537 (39.1 %)	197 (42.1 %)	1.45 (.76-2.77)	1.12 (.68-1.84)
6 to 7 times/week	317 (23.1 %)	92 (19.7 %)	1.38 (.71-2.66)	.84 (.49-1.45)
Sweet beverages				
None	61 (4.4 %)	14 (3.0 %)	1	1
1 to 2 times/week	282 (20.5 %)	100 (21.4 %)	1.46 (.76-2.82)	1.39 (.70-2.76)
3 to 5 times/week	537 (39.1 %)	190 (40.7 %)	1.44 (.76-2.77)	1.38 (.70-2.72)
6 to 7 times/week	495 (36.0 %)	163 (34.9 %)	1.38 (.71-2.66)	1.41 (.71-2.82)
Snacks				
None	159 (11.6 %)	59 (12.6 %)	1	1
1 to 2 times/week	466 (33.9 %)	159 (33.9 %)	.87 (.60-1.26)	.78 (.53-1.15)
3 to 5 times/week	540 (39.3 %)	184 (39.2 %)	.86 (.59-1.26)	.79 (.54-1.17)
6 to 7 times/week	210 (15.3 %)	67 (14.3 %)	.89 (.56-1.41)	.80 (.50-1.28)

†Adjusted for sex and age
*Significantly different from reference group *(P < 0.05)*
**Significantly different from reference group *(P < 0.01)*

Family functioning, which may also be linked to behavioral and psychological factors, has often been the interest of research (47, 48), while aspects of family structure (single parent families, number of siblings, birth order of child, age of mother at the birth of her child) have only rarely been examined and the results were inconsistent (49). In this study, the association of the variable referring to family structure with the occurrence of overweight and obesity wasn't found.

Researchers examined school performance as a variable associated with adolescents being overweight. In one review, which examined this association, it found that being or becoming overweight in adolescence was associated with poor school performance (50). The results of this study didn't find an association.

A large number of cross-sectional studies have investigated the association between eating habits and the occurrence of overweight/obesity. Namely, skipping breakfast is a powerful predictor for the occurrence of overweight/obesity in adolescents in both developed countries (28, 51, 52) and developing countries (53-55). Findings from the review of the prospective studies showed a negative association between breakfast consumption and BMI. In fact, breakfast consumption may be associated with decreased fat and snack intake later in the day, and it may a marker of health behavior of preparing food and eating at the table (56). Our research confirmed the results of the previously mentioned studies.

Among dietary factors linked with obesity, high-fat and sugar-containing foods have been the most studied. While overconsumption of these foods leads to excessive weight gain and obesity, consuming a diet high in fruits and vegetables protects against obesity.

The choice of beverage deserves special attention as a potential obesity risk factor in children and adolescents. Findings from recent systematic reviews ranged from no evidence to strong evidence for the independent role of the intake of sugar-sweetened beverages in the promotion of weight gain and obesity in children and adolescents (57, 58). Cross-sectional studies (59-61), as well as observational follow-up studies (62-64), showed positive associations between intake of sugar-sweetened beverages and overweight/obesity.

Although snack foods are generally high in both fat and calories and low in micronutrients or micronutrient density, prospective studies reported that they were not an important independent determinant of weight gain among children and adolescents (63, 65, 66).

Fruits and vegetables have high water and dietary fiber contents, making them low in energy density. However, a recent review of 23 longitudinal or experimental studies about fruit and vegetable intake and adiposity levels in children (67) showed an unclear relationship among children. Most studies in the review found no association, while only half of the child longitudinal studies found a significant inverse association. In a cross-sectional analysis, lifestyle pattern, including the consumption of vegetables, cooked meals and eating dinner, was negatively associated with obesity (68). Likewise, the findings of a review of 3 prospective, 10 cross sectional and 1 case control studies do not support a protective association between fruit or vegetable consumption and childhood obesity (69). Janssen I et al. showed, in a systematic review of a cross-sectional survey of 137,593 youth (10-16 years) from the 34 (primarily European) participating countries of the 2001-2002 Health Behavior in School-Aged Children Study, that overweight status was not associated with the intake of fruits, vegetables and soft drinks (70).

When considering an association of prevalence of overweight with the consumption of sweets, studies reported frequent consumption of sweets among other lifestyle factors significantly associated with obesity and overweight (27, 71-73). However, eating sweets was negatively associated with overweight/obesity in only two cross sectional studies (37, 74). Our data have shown no statistically significant association between the above-mentioned dietary factors and the overweight.

Lack of physical activity is a known determinant of obesity. Unfortunately, children become less and less active as they reach and progress through adolescence. Rauner A et al., in a review of twelve cross-sectional and two longitudinal studies, found that all studies reported inverse relations between physical fitness or physical activity and overweight. Only four studies analyzed the interaction among physical activity, fitness and overweight in adolescents and reported inconsistent results (75). One other systematic review of the cross-sectional studies examined the associations of physical activity and sedentary behavior to childhood and adolescent overweight and obesity and reported mixed results (76). Findings from a review of prospective observational studies published in English between 1990 - 2007 reported that physical activity showed more consistent inverse associations with fatness outcomes than for weight status, but the magnitudes of association were modest (56). Our study has shown a statistically significant association between conducting physical activities less than 7 h a week and the occurrence of overweight/obesity.

Several studies have specifically examined the relationship between television viewing and adolescents' risk of overweight. Although some find only weak relationships (77, 78), several others have found that hours of television viewing were closely associated with increased levels of obesity in cross-sectional and prospective studies (79-85). This discrepancy may reflect the replacement of television viewing with other forms of inactivity in older children, especially for girls. The results of a prospective study by Gortmaker et al. (86) showed a strong dose–response relationship between hours of television viewing and the prevalence of overweight at the end of the period. Those children who watched more than 5 h of television per day were five times as likely to be overweight than their counterparts who watched 2h or less of television per day. Our research has shown that there is no statistically significant association between overweight and habits of watching television.

The link between pediatric obesity, higher body fat and sleep duration has been widely demonstrated in the literature (87). In contrast to other sources of inactivity, short sleep duration is associated with excess weight (88). Interestingly, differences in risk have been shown between boys and girls, with the relationship between sleep and overweight seeming to be stronger among boys (89, 90). Our research has shown that there is no statistically significant association between overweight and sleep duration.

The limitations of the study are the difficulties in determining the direction of the cause-effect relationship and the fact that the resulting association does not necessarily reflect the association between the exposure and the morbidity risk, which are the main limitations of these studies. These deficiencies can be remedied by performing longitudinal studies, but those studies are expensive, time-consuming and involve a risk of the respondents dropping out. When it comes to data collection, the observed limitation is biasness in the data provision (older respondents and girls).

5 CONCLUSION

The prevalence of overweight, including obesity, in Serbia has reached the level of leading Southern European countries. This study showed an association between sex, age, physical inactivity and habit of skipping breakfast with the prevalence of overweight among adolescents in Serbia.

These findings should be an integral part of further preventive interventions, especially those oriented towards younger adolescents, who are physically inactive, have a habit of skipping breakfast and are boys.

LIST OF ABBREVIATIONS

WHO	World Health Organization
BMI	Body Mass Index
IOTF	The International Obesity Task Force
CDC	Centers for Disease Control and Prevention
NCHS	National Center for Health Statistics
EAs	Enumeration Areas
EHRM	European Health Risk Monitoring
Wealth Index	Demographic and Health Survey Wealth Index

OR	Odds Ratio
Cl	Confidence Interval
SPSS	Statistical Package for the Social Sciences
SD	Standard Deviation

CONFLICT OF INTEREST

The authors declare that no conflict of interest exist.

FUNDING

The study is a part of the 2006 National Health Survey for the population of Serbia (without data on Kosovo and Metohia) that was carried out by the Ministry of Health of the Republic of Serbia with financial and professional support of the World Bank, the World Health Organization Regional Office for Europe (country office Serbia) and the Institute of Public Health of Serbia 'Dr Milan Jovanovic Batut'.

ETHICAL APPROVAL

Ethical approval was received from the Review Board of the Ministry of Health of Serbia and the Institute of Public Health of Serbia.

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MANAGEMENT OF GASTROINTESTINAL DISORDERS IN CENTRAL AND EASTERN EUROPE: SELF-REPORTED PRACTICE OF PRIMARY CARE PHYSICIANS

ZDRAVLJENJE BOLEZNI PREBAVIL V SREDNJI IN VZHODNI EVROPI: PODATKI, KI JIH ZDRAVNIKI V PRIMARNI ZDRAVSTVENI OSKRBI SAMI SPOROČAJO

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Received/Prispelo: 5. 6. 2014
Accepted/Sprejeto: 18. 8. 2014

Original scientific article/Izvirni znanstveni članek
UDC/UDK 616.3:614

ABSTRACT

Keywords:
General practice; gastrointestinal diseases; gastroesophageal reflux; colorectal neoplasms; irritable bowel syndrome

Background. Gastrointestinal disorders account for 7-10% of all consultations in primary care. General practitioners' management of digestive disorders in Central and Eastern European countries is largely unknown.

Aims. To identify and compare variations in the self-perceived responsibilities of general practitioners in the management of digestive disorders in Central and Eastern Europe.

Methods. A cross-sectional survey of a randomized sample of primary care physicians from 9 countries was conducted. An anonymous questionnaire was sent via post to primary care doctors.

Results. We received 867 responses; the response rate was 28.9%. Over 70% of respondents reported familiarity with available guidelines for gastrointestinal diseases. For uninvestigated dyspepsia in patients under 45 years, the "test and treat" strategy was twice as popular as "test and scope". The majority (59.8%) of family physicians would refer patients with rectal bleeding without alarm symptoms to a specialist (from 7.6% of doctors in Slovenia to 85.1% of doctors in Bulgaria; p<0.001). 93.4% of respondents declared their involvement in colorectal cancer screening. In the majority of countries, responding doctors most often reported that they order fecal occult blood tests. The exceptions were Estonia and Hungary, where the majority of family physicians referred patients to a specialist (p<0.001).

Conclusions. Physicians from Central and Eastern European countries understood the need for the use of guidelines for the care of patients with gastrointestinal problems, but there is broad variation between countries in their management. Numerous efforts should be undertaken to establish and implement international standards for digestive disorders' management in general practice.

IZVLEČEK

Ključne besede:
*Splo*šna medicina, bolezni prebavil, *gastroezofagealni refluks, novotvorbe debelega črevesa in danke, sindrom razdražljivega črevesja*

***Uvod**. 7-10 % vseh posvetov v primarni zdravstveni oskrbi se nanaša na bolezni prebavil. O zdravljenju bolezni prebavil s strani splošnih zdravnikov v Srednji in Vzhodni Evropi ni na razpolago veliko podatkov.*

***Cilji**. Ugotoviti in primerjati razlike v samozaznani odgovornosti splošnih zdravnikov pri zdravljenju bolezni prebavil v Srednji in Vzhodni Evropi.*

***Metode**. Naredili smo presečne ankete na randomiziranem vzorcu splošnih zdravnikov v primarni zdravstveni oskrbi iz devetih držav. Po pošti smo zdravnikom v primarni zdravstveni oskrbi poslali anonimni vprašalnik.*

***Rezultati**. Prejeli smo 867 odgovorov, stopnja odzivnosti je bila 28,9 %. Več kot 70 % anketirancev je v odgovorih navedlo, da so seznanjeni z razpoložljivimi smernicami za bolezni prebavil. Za neraziskano dispepsijo pri bolnikih, mlajših od 45 let, je bila dvakrat bolj priljubljena strategija »testiranja in zdravljenja« kot pa strategija »testiranja in gastroskopije«. Večina (59,8 %) zdravnikov v primarni zdravstveni oskrbi bi bolnike z rektalnimi krvavitvami brez znakov alarma napotila k specialistu (od 7,6 % zdravnikov v Sloveniji do 85,1 % zdravnikov v Bolgariji; p<0.001). 93,4 % anketirancev je potrdilo svojo udeležbo pri presejalnih pregledih za odkrivanje raka debelega črevesa in danke. V večini držav so zdravniki najpogosteje poročali, da naročajo testiranje za odkrivanje prikritih krvavitev v blatu. Izjema pri tem sta bili Estonija in Madžarska, kjer večina zdravnikov v primarni zdravstveni oskrbi napoti paciente k specialistu (p<0.001).*

***Zaključki**. Zdravniki iz Srednje in Zahodne Evrope razumejo potrebo po uporabi smernic za nego bolnikov z boleznimi prebavil, vendar pa je pri obravnavi veliko razlik med posameznimi državami. Treba si je prizadevati in sprejeti ukrepe za vzpostavitev in izvajanje mednarodnih standardov za obravnavo bolezni prebavil v splošni praksi.*

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1 INTRODUCTION

Gastrointestinal (GI) symptoms are highly prevalent in the community. Up to 60% of adult population could be classified as having symptoms of gastro-esophageal reflux (GORD), dyspepsia or irritable bowel syndrome (IBS), of which approximately 90% of the symptoms remained over a period of 1-6 months (1, 2). Gastrointestinal complaints are the cause for about 7-10% of all consultations in primary care, and the number of ambulatory visits due to digestive diseases is steadily rising (3). The costs of consultations in primary care for GI problems alone approach 7.8% of the total remuneration paid out to these physicians (4). GI disorders impair the quality of life and strongly affect health care services (5, 6). Colorectal cancer is a significant problem in the population with approximately 1.2 million newly diagnosed cases each year (7, 8).

Since the 1990s, Central and Eastern European (CEE) countries have gone through significant changes in the provision of health care, from a system that relied almost exclusively on centrally-administered specialist clinics to a new system modeled after western European systems (primarily from the United Kingdom and the Netherlands) (9-11). Under the newly implemented systems, family physicians/general practitioners (FPs/GPs) are the first contact health care professionals seen by individuals with GI symptoms. The FPs'/GPs' ability to manage the diversity of digestive disorders thus requires sound knowledge of guidelines and different approach strategies (12, 13).

The differences in the management of digestive disorders in primary care practices around Europe are still poorly known despite the recognized importance of such disorders' medical and economic implications (14, 15). While some pan-European and country-specific studies on the management of GI disorders in primary care exist, they refer mainly to health care in western, northern and southern Europe (16-18).

The aims of this study were:
1. to identify and compare variations in the self-perceived responsibilities of FPs/GPs in the management of digestive disorders in CEE countries,
2. to analyze associations between physicians' characteristics and the self-perceived care to patients with gastrointestinal diseases.

2 METHODS

We analyzed and compared data from a cross-sectional study of FPs/GPs in 9 CEE countries concerning their management of gastrointestinal diseases.

2.1 Survey

Based on the literature review and the expertise of the research team members, a draft version of the questionnaire was prepared. Content validity was verified by a coordination team consisting of at least one representative from each participating country. The face validity was determined in a pilot study conducted among at least 10 FPs/GPs in each of the countries.

The English version of the questionnaire was translated into the 9 countries' national languages by professional translators and then reviewed, discussed and agreed upon by the respective members of the coordination team. The questionnaire consisted of three separate parts: 1) demographic data and professional characteristics of the study participants, 2) questions about declared management of patients with cardiovascular diseases and 3) a section aimed at evaluation of different aspects of care provided to patients with gastrointestinal disorders. The third part contained 10 questions, of which 5 had predefined answer options and 5 required the selection of one of four options on the Likert scale (never, sometimes, usually and always). The present paper deals only with the issues included in the GI part of the study, while the results related to cardiovascular problems have already been published elsewhere (19-21).

2.2 Subjects

The questionnaires were distributed to a total of 3000 primary care doctors in the 9 countries: Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Slovakia (SK) and Slovenia (SL). A random sample of GPs was drawn from national physicians' registers in each country. We aimed at a sample of at least 50 GPs in the smaller countries (Estonia, Latvia, Lithuania, Slovakia and Slovenia) and 100 in the larger ones (Bulgaria, Czech Republic, Hungary and Poland) to enable a reliable comparison between countries. The number of doctors approached in countries varied between 150 and 500 depending on the country's population and expected response rate.

2.3 Data collection and analysis

The chosen physicians received by regular mail (post) an anonymous questionnaire for self-completion, along with an instructional cover letter and a pre-paid return envelope. Reminders were mailed to non-responders at three weeks after the deadline and a phone call was made two weeks later. Data was compiled into a database for further analysis at a coordinating center in the Czech Republic.

Quantitative and qualitative analyses were performed. Frequency distribution for categorical variables and mean values for continuous variables were computed to describe the family physicians' samples. For questions with answers on the Likert scale, options were grouped as follows: "never" with "sometimes" and "usually" with "always". The Chi-squared test was used to compare differences between countries. The Chi-squared test was also used to investigate the relationship between the results and respondents' characteristics for qualitative variables. The Gamma correlation coefficient was calculated to measure correlations with quantitative variables. An alpha level of $p=0.05$ was considered statistically significant. A statistical analysis was performed by means of Statistica 10 software (StatSoft Inc.).

2.4 Ethics

Due to the nonexperimental design and lack of human or animal material involvement, ethical approval was not sought. The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki.

3 RESULTS

3.1 Characteristics of participants

The desired number of collected questionnaires per country was attained in all countries with the exception of Lithuania. The sample included 867 family physicians. The average response rate for all participating countries was 28.9% and ranged from 20.7% in Lithuania to 85.6% in the Czech Republic. In all of the countries, about two-thirds of the respondents were women. The mean age of the respondents was 49.3 years (min. 44.1 in Bulgaria, max 53.5 in Hungary). The mean practice experience as a general practitioner ranged from 9.2 in Bulgaria to 22.6 years in Slovakia. Over three-quarters of doctors in all the countries had a specialization in family medicine/general practice. The majority of study participants practiced in urban areas. The detailed country-by-country characteristics of respondents are presented in Table 1.

Table 1. Number of respondents and characteristics of physicians in the study.

	Respondent (n)	Female (%)	Age in years (mean)	Years of experience in GP (mean)	Specialty in FM/GP (%)	Patients' population municipal/village/mixed (%)
BG	114	66	44.1	9.2	6	85/9/6
CZ	214	71	52.0	21.9	98	57/18/24
EE	51	92	48.3	17.9	96	51/29/20
HU	144	41	53.5	21.8	87	56/24/40
LT	31	68	45.1	9.0	83	65/23/13
LV	77	91	49.3	19.1	99	77/16/8
PL	100	62	46.4	16.6	96	47/29/23
SK	57	77	51.8	22.6	100	54/20/27
SL	79	66	46.2	18.4	77	33/30/37
Total	867	67	49.3	18.5	82	59/21/20

3.2 Familiarity of guidelines for gastrointestinal problems

Over 70% of respondents in 8 of the 9 countries were aware of guidelines for dyspepsia, GORD and colorectal cancer risk. The sole exception was Lithuania, where 48.4% of doctors knew the guidelines for dyspepsia ($p<0.001$) and 41.9% for colorectal cancer risk ($p<0.001$). Considerable differences between countries were found in the reported familiarity of guidelines for irritable bowel syndrome ($p<0.001$).

Doctors with longer experience more frequently declared knowledge of guidelines for GORD (correlation coefficient Gamma=0.09; $p=0.006$) and colorectal cancer risk (correlation coefficient Gamma= 0.12; $p<0.001$). Awareness of standard procedures in colorectal cancer risk was also correlated with age of GPs (correlation coefficient Gamma= 0.08; $p=0.008$). No correlations were found between familiarity of guidelines and respondents' gender, specialization and practice location.

3.3 Clinical management of upper gastrointestinal tract disorders

3.3.1 Dyspepsia

Considerable national differences were found in first-line diagnostic and management approaches for patients younger than 45 years of age with uninvestigated dyspepsia without alarm symptoms. Empirical therapy with proton pump inhibitors (PPI) was reported by a majority of respondents, with a range from 35.5% physicians in Lithuania up to 80% of doctors in Poland ($p<0.001$). 32.2% of all doctors declared referring patients to a specialist, and that percentage varied from 7.6% in Slovenia to 55.3% in Bulgaria ($p<0.001$). Country specific data are presented in Figure 1.

PPI therapy was more often reported by younger GPs (correlation coefficient Gamma= -0.17; $p<0.001$) and by physicians with fewer years of experience in general practice (correlation coefficient Gamma= -0.1; $p<0.001$). No correlations were found between the use of PPI and respondents' gender, specialization and practice location.

Referral to a specialist was more frequently declared by older respondents (correlation coefficient Gamma=0.07; $p=0.011$) and by doctors without specialization in family medicine/general practice (49.4% versus 28.3% of doctors with specialization; $p<0.001$). The least popular approach was empirical therapy with histamine-2 receptor antagonist (H2RA), which was acknowledged by 23.6% of family physicians, with a range from 10.3% of respondents in the Czech Republic up to 42.1% of doctors in Slovakia ($p<0.001$).

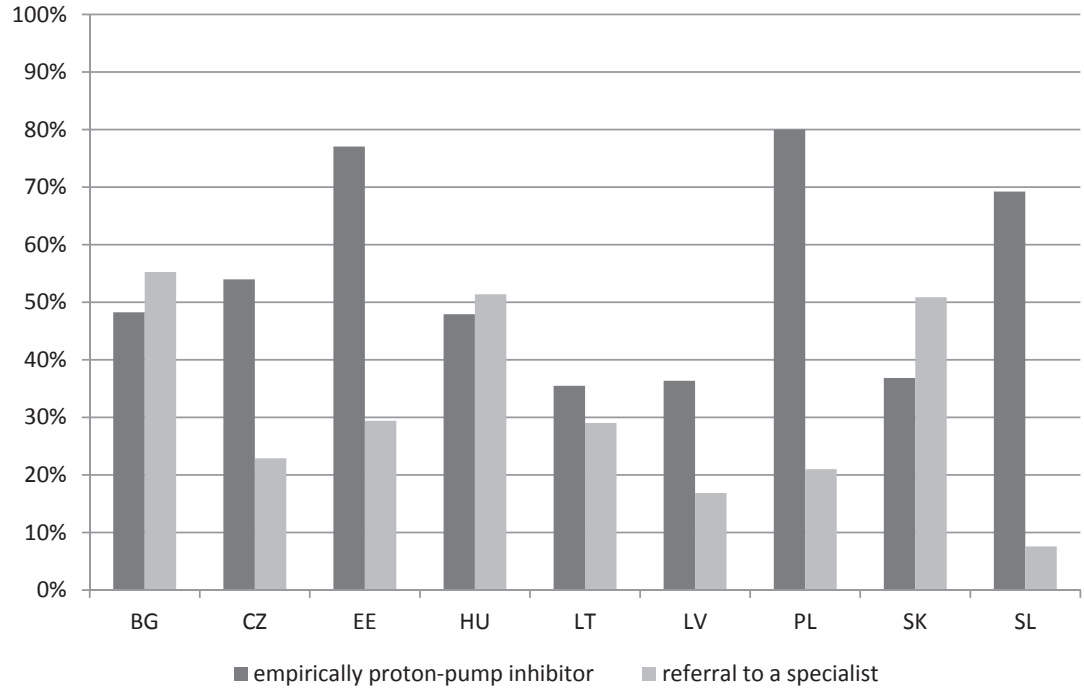

Figure 1. Percentage within each country - first-line diagnostic and management approach in patients under 45 years with uninvestigated dyspepsia without alarm symptoms.

3.3.2 Gastro-esophageal reflux disease

In managing GORD, 65.1% of physicians from participating countries declared use of therapeutic test by PPI for diagnosing the condition. In particular countries, this percentage varied significantly (42.9% in Latvia to 96.2% in Slovenia; $p<0.001$). Detailed data are showed in Figure 2.

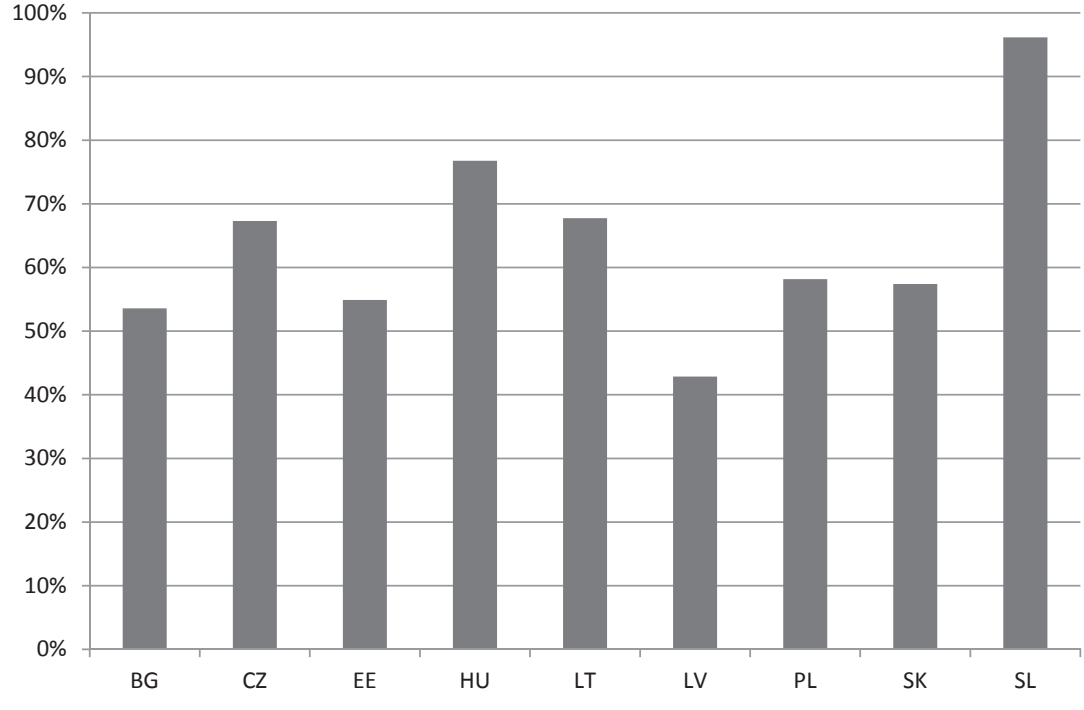

Figure 2. Percentage of physicians using the therapeutic test by proton inhibitors for diagnosing gastro-oesophageal reflux disease in primary care.

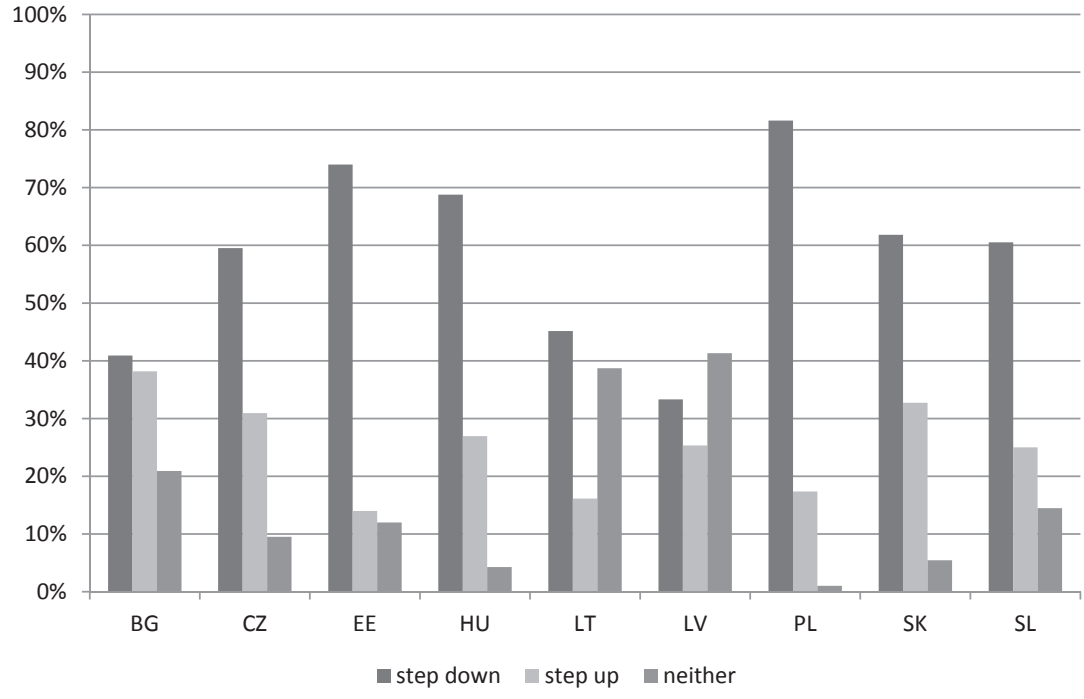

Figure 3. Percentage of physicians using "step down" and "step up" approach in the managment of gastro-oesophageal reflux disease in primary care.

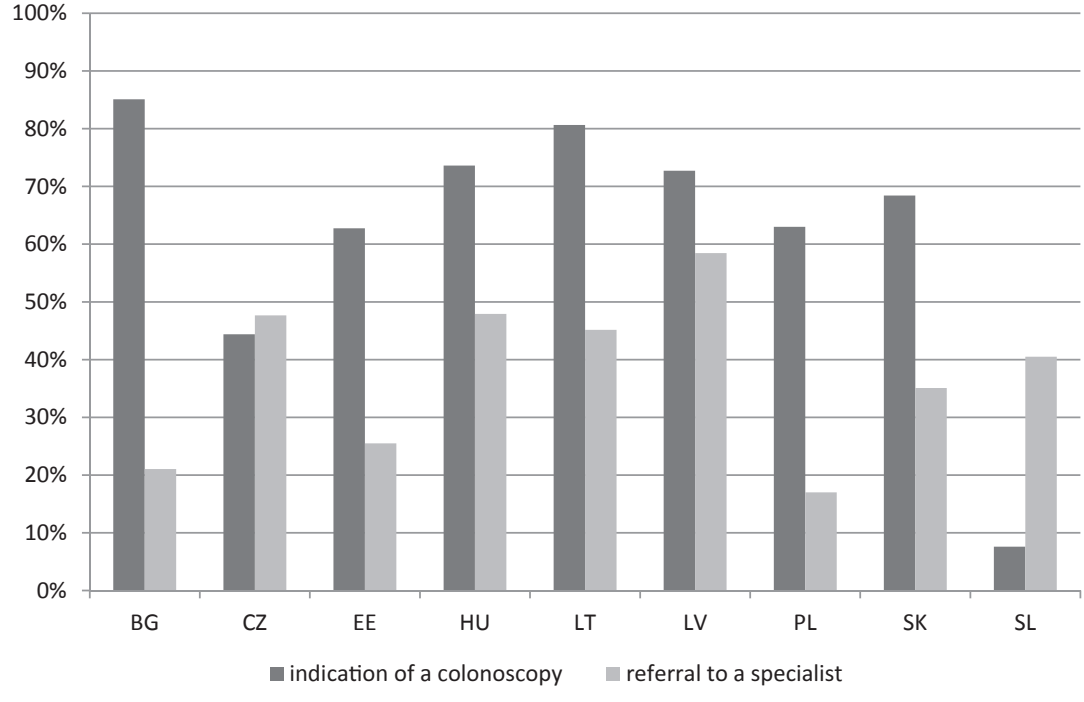

Figure 4. Percentage within each country - investigations at first visit in patients under 45 years with rectal bleeding without alarm symptoms.

We did not find associations between the use of the therapeutic test by PPI in diagnosing GORD and respondents' characteristics. Figure 3 illustrates the percentage of physicians within each country using a "step down" (from the most potent drug down to the weakest) and "step up" (from the weakest up to the most potent) drug treatment strategy in the management of GORD. The differences between studied countries were significant (p<0.001). A "step down" approach was favored over a "step up" approach in all countries apart from Latvia, where the respondents most often declared using neither of the strategies. The use of a "step down" approach was reported by 62.9% of physicians with a specialization in family medicine/general practice and by 45.4% of physicians without it (p<0.001).

3.4 Clinical management of lower gastrointestinal tract disorders

3.4.1 Rectal bleeding without alarm symptoms

The approach strategies in patients with rectal bleeding differed significantly between countries. The majority (59.8%) of family physicians would refer patients under 45 years without alarm symptoms to a specialist for assessment (from 7.6% of doctors in Slovenia to 85.1% of doctors in Bulgaria; p<0.001). 38.7% of respondents would indicate a colonoscopy examination (from 17% of doctors in Poland to 58.4% of doctors in Latvia; p<0.001). Figure 4 shows detailed data.

Indication for a colonoscopy was more frequently declared by doctors with family medicine specialization (40.7% versus 31.4%, p=0.032), by older respondents (correlation coefficient Gamma=0.06; p=0.03) and by doctors with longer experience in general practice (correlation coefficient Gamma=0.1; p<0.001). The analysis did not show correlations between this approach and respondents' gender and practice location. Study participants without specialization (71.2% versus 57.1%, p=0.001) and with fewer years of experience in general practice (correlation coefficient Gamma= -0.07; p=0.016) would more often seek a consultation with a specialist. No associations were found between referral to a specialist and the respondents' gender, age and practice location.

3.4.2 Rectal bleeding with alarm symptoms

Routine referrals to specialists or hospitals for patients with rectal bleeding (mixed with stool, in the elderly, along with alterations in frequency of stools) were employed by 58.9% of doctors (from 25.9% in Lithuania to 82.5% of respondents in Bulgaria; p<0.001). 54.9% of family physicians would make an urgent specialist appointment or hospital admission (from 38% in Slovenia to 80.7% in Lithuania; p<0.001). 54.7% of respondents would arrange a colonoscopy (from 37% of respondents in Poland to 76% in Lithuania; p<0.001). Detailed data are presented in Figure 5.

Routine referral to a specialist and arrangement of a colonoscopy were considerably influenced by respondents' specialization. Doctors without family medicine specialization more often declared they would request a routine referral to a specialist (76.3% versus 54.8%, p<0.001) and more rarely reported arrangement of a colonoscopy (46.8%

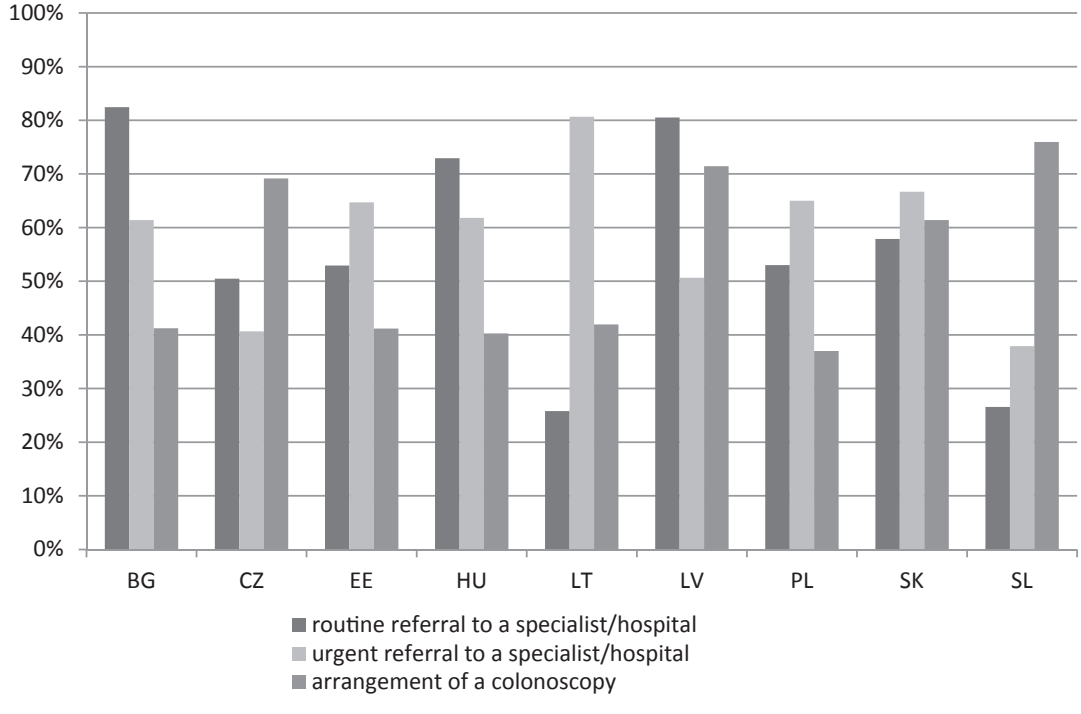

Figure 5. Percentage within each country - investigations in patients with rectal bleeding in connection with alarm symptoms.

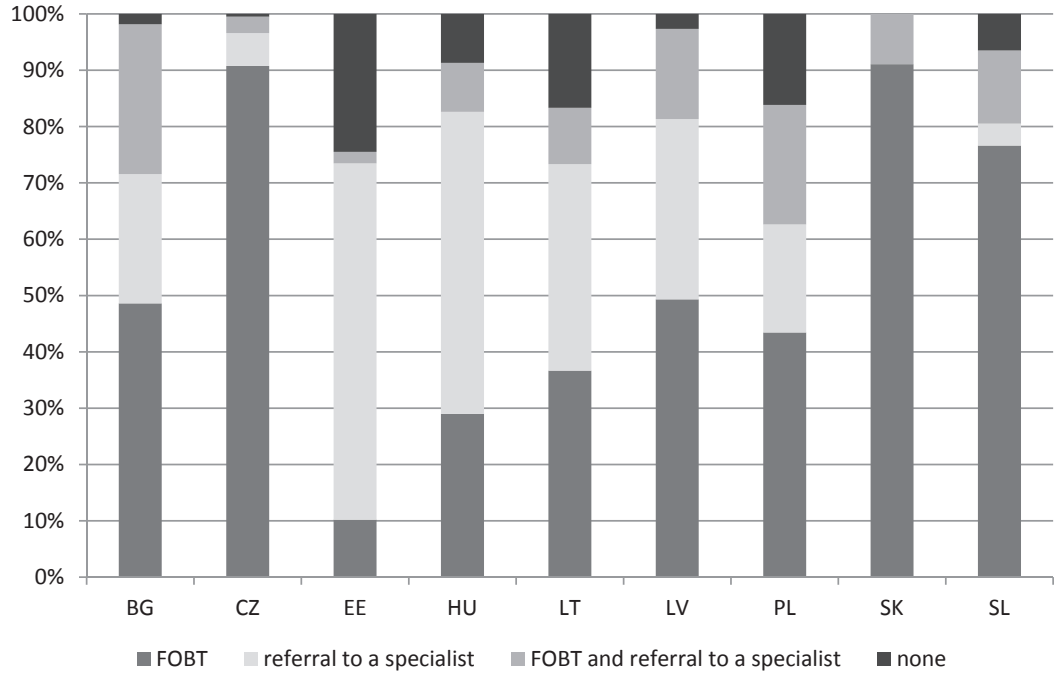

Figure 6. Percentage within each country - approach to colorectal cancer screening.

versus 56.7%, p=0.026). No correlation was found between an urgent referral to a specialist/hospital and respondents' specialization.

3.4.3 Colorectal cancer screening

Altogether, 93.4% of FPs confirmed their involvement in colorectal cancer screening. The approach to the screening varied significantly among countries participating in the study. In the majority of the countries, responding doctors most often reported that they ordered fecal occult blood test (FOBT). The exceptions were Estonia and Hungary, where the majority of family physicians referred patients to a specialist (p<0.001). Colorectal screening by means of FOBT was considerably influenced by respondents' specialization (60% of doctors with specialization versus 50% of doctors without specialization; p=0.009) and gender (62.2% of female doctors versus 49.8% of male doctors; p=0.003). There were no correlations between the screening method and respondents' age, professional experience and practice location. The approach to colorectal cancer screening is illustrated in Figure 6.

3.3.4 Irritable bowel syndrome

Only 32.7% of respondents declared use of any criteria for the diagnosis of IBS, with a range from 9.7% in Lithuania up to 69.2% in Poland (p<0.001). The use of any IBS criteria correlated significantly with respondents' specialization (35.5% of doctors with specialization versus 19.4% of doctors without specialization; p<0.001) and gender (35.2% of female doctors versus 27.1% of male doctors; p=0.018).

4 DISCUSSION

4.1 Main findings in comparison with other studies

In this international cross-sectional study with focus on the management of GI tract disorders, we observed many differences between general practitioners from CEE countries. The results of our survey may be compared with results from the pan-European study by the European Society for Primary Care Gastroenterology (ESPCG) (16). Both studies showed high levels of awareness of guidelines for management of GI disorders among family physicians.

For patients with uninvestigated dyspepsia without alarm symptoms, the managerial strategies revealed by our study included mainly therapy with PPI and referral to a specialist. The least popular preference was the empirical therapy with H2RA. Spiegel et al. found that gastroenterologists followed available guidelines more often than primary care physicians. Primary care physicians often define dyspepsia incorrectly and overuse unnecessary diagnostic testing and treatment not supported by scientific evidence (22).

In the process of diagnosis of GORD, nearly two thirds of all doctors in our study reported using the PPI test. In the management of GORD, general practitioners in most of the countries, except those in Latvia, preferred a "step down" approach over a "step up" strategy. As in our survey, according to Seifert et al. the most preferred approach in dyspepsia was empirical therapy with proton pump inhibitor, and a "step down" drug treatment strategy in management of GORD was favored in all studied countries except Spain (16). Several other studies also demonstrated that a "step

down" approach is currently the most common strategy in primary care (23, 24).

Gisbert et al. showed that the majority of patients with GORD symptoms were prescribed a proton pump inhibitor, results that were also confirmed by our survey (17). The study conducted by Boparai et al. revealed that younger FPs/GPs use PPI more often than their older colleagues, as it is a new management approach (25). PPI are one of the most frequently prescribed medications and there is a growing concern about the rationale for the use of PPI therapy in primary care (26).

Studies from Australia regarding the approach to the symptom of rectal bleeding and involvement in implementing a colorectal cancer screening program showed a wide variation in practices among GPs (27, 28). Nevertheless, it is proven that primary care physicians could play an essential role by encouraging patients to take part in prevention programs and by offering psychosocial support for both the patient suffering from colorectal cancer and their family (29). In our survey, the majority of family physicians reported that they would refer patients with rectal bleeding to a specialist for further diagnostic tests or arrange a colonoscopy; these results are similar to findings from a German study that investigated strategies of the diagnostic work-up of patients presenting with rectal bleeding in general practice using a digital practice patient file (30). The vast majority of GPs from our study (over 90%) declared their involvement in colorectal cancer screening. A review from Mauri et al. reported that in Western European countries (France, Italy, Switzerland) colorectal cancer screening was recommended by 65%–95% of physicians, and the majority of them implemented it only among high-risk individuals (31). Xilomenos et al. found that in Greece only 50% of general practitioners recommend screening for colorectal cancer during usual consultations (32).

GPs in our survey more often declared use of any criteria for the diagnosis of IBS than the respondents from a relevant Pan-European study, 33% and 23% respectively (16). The available studies showed that IBS criteria are poorly known in primary care (33, 34). Olafsdottir et al. found that although 64% of general practitioners in Iceland declared they knew that IBS criteria existed, only 10% had heard of the Manning criteria, 27% of Rome I and 17% of Rome II (35).

4.2 Limitations of the study

This is a new study about the management of GI disorders in primary care from health care systems of Central and Eastern Europe. The strength of the study is the participation of physicians from a large number of CEE countries. Some studies show large positive changes in Eastern and Central European primary care systems, but other studies show the opposite (36). Only a few studies in primary care have analyzed physicians' decisions about the initiation of diagnosis and management of GI tract disease (16-18). Most of these were performed in Western European countries. In our study, the total number of participants was large. Although the response rate was relatively low, it was comparable with other studies of similar type (16, 37, 38), and moreover a predesignated number of respondents was reached in almost all countries.

Physician surveys are often characterized by low response rates, although they are an important tool in health services and policy research (39). There is a number of reasons why physicians refuse to participate in surveys, e.g. lack of time, perceived salience of the study, concerns about the confidentiality of the results and confusing content of the questionnaire: individual survey questions not allowing the respondent a full range of choices on the subject (39). To improve the response rate in our study, several steps were undertaken: the face and content validity of the questionnaire were assessed, a rigorous questionnaire translation procedure was implemented and survey reminders to all non-respondents were sent (19). Unfortunately, due to limited resources, detailed non-respondents analysis was not conducted, which limits the ability to gain a more specific look at the studied problems. The other limitation was the difficulty in interpreting the survey results, since these are influenced by national health care variations, competencies, responsibilities, etc.

It is necessary to highlight the fact that we did not study the everyday, routine practice of primary care physicians (e.g. from medical records) influenced by the actual position in their country's health care system but self-reported behavior.

4.3 Interpretation of study findings

The highly declared familiarity with the guidelines for gastroenterology should be looked at positively, because it reflects an improvement in professional education and health policy. However, it is known that awareness of standards does not always mean that they will be implemented in daily practice. There is a need for a comparative study that would explore the implementation of guidelines in practice.

GPs participating in our study showed sufficient medical knowledge that can be used in daily practice. Only IBS management was neglected by the majority of the respondents. These findings are not surprising, because there is a lack of widely accepted, evidence-based international guidelines. This is also a problem in specialist care (40, 41).

The higher incidence of colorectal cancer in CEE countries influences the approach to lower gastrointestinal tract symptoms, which is reflected by the involvement of almost all participating family physicians in colorectal cancer screening. In countries were FOBT based colorectal cancer screening was established (Czech Republic and Slovakia), GPs reported using it for screening. In other countries, GPs referred patients to specialists either for screening or if they suspected cancer. This is the proper management for the problem of colorectal cancer, especially considering the increasing prevalence all over the world. According to current recommendations, screening for colon cancer should be performed in each European country (42). Several models of screening programs have been designed

in Europe to meet this problem (43). Current guidelines highlight that primary care should be responsible for the identification and management of individuals at increased total risk of GI cancer (15, 44). The involvement of GPs in colorectal cancer screening has been found to strongly improve patient compliance (45, 46).

The great diversity between CEE countries in general practitioners' management of GI disorders can be partly explained through variations in development of family medicine/general practice in national health care systems (47). In the past, the health care systems of CEE countries were largely focused on specialist and hospital care. In all CEE countries, postgraduate training has been established according to European Directives. Recently, these countries have experienced a lot of changes and developed their own strategies and priorities for health systems by putting more emphasis on primary care systems (9, 36). Unfortunately, a recent international survey revealed that the levels of implementation of family medicine differ between CEE countries and that initial enthusiasm for implementing family medicine has decreased (36). In most countries, family medicine is just one of many medical specialties (e.g. internal medicine) in primary health care. A full introduction of family medicine, where the family doctor would be the main health care professional, covering the whole range of diagnostic, curative and preventive tasks, was successful only in Estonia. Although all the studied countries have legally described the competencies of primary care providers, the agencies that are responsible for this vary. In Bulgaria, Poland and Slovakia, the government describes the tasks of general practitioners. In Slovenia, this is done by the college of physicians, and in some countries (Czech Republic and partially Poland), there is a strong regulative role by health insurance companies. The level of gate-keeping in the studied countries varies. Its limitation might lead to an excessive use and overloading of secondary care (48). The differences between countries might also be explained by the various methods of financing. The payment system in some countries (e.g. BG, EE, LT and PL) encourages primary care providers to be active in performing procedures (e.g. colonoscopy, screening), while in the others similar incentives are lacking (49).

Our study showed that after several years of transformation, primary care physicians recognize the importance of using current guidelines for management of gastrointestinal disorders. Updated and existing guidelines like the Maastricht H. pylori consensus, the Montreal definition, classification on GORD and the dyspepsia guidelines can lead physicians through management of common gastrointestinal problems (50-53). The new politics of continuing medical education, cooperation between primary care and specialist care and internet access are the main future development tools (31).

5 CONCLUSIONS

We conclude that FPs/GPs from CEE countries have a good understanding of their role in management of patients with GI tract problems. The results of this study suggest that more experienced physicians and those having specialization in family medicine are better prepared to manage GI problems. This conclusion, however, should be taken with caution due to the relatively low response rate of the respondents participating in the study. Significant variation between the countries of Central and Eastern Europe justifies calling for better international collaboration in education and development of clinical guidelines to achieve high quality of care for patients with GI problems.

CONFLICT OF INTEREST

The authors declare that no conflict of interest exist.

FUNDING

This study in the phase of planning and data collection was supported by an unrestricted grant from Zentiva.

ETHICAL APPROVAL

Not required.

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VOICE DISORDERS IN OCCUPATIONS WITH VOCAL LOAD IN SLOVENIA

GLASOVNE TEŽAVE V POKLICIH Z GLASOVNO OBREMENITVIJO V SLOVENIJI

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Received/Prispelo: 16. 5. 2014
Accepted/Sprejeto: 20. 8. 2014

Original scientific article/Izvirni znanstveni članek
UDC/UDK 616.21(497.4)

ABSTRACT

Aim. The aim of this paper is to compare the prevalence of voice disorders and the risk factors for them in different occupations with a vocal load in Slovenia.

Methods. A meta-analysis of six different Slovenian studies involving teachers, physicians, salespeople, catholic priests, nurses and speech-and-language therapists (SLTs) was performed. In all six studies, similar questions about the prevalence of voice disorders and the causes for them were included.

Results. The comparison of the six studies showed that more than 82% of the 2347 included subjects had voice problems at some time during their career. The teachers were the most affected by voice problems. The prevalent cause of voice problems was the vocal load in teachers and salespeople and respiratory-tract infections in all the other occupational groups. When the occupational groups were compared, it was stated that the teachers had more voice problems and showed less care for their voices than the priests. The physicians had more voice problems and showed better consideration of vocal hygiene rules than the SLTs. The majority of all the included subjects did not receive instructions about voice care during education.

Conclusions. In order to decrease the prevalence of voice disorders in vocal professionals, a screening program is recommended before the beginning of their studies. Regular courses on voice care and proper vocal technique should be obligatory for all professional voice users during their career. The inclusion of dysphonia in the list of occupational diseases should be considered in Slovenia as it is in some European countries.

Keywords:
Professional voice users, voice disorders, voice care, vocal load, questionnaires

IZVLEČEK

***Cilj**. Primerjati prevalenco glasovnih motenj in dejavnikov tveganja za njihov nastanek pri različnih poklicih v Sloveniji.*

***Metode**. Narejena je bila meta analiza šestih različnih raziskav v Sloveniji, ki so vključevale zdravnike, učitelje, prodajalce, duhovnike, medicinske sestre in logopede. V vseh študijah so bili uporabljeni podobni vprašalniki, ki so zajemali vprašanja o pojavu glasovnih motenj in razlogih zanje.*

***Rezultati**. Primerjava raziskav je pokazala, da je 82% od 2.347 vključenih že imelo glasovne težave v svoji karieri. Največ težav z glasom so imeli učitelji. Glavni vzrok hripavosti pri učiteljih in prodajalcih je bila glasovna obremenitev, pri preostalih poklicih pa akutne respiratorne okužbe. Primerjava poklicev je pokazala, da imajo učitelji več glasovnih težav kot duhovniki, manj tudi skrbijo za svoj glas. Primerjava zdravnikov in logopedov je pokazala, da imajo zdravniki več glasovnih motenj, čeprav bolje skrbijo za svoj glas. Večina vprašanih ni dobila navodil glede skrbi in rabe glasu med svojim študijem.*

***Zaključki**. Za zmanjšanje pojava glasovnih motenj bi bili potrebni presejalni pregledi kandidatov za poklice z glasovno obremenitvijo še pred začetkom študija. Poklicni govorniki bi se morali tudi med opravljanjem svojega poklica dodatno izobraževati o skrbi za glas in pravilni vokalni tehniki. Glasovne motnje bi morali vključiti v seznam poklicnih bolezni, tako kot je to urejeno že ponekod v Evropi.*

Ključne besede:
poklicni govorniki, glasovne motnje, skrb za glas, glasovne obremenitve, vprašalniki

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1 INTRODUCTION

In modern societies, about one-third of the labor force works in occupations for which the voice is the primary tool (1). The term "professional voice users" has been defined for those who depend on a consistent, special or appealing voice quality as a primary tool of their trade and those who if afflicted with dysphonia or aphonia would generally be discouraged in their jobs and seek alternative employment (2). Therefore, among professional voice users, not only singers and actors but also clergy, teachers, receptionists, sales personnel, physicians and anyone else whose ability to earn a living is impacted negatively by a loss of vocal quality and endurance are included (3). Koufman et al. defined four levels of vocal users: the elite vocal performer (singers, actors), professional voice user (clergy, lecturers, telephone operators), the non-vocal professional (teachers, doctors, lawyers, businessmen, receptionists, etc.) and the non-vocal nonprofessional (laborers, clerks) (4). Vilkman classifies voice professionals according to the demands put on their voice and the vocal load. Actors and singers need a high voice quality and their vocal load is high. Teachers, telephone operators, clergy, etc. need a moderate voice quality, but they have a high vocal load. Physicians, nurses, lawyers, etc. need moderate voice quality and have a moderate vocal load (1).

Verdolini and Ramig tried to estimate the prevalence of voice problems in different occupations in the workforce. In several countries, teaching was the most common occupation among the visitors to voice clinics. Other occupations likely to search for otorhinolaryngological help for voice problems included singer, counselor/social worker, lawyer and clergy (5).

In the USA, workers in sales and sales-related occupations (13%) and teachers (4.2%) represent the largest percentage of professional voice users. Clergy, psychologists, counselors and speech-and-language pathologists constitute only 0.8% of the workforce, but they make up a much larger section of the patients with voice problems. In any case, teachers are still the most frequent visitors to voice clinics (2).

Teachers are one of the most affected occupations with respect to voice disorders (6-8). In the USA, a greater prevalence for reporting a current voice problem and a prevalence for voice disorders during their lifetime were noted in the teacher population more than in other occupations. The identified risk factors for voice disorders were being a woman, being between 40 and 59 years of age, having 16 or more years of education and having a family history of voice disorders (7). However, being a university teacher was associated with good vocal quality and no handicapping effect from possible voice disorders (9). Voice disorders were more prevalent in teachers in nurseries (36.4%) than for those in elementary school (25%) and in high school (20.8%). The width and depth of classrooms, a larger number of students, longer classroom hours and the level of noise were related to the frequency of voice disorders (10). Lehto also identified the risk factors for voice disorders in other voice professions such as: background noise, poor air quality (dryness, dust), poor posture and vocal loading (11).

Over 20% of teachers had missed some days at work due to a voice problem (12, 13). When compared to the general population, teachers had missed more working days in the preceding year because of voice problems and were more likely to consider changing their occupation because of problems with their voice (14). Voice disorders in teachers were also associated with major episodes of depression, general anxiety disorder and phobias (15).

There are rare studies comparing different occupations with a vocal load. A comparison between day-care teachers and nurses was made in Finland. The teachers had more voice problems (12% vs. 7%), which was connected with higher background-noise levels and poor acoustics in the rooms (8).

Dysphonia related to vocal load during work is an occupational disease in France and Russia but not in Germany, the UK, Italy or Slovenia (16). In Croatia, the vocal nodules that appear as a result of occupational voice use are considered an occupational disease (17).

Voice disorders are not considered as an occupational disease in Slovenia. Therefore, the aim of this paper is to present the extent of the problem of dysphonia as an occupation-related disease in professional voice users. A meta-analysis of several studies was performed in order to compare the prevalence of voice disorders and the risk factors for them in different occupations with a vocal load in Slovenia.

2 METHODS

A meta-analysis was made of six different Slovenian studies among occupations with a vocal load (18-23). Some Slovenian studies were identified through the union bibliographic/catalogue database COBIB.SI search using the keywords "professional voice disorders". The other studies were found in the COBISS bibliography of the authors of these papers. In all six studies, including teachers, physicians, salespeople, catholic priests, speech-and-language therapists (SLTs) and nurses, very similar questionnaires were used. The core of every questionnaire included the same questions about age, gender, the prevalence of voice disorders in the current year, in the entire career and during education, the causes of voice disorders (vocal load and/or respiratory-tract infection or other), vocal habits (speaking loudly, shouting frequently, fast speaking rate, vocal rest when encountering voice problems), frequent throat clearing, sufficient hydration and smoking. In some studies, the questions about daily vocal load, length of career, instructions about voice care, typical symptoms of gastroesophageal reflux (hear*tbu*rn, acid regurgitation) and allergies were also part of the questionnaire.

The results of the questionnaires were compared between the occupational groups with similar vocal loads according to Vilkman, e.g. teachers versus priests and physicians versus SLTs. The t-test and x2-test or Fischer's Exact test of the program package SPSS 19.0 (SPSS Corporation, USA) were used for the statistical analysis.

3 RESULTS

The six studies (18-23) involved a total of 2347 subjects (599 men, 1748 women).

The majority of all the included subjects with occupations involving a vocal load had experienced voice problems during their professional career, 16.7% of them admitted to frequent voice problems. The teachers, the nurses and the physicians declared the highest prevalence of voice problems in their career. Their voice problems were caused by vocal load in the majority of teachers and salespeople and by respiratory-tract infections in more than 40% of nurses and physicians. In the case of hoarseness, less than one half of the included subjects have voice rest. In three studies, 13.6% of the participants missed work because of voice problems. More than one half of the included subjects have improper voice habits: in particular, they speak loudly. The detailed results of the questionnaires are listed in Table 1.

In Slovenian teachers, the following risk factors for voice disorders were identified: female gender, age over 40 years and allergies.

In catholic priests, the risk factors for frequent voice disorders were vocal load during spare time, not getting instructions about voice care, voice disorders during education and frequent throat clearing.

Among the Slovenian physicians with frequent voice disorders, most were those who did not respect voice rest when having voice problems, those with frequent throat clearing and those with allergies.

In SLTs, the following risk factors for voice disorders were identified: improper voice technique and frequent cough.

Smoking was a risk factor for voice disorders in nurses.

When the groups of priests and teachers were compared, some significant differences were found. Firstly, priests are only men. Secondly, the teachers had a significantly

Table 1. Results of the questionnaires about voice problems in six different occupations with a vocal load in Slovenia (18-23).

Parameter	Priests N=340	Teachers N=1509	Physicians N=145	Speech and language therapists N=111	Salespersons N=136	Nurses N=106
Age (mean/stand dev. – years)	52.1 / 13.2	40.4*	44.7 / 8.2	43 / 6.7	41.9	42.6 / 0.3
Gender (M/F)	340 / 0	196 / 1313	33 / 112	0 / 111	21 / 115	9 / 97
Career length (mean – years)	25.7	19.8*	18.2	20.4	19.6	22.1
Vocal load/day (mean - hours)	3.7	4.8**	6.8	6	8.4	8.7
Vocal load during spare time	100 (29.4 %)	389 (25.8 %)	29 (20 %)	18 (16.2 %)	27 (19.9 %)	14 (13.2 %)
Instructions about voice care	164 (48.2 %)				21 (15.4 %)	12 (11.3 %)
Voice disorders in the current year	230 (67.7 %)	989 (65.5 %)	77 (53.1 %)	42 (37.8 %)	85 (62.5 %)	53 (50 %)
Voice disorders in career	237 (69.7%)	1338 (88.7 %)	120 (82.8 %)	48 (43.3 %)	95 (69.9 %)	94 (88.7 %)
Frequent voice disorders in career	54 (15.9 %)	273 (18.1 %)	11 (7.6 %)	5 (4.5 %)		27 (25.5 %)
Voice disorders during education	53 (15.6 %)	109 (7.2 %)	29 (20 %)	12 (10.8 %)	14 (10.3 %)	10 (9.4 %)
A cause for voice disorders:						
- vocal load	99 (29.1 %)	695 (46.1 %)	17 (11.7 %)	15 (13.6 %)	93 (68 %)	16 (15.1 %)
- respiratory tract infection	119 (35 %)	428 (28.4 %)	85 (58.6 %)	40 (36.0 %)	43 (32 %)	47 (44.3 %)
- vocal load + resp. tract infection	47 (13.8 %)	200 (13.2%)	23 (15.8 %)	40 (36.0 %)		11 (10.4 %)
- other	22 (6.5 %)		20 (13.8 %)			
Missing work because of voice problems	41 (12.1 %)				23 (17 %)	15 (14.1 %)
Voice rest during voice problems	72 (21.2 %)	477 (31.6 %)	69 (47.6 %)	58 (52 %)	44 (32.4 %)	32 (30.2 %)
Speaking loudly	258 (75.9 %)	741 (49.1 %)	80 (55.2 %)	51 (46 %)	79 (58.1 %)	55 (51.9 %)
Shouting frequently	33 (9.7 %)	144 (9.5 %)	13 (8.9 %)	9 (8 %)	19 (13.9 %)	17 (16 %)
Fast speaking rate	115 (33.8 %)	572 (37.9 %)	66 (45.5 %)	37 (33.3 %)	46 (33.8 %)	42 (39.6 %)
Frequent throat clearing	189 (55.6 %)	568 (37.6 %)	42 (28.9 %)	25 (22.5 %)	64 (47.1 %)	39 (36.8 %)
Heartburn and acid regurgitation	112 (32.9 %)	405 (26.8 %)	62 (42.7 %)		45 (33.1 %)	30 (28.3 %)
Allergy, asthma	52 (15.3 %)	212 (14 %)	27 (18.6 %)		18 (13.2 %)	16 (15.1 %)
Smoking	26 (7.6 %)	275 (18.1 %)	10 (6.9 %)	27 (24.3 %)	49 (36 %)	19 (17.9 %)
Sufficient hydration	278 (81.8 %)	747 (49.5 %)	114 (78.6 %)	73 (65.7 %)	104 (76.5 %)	99 (93.4 %)

*calculated from the Figure 2 (18)
**calculated from the minimum weekly obligation for teachers in schools (72% of included subjects; minimum obligation 22 hours/week) and nurseries (28% of included subjects; minimum obligation 30 hours/week) in Slovenia (18)

Table 2. Comparison of the results from questionnaires about voice problems between catholic priests and teachers in Slovenia (18, 23).

Parameter	Priests N=340	Teachers N=1509	p
Age (mean – years)	52.1	40.4*	
Gender (M/F)	340/0	196/1313	0.000
Voice disorders in the current year	230	989	0.486
Voice disorders in career	237	1338	0.000
Frequent voice disorders in career	54	273	0.387
Voice disorders during education	53	109	0.000
A cause for voice disorders: - vocal load	99	695	0.000
A cause for voice disorders: - respiratory-tract infection	119	428	0.018
A cause for voice disorders - respiratory-tract infection + vocal load	47	200	0.791
Voice rest during voice problems	72	477	0.000
Speaking loudly	258	741	0.000
Shouting frequently	33	144	0.919
Fast speaking rate	115	572	0.172
Frequent throat clearing	189	568	0.000
Typical symptoms of gastroesophageal reflux	112	405	0.027
Vocal load during spare time	100	389	0.174
Smoking	26	275	0.000
Sufficient hydration	278	747	0.000
Allergy, asthma	52	212	0.549

*calculated from the Figure 2 (18)

Table 3. Comparison of the results from questionnaires about voice problems between physicians and speech-and-language therapists in Slovenia (19, 21).

Parameter	Physicians N = 145	Speech and language therapists N= 111	p
Age (mean – years)	44.7/8.2	43/6.7	0.077
Gender (M/F)	33/112	0/111	0.000
Vocal load (hours/day)	6.8	6	
Voice disorders in the current year	77	42	0.017
Voice disorders in career	120	48	0.000
Frequent voice disorders in career	11	5	0.436
Voice disorders during education	29	12	0.058
A cause for voice disorders: - vocal load	17	15	0.706
A cause for voice disorders: - respiratory tract infection	85	40	0.000
A cause for voice disorders: - vocal load and respiratory-tract infection	23	40	0.000
Voice rest during voice problems	69	58	0.528
Speaking loudly	80	51	0.131
Shouting frequently	13	9	1.000
Fast speaking rate	66	37	0.054
Frequent throat clearing	42	25	0.255
Vocal load during spare time	29	18	0.516
Smoking	10	27	0.000
Sufficient hydration	114	73	0.024

higher prevalence of voice disorders during their careers and during education, with vocal load being the most frequent cause of dysphonia. Thirdly, there were more smokers among the teachers than among the priests. Finally, the priests are better at taking care to have sufficient hydration, but most of them speak loudly and do not take voice rest when they are having voice problems. They also have more problems with gastroesophageal reflux than the teachers. The comparison is presented in Table 2.

When the physicians and the SLTs were compared, the groups were significantly different with regards to gender, the prevalence of voice disorders during their careers, the causes of voice disorders and smoking. The results are given in Table 3.

4 DISCUSSION

The aim of this paper is to present the extent of the problem of dysphonia as an occupation-related disease in professional voice users in Slovenia. The results of meta-analysis of six Slovenian studies of voice disorders among different occupations with a vocal load (18-23) showed that more than 82% of all the included subjects had voice problems at some time during their career, with 16.7% having frequent voice problems. However, only with teachers and salespeople was vocal load the prevalent cause of the voice problems. All the other occupational groups had voice problems, mostly because of respiratory-tract infections. Less than one-third (32%) of the participants can afford a voice rest when suffering from voice problems, and 13.6% miss work because of dysphonia. More than one half of the participants with a vocal load at work have improper speaking habits (e.g., speaking loudly, 53.9%). A considerable number of the participants have some diseases or habits influencing voice quality (gastroesophageal reflux 29%, asthma and allergies 14.5%, frequent throat clearing 39.5% and smoking 17.3%). The vast majority of the included subjects did not get any information about voice care.

The study demonstrated that important information about prevalence of voice problems cannot be obtained only from the papers included in the PubMed database. One out of six included studies was published in the proceeding book of a national otorhinolaryngological congress (20). The other two studies were graduate theses at the University of Ljubljana, Faculty of Education, Department for SLTs (21, 22). They were found through the COBIB.SI database and in the COBISS bibliography of one of the authors of the papers published in the SCI journals. Therefore, for a more complete impression about the problem of voice disorders in the occupations with vocal load in Slovenia, the papers from so-called "grey literature" also had to be included.

In order to demonstrate the importance of knowledge of voice care, two occupations with a similar vocal load and different study programs regarding information about voice care were compared. We compared the teachers and the priests because at work they both speak to groups of people, and the physicians and the SLTs because they have mostly one-to-one communication at work. In Slovenia, some information about vocal technique, the causes of voice disorders and voice care is presented to future SLTs, priests and physicians during their regular educational program. The priests obtain the knowledge during their regular educational program of choral singing. The physicians get information about the causes and treatment of voice disorders during their course on ear, nose and throat diseases but do not receive any vocal training. In the past 15 years, the study program for SLTs has included a one-semester course on the pathology of voice. In the last 5 years, a course on voice therapy has been added to the curriculum.

In Slovenia, future teachers do not get any information about voice care during their education. The prevalence of voice disorders among teachers in Slovenia was reported to be about the highest among all included occupations - 88.7%. More than 18% of teachers had frequent voice disorders (18). A survey of Slovenian catholic priests showed that 69.7% of the included priests reported voice problems during their careers, and an additional 15.9% reported frequent problems. Not having lessons about proper vocal technique was one of the risk factors for frequent voice disorders in priests (23).

Since about one-half of the priests reported having had lessons on vocal technique, we expected better vocal habits and voice care in the priests than in the teachers. Compared to the priests, the teachers more often reported smoking (18.1% vs. 7.6%) and not drinking enough water through the day (81.8% vs. 49.5%). The good hydration and non-smoking lifestyle of priests can be attributed to an awareness of a healthy life style, voice care or the nature of their work (18, 23).

Since about one-half of teachers reported speaking loudly quite often, their most common cause of voice problems was vocal load and overuse (46.1%). Even though the priests claimed to speak loudly more often than the teachers (75.9% vs. 49.1%), their most common cause of vocal problems was respiratory-tract infection (35%). According to the results of daily vocal load, the teachers' vocal load was greater than the priests' (18, 23). We suppose that the time period of high vocal load at work was the most important ground for the different causes for voice problems in both groups.

Surprisingly, only 21.2% of priests and 31.6% of teachers vocally rest when they have voice problems (p=0.000) (18, 23). Only 12.1% of priests miss their work because of dysphonia (23). The reason for the significantly smaller portion of priests who have voice rest in the case of dysphonia could be the lack of priests in Slovenia. Therefore, they cannot afford to miss their work.

We expected fewer voice problems in the physicians and the SLTs in comparison with the teachers and the priests since their communication is usually with an individual and not with a large group. Since the SLTs included in the study were only women, we anticipated detecting more voice problems among them than among the physicians (22.8% of men) (19, 21). The comparison of the two groups showed that the problems are more common in the physicians (p=0.000). Fewer than one half of the SLTs had voice problems at some point during their working life (21), which represented the lowest prevalence of voice disorders in all the included studies (18-23). Education about voice care is probably the reason for the lowest prevalence of voice disorders in the SLTs.

The SLTs reported the highest proportion of vocal rest during voice problems (52%) among all the studied occupations with a vocal load. On the other hand, they also reported speaking loudly quite often (46%) (21). So even though the SLTs were the group that had the best knowledge about voice care, they still do not use it in their profession. We believe that they could benefit from more education regarding the diseases affecting voice quality and practical aspects of voice use in everyday situations.

The main reason for vocal problems in physicians is respiratory-tract infection (58.6%) (19), which is understandable due to the nature of their work. Physicians' offices are always full of sick people, while the visitors to e.g. the SLTs are usually healthy subjects without any infections.

Salespeople and nurses are not really comparable groups with regard to their professional voice use. Both groups usually talk to an individual, but sometimes in unfavorable acoustic conditions. We suppose that the quantity of talking is much greater for the nurses. They often have to communicate with old patients who have hearing impairments. The nurses are also exposed to infections; therefore, their voice problems occurred mostly due to respiratory-tract infections (44.3%) (22). In Slovenia, the education of salespeople and nurses does not include any instructions on vocal hygiene, so they depend on themselves to obtain the information they need. In spite of that, the salespeople reported obtaining information on voice care in 15.4% of cases and the nurses in 11.3% (20, 22).

Unfortunately, the questionnaires used in all included studies did not contain questions on background noise, acoustic properties or unfavorable microclimate at the working place. The information on such external causes for voice

disorders would even better elucidate the reasons for voice problems in different occupations with vocal load.

A survey among students in teacher-education programs in Finland showed that 20% of the students had two or more vocal symptoms during their training and as many as 19% had an organic voice disorder. The authors proposed a clinical evaluation of the students with voice symptoms and vocal training in the teacher-education programs (24). Namely, in other studies the teachers with voice problems during their training reported more voice problems later during their careers (13, 25).

In the Slovenian surveys, 7.2–20% of the included subjects had voice problems during education (18-23). Having voice problems during training has been shown to be one of the risk factors for later voice problems during a professional career for teachers, priests and SLTs (18, 23, 26). Besides that, in the study of Radšel et al., it was shown that 25% of future teachers had serious voice and speech disorders, which could represent an obstacle in their future profession (27). Therefore, in order to prevent occupational dysphonia, it would be necessary to examine every candidate for the occupation with a considerable vocal load before the beginning of the study program and to allow only those with healthy vocal apparatuses to enter it. In Slovenia, such a preventive examination before the start of the educational program only applies to students of acting and solo singing and no one else. The candidates for SLTs have an interview before the beginning of the study with two experienced SLTs in order to exclude those with speech pathology, but they do not have an ENT examination. There are no ENT examinations or screening programs for future teachers, physicians, priests, nurses and salespeople. The proper selection of the candidates for the educational program could be another reason for the lowest prevalence of voice disorders in the SLTs.

Dysphonia related to vocal load during work is an occupational disease in France and Russia (16). In Croatia, the vocal nodules that appear as a result of occupational voice use are considered an occupational disease (17). In the European Union recommendations, dysphonia is on a list of diseases related to occupation (28). In Slovenia, no laryngeal diseases are on the list of occupational diseases (29).

In the development of an occupational disease, besides known etiological factors, the individual characteristics of the worker and coincidence of other general diseases are important (30). In order to recognize dysphonia as an occupational disease, the worker must have a healthy vocal tract and a proper vocal technique before starting to work in their occupation. The voice problems should always appear at work and should deteriorate with the prolonged time of vocal load at work. They should decrease after vacations or during weekends and deteriorate after coming back to work (30, 31). Therefore, in order to acknowledge dysphonia as an occupational disease, an ENT and SLT examination before starting work in an occupation with vocal load is essential.

5 CONCLUSIONS

In Slovenia, voice problems are common in occupations with an everyday vocal load. The most common causes for dysphonia are excessive vocal load, misuse of the voice and respiratory-tract infections. Our comparison study has shown that a great majority of professional voice users do not get enough knowledge about vocal hygiene during their educational programs. Up to 20% of participants had voice problems already during their educational programs, indicating unsuitable voice technique or vocal tract endurance. Therefore, further research on risk factors for voice disorders among students for occupations with vocal load is necessary.

In order to decrease the prevalence of voice disorders in professional voice users, at least a simple and quick screening tool to identify those with the highest risk of voice problems in an occupation with vocal load should be applied before beginning their education. Obligatory regular courses on voice hygiene, diseases affecting voice quality and proper vocal technique should be organized for professional voice users with the intention to increase the efficiency of their own voice care. The criteria for the inclusion of dysphonia in the list of occupational diseases should be established considering the European Union recommendations.

In the case of acute voice problems, the vocal hygiene instructions about short voice rest should be taken into consideration by the affected professional voice user. In the case of frequent or long-lasting voice problems, the patient should be sent to an otorhinolaryngologist or - even better - to a phoniatrician and a SLT-voice specialist for further treatment. Nevertheless, for successful voice rehabilitation, the patient's own activity in acquiring better vocal technique and vocal habits is indispensable.

CONFLICT OF INTEREST

The authors declare that no conflict of interest exist.

FUNDING

None.

ETHICAL APPROVAL

Not required.

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INDIVIDUAL AND CONTEXTUAL DETERMINANTS OF SOCIAL HOMECARE USAGE IN SLOVENIA

DISPOZICIJSKI IN KONTEKSTUALNI DEJAVNIKI UPORABE SOCIALNE OSKRBE NA DOMU

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Received/Prispelo: 27. 5. 2014
Accepted/Sprejeto: 1. 9. 2014

Original scientific article/Izvirni znanstveni članek
UDC/UDK 614:364-053.88(497.4)

ABSTRACT

Theory. Social homecare is important for older people, as it enables them to remain in their own homes during worsening health, thus relieving the burden on institutional facilities such as homes for the elderly or nursing homes and hospitals.

Method. A representative survey of social homecare users was employed to assess determinants of the scope of social homecare in Slovenia. Multiple regression analysis was used to evaluate determinants defined by Andersen's behavioral model that affect the scope of social homecare.

Results. As expected, need (Functional impairment B = .378, P = 0.000) was the most important explanatory component, followed by availability of informal care network (Lives alone B = -.136, P = 0.000; Has children B = - .142; P = 0.000) and other contextual factors such as total costs of the services (B = -.075; P = 0.003) and temporal availability of services (B=-.075, P=0.012). The model explained 18% of variability in the scope of social homecare.

Conclusion. This study showed that data on the individual level, as opposed to data on an aggregated level, show different determinants of social homecare utilization. Moreover, the results showed that social homecare is especially important in two circumstances: when older people have a high level of need and when they do not have access to informal care networks. Contextual factors had a moderate effect on the scope of social homecare, which shows universal access to the latter at the individual level.

Keywords:
Social home care, regression analysis, health, older people

IZVLEČEK

***Teoretična izhodišča**. Socialna oskrba na domu je pomembna storitev za starejše z zdravstvenimi težavami, prebivajoče v domačem okolju. Ob zagotavljanju boljše kakovosti življenja ta storitev pomembno razbremenjuje institucionalne storitve zdravstvenega in socialnovarstvenega sistema.*

***Metoda**. Na podatkih reprezentativne raziskave uporabnikov socialne oskrbe na domu smo raziskali vpliv teh dejavnikov na obseg socialne oskrbe na domu. Z multiplo regresijsko analizo smo ugotovili vpliv dispozicijskih in kontekstualnih dejavnikov ter potreb na število aktivnosti, pri katerih uporabnikom pomagajo socialne oskrbovalke.*

***Rezultati**. Kot predpostavlja teoretski model, potrebe (B = ,378, P = 0,000) pojasnijo največji del variabilnosti obsega socialne oskrbe na domu. Po pojasnjevalni moči sledijo razpoložljivost neformalnih oskrbovalcev(živi sam B = -0,136, P = 0,000; ima otroke B = -0,142; P = 0,000) ter drugi kontekstualni dejavniki, kot so skupni stroški ure oskrbe(B = -0,075; P = 0,003) in* časovna razpoložljivost socialne oskrbe na domu(B= *-0,075, P=0,012). Končni model pojasni 18% obsega socialne oskrbe na domu.*

***Razprava**. Dokazali smo, da na individualni ravni na uporabo socialne oskrbe na domu vplivajo drugi dejavniki kot na agregirani ravni. Socialna oskrba na domu je najpomembnejša ob veliki potrebi po oskrbi in odsotnosti neformalnih oskrbovalcev. Zmeren vpliv kontekstualnih dejavnikov nakazuje sorazmerno enakomeren dostop do socialne oskrbe na domu.*

Ključne besede:
socialna oskrba na domu, regresijska analiza, zdravje, starejši

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1 INTRODUCTION

Population ageing results in severe transformations of societies, such as leading to an increasing number of both healthy and ill older people and a decreasing number of middle-aged and young people (1). It is also accompanied by changes in family structures, such as a smaller number of children, an increasing number of people living alone and an increasing number of reorganized families (1). Owing to these transformations, provision of care for older people has been a topic of research and policy focus in most Western societies (1). Care for older people who are unable to care for themselves and perform everyday activities was traditionally primarily performed by close and intimate family members, such as spouse and/or children, and this remains the case nowadays (1-4). Formal care, provided by the health or social system and delivered to the recipient's home, is an important complement to both informal and institutional care for older people (3, 4).

Social homecare in Slovenia is a social assistance service that was implemented at the state level with the adoption of the Social Security Act (5). The main objective of the service is to improve the quality of life of those people living at home who are unable to care for themselves, due to old age or illness, and whose family cannot provide them with sufficient care (5). On the basis of the characteristics of its users, the program focuses primarily on maintaining the health of older people, thus relieving the burden on nursing homes and healthcare institutions for elderly people (5). An individual is eligible for up to 4 hours of care per day, or a maximum of 20 hours per week (5). The financial burden of the service is shared between the municipality, which is obliged by law to cover at least 50% of the cost of the service, and by the users (5). The implementation of the service has been evaluated several times on an aggregate level, primarily by estimating the number of users across municipalities and the organizational characteristics of service implementation (5). The number of users steadily increased from 3,909 in 1998 to 6,624 at the end of 2011 (5). There were, and still are, large differences across municipalities as regards the price paid by users per hour of service (6, 7), and the approximately 13% of variability in the relative number of users can be explained by contextual factors on the aggregated level of the municipality (8). Very little is known of the determinants that affect the usage of social homecare services in Slovenia on the individual level.

The Andersen behavioral model (9-12) was originally proposed to conceptualize and understand the ways in which people use medical care services. The model proposes that usage of such services occurs in context and that it depends on the characteristics of individuals, families, communities and societies (9-12). Moreover, it includes facts, such as diagnosed illness or disability, and subjective evaluations of health as well as attitudes toward usage of medical services (9-12). On the individual level, use of services is mediated by predisposing and enabling factors and need (9-12). Predisposing characteristics include demographic characteristics (age, gender, marital status and past illnesses), social structure (education, race, occupation, family size, ethnicity, religion and geographical mobility) and beliefs (attitudes and beliefs about health and illness and about usage of the health system and knowledge of illness) (9-12). Demographic characteristics represent biological factors influencing the likelihood that people will need health services (9-12). They exist prior to actual conditions and need (9-12). Social structure measures the status of the person in the community and that individual's capacity to cope with illness and activate the appropriate services (9-12). It also indicates how healthy or unhealthy specific environments may be, i.e. those which may lead, for example, to occupational illnesses (9-12). Age, gender and education level are among the most often used predisposing variables in studies of formal and informal care models (13-17). Reception of social homecare is empirically mostly linked to unavailability of spouse or child (11). Most often, formal services are used by people living alone (13, 19-21), and middle class older people are most likely to obtain a disproportionate share of services (22).

Enabling resources brings in the family (family income, type of health insurance, regular source of care and its availability) and the community context (availability of health personnel and facilities, financial and geographical accessibility of services, waiting times and degree of urbanization) and may hinder or encourage the use of services (7, 8, 23). First, the services must be available in the area where people live and work, and second, people must know how to use them. In a broader sense, the contexts are also the characteristics of the healthcare delivery system, policies, resources, organization and financial arrangements that influence the availability, accessibility, affordability and acceptability of services as well as provider characteristics, such as gender of physician (7, 8, 23). External environment or societal level draws in the economic situation, the relative wealth of the population and the prevailing norms in society (7, 8, 23). Family income and type of health or long-term insurance can make a big impact on the number of care services used, especially those services that require extra fees from the user (7, 8, 23). Some services may be readily available in urban areas but are less accessible and maybe less socially appropriate in rural areas (7, 8, 23). Availability of informal carer in close geographical proximity is extremely important for informal care and also affects the usage of formal care. Children may act differently in a care-giving role, requiring more formal assistance than a spouse. Finally, Bass and Noelker (13) introduced caregiver need as an enabling variable in the studies of social homecare, indicating that an informal carer may also have their own medical conditions that hinder informal care and encourage the use of more formal services. Among the enabling factors for social homecare usage shown in a number of studies are availability of informal carer (child or partner), degree of urbanization, income and caregiver need (13-17). Among the enabling factors for social homecare in assessing community and society level are price of the service, temporal and geographical accessibility of services and relative number of formal carers per users (7, 8).

Need is assessed with subjective evaluations (perceptions of health, reports of difficulties in managing everyday ta-

sks) and diagnosis (13-17, 21). This is probably the most important predictor of usage of health and social services. There are several indicators of older people's needs, such as the existence and number of chronic physical diseases, functional limitations (ability of the individual to perform various activities of daily living (ADLs), such as advanced, basic, and instrumental), depression, cognitive impairments, incontinence, paralysis and self-rated health (13-17, 21).

In studies in which social homecare was the focus of attention, the dependent variable assessing its usage has been operationalized in different ways: the presence or receipt of social homecare (yes/no), the number and amount of services in various time spans or the hours and frequency of received care (24, 25). When ADLs were included, the scope of social homecare was measured using the total number of such activities for which the respondent reported receiving formal assistance and the intensity of care provided was assessed using the total number of minutes or hours of assistance per month provided across all ADLs (21).

The research question that we want to examine is to estimate how much variability in the scope of social homecare can be explained by predisposing and enabling (family, community and organizational context) factors and need, according to the Andersen behavioral model.

2 METHODS

1.1 Subjects and procedure

Data for this study were drawn from the first Slovenian national survey of social homecare users in 2013, and there were 6,624 users of social homecare in 201 municipalities at the beginning of the field work. We used stratified random sampling to obtain a representative sample of these users and the municipalities and organizations that provide this type of care (26). A total of 4,917 users from 154 municipalities were invited to participate via providers of social homecare. Social carers distributed the paper and pencil questionnaire to users. The average response rate across municipalities was 37% (8%-92%). Variability in response rate was due to the level of willingness on behalf of social homecare providers to engage in the survey. The realized sample size was 1,768 (a number of questionnaires were not completed properly).

2.2 Instruments

In the present study, we investigated the role of predisposing and enabling factors and need in the scope of care received by social homecare users in Slovenia. We included not only individual factors but also community factors, and, even more importantly, we also addressed the organizational factors. As stated previously, no representative information regarding the users of social home care in Slovenia and the factors that determine the use of formal care is currently available. Organizational factors are not very often included in research designs, whereby data are collected and analyzed on an individual level. In Slovenia, where this service is a relative novelty, it is very important to uncover underlying structures that affect the scope of social homecare.

With regard to predisposing factors, we included age, gender and level of education. Prior to conducting the study, we had expected that only education would have a positive effect on scope of social homecare after controlling for need. It is difficult to predict the direction of effect of age on scope of social homecare, as the service is used also by younger people with severe disabilities; it may be that the scope is actually higher for younger users (Hypotheses 1a, b, c). Marital status and family size were used in a proxy variable for availability of informal care as an enabling factor. Among enabling factors, we included a subjective evaluation of sufficiency of household income – one can expect that those people who evaluate their income as not being sufficient for all costs are also those who have a higher scope of formal care and that this also contributes to the household costs (Hypothesis 2a). We had expected that people who have an available informal care network would have a lower scope of formal care (does not live alone – Hypothesis 2b; has children – Hypothesis 2c). The scope of social homecare was also associated with community enabling factors (price of service for user, which is set by the municipality - the higher the price, the lower the scope of social home care – Hypothesis 2d, total costs of service - lower scope in communities where there are larger distances between users and provider of social homecare and therefore higher total costs of service - Hypothesis 2e - owing to multicollinearity with degree of urbanization, only distance was used in the model) and organizational factors (the number of users – the higher the number, the lower the scope of social homecare – Hypothesis 2f, the scope of the social homecare may be higher for service provision in the mornings than for service provision in the afternoons, on holidays and during weekends, perhaps owing to the fact that informal carers would be more likely to be available during these times - Hypothesis 2g).

Need was assessed using several indicators. Functional impairment was assessed on the basis of respondents' reports concerning the level of difficulty they experienced with various ADLs (the higher the level of functional impairment, the higher the scope of social homecare - Hypothesis 3a). Respondents were also asked to report the existence of any long-term physical or psychological impairment, illness or disability that limits them in ADLs (the higher the need, the higher the scope of social homecare - Hypothesis 3b). In evaluating advanced ADLs regarding travel arrangements, it could be that severe memory problems prevent travel and therefore reduce the scope of social homecare (Hypothesis 3c).

Respondents were presented with a series of 22 questions concerning their ability to engage in various ADLs. Advanced activities of daily living (AADL)1– managing travel, including carrying out social activities, meetings and hobbies; visiting friends and family, carrying out errands (e.g., going to the bank or library), organizing travel (such as

visiting a doctor) and transportation in general; AADL2 –finding out information about things, managing money (such as paying bills), offering financial aid, engaging in yard work or house repairs, taking medications and shopping for medications and medical aids, maintaining orthopedic aids; instrumental activities of daily living (IADL) – household management tasks, including shopping for groceries and other shopping, preparing a hot meal (or meals on wheels), washing the dishes, light housework (cleaning and managing the garbage), making the bed and cleaning the bedroom, doing the laundry; personal activities of daily living (PADL) – personal care activities or basic activities, including getting in and out of bed, dressing, bathing, using the toilet, feeding oneself. For each task, the respondents were also asked who, if anyone, assisted them with it. There were multiple possible answers for this question: does not need help, family member, neighbor, social home-carer, community nurse or someone else. Contextual variables on the level of municipality were drawn from the annual report of social homecare usage (27).

The dependent variable was the scope of social homecare assessed across 22 ADLs. To measure the scope, the number of tasks in which the social home carer assisted was calculated.

Model 1 – individual and social predisposing variables

Individual predisposing variables
- X1 – age
- X2 – gender (0 – female, 1 male)

Social predisposing variable
- X3 – education (0 – elementary school or less, 1 high school or more)

Model 2 – enabling resources; family, community and organizational context

Family context – family income and availability of informal care
- X4 – evaluation of family income (0 – we can manage with our family income, 1 – it is (very) difficult to manage with our family income)
- X5 – household composition (0 – lives alone, 1 – does not live alone)
- X6 – has children (0 – does not have children, 1 – has children)

Community context
- X7 – price of service for users
- X8 – total costs of the service

Organizational context
- X9 – the number of users
- X10 – temporal availability of the service (0 – service is available only in the morning, 1 – service is also available at other times, in the afternoons, at weekends and on holidays)

Model 3 – Care need was evaluated using three variables: the functional impairment, the existence of a long-term physical or psychological impairment, illness or disability that limits the respondents in daily life activities and problems with memory (not at all, some, considerable). Functional impairment was assessed on the basis of respondents' reports concerning the level of difficulty they experienced with various ADLs (need help, ranging from 0 to 22).

- X11 – functional impairment
- X12 – existence of a long-term physical or psychological impairment, illness or disability that limits the respondents in daily life activities (0 – none or one, 1 – more)
- X13 – problems with memory (0 – none, some, 1 – considerable)

2.3 Data analysis

Multiple linear regression analysis was used. Independent variables were entered in three stages according to the parameters of the Andersen behavioral model.

Models:

Model 1: predisposing variables

$$Y_i = b_0 + b_1X_{1i} + b_2X_{2i} + b_3X_{3i} + e$$

Model 2: Predisposing and enabling variables

$$Y_i = b_0 + b_1X_{1i} + b_2X_{2i} + b_3X_{3i} + b_4X_{4i} + .. + b_{10}X_{10i} + e$$

Model 3: Predisposing, enabling variables and need

$$Y_i = b_0 + b_1X_{1i} + b_2X_{2i} + b_3X_{3i} + b_4X_{4i} + .. + b_{10}X_{10i} + b_{11}X_{11i} + b_{12}X_{12i} + b_{13}X_{13i} + e$$

Y_i = scope of social homecare
b_0 = intercept
bi = regression coefficients
X_i = independent variables
e = error

3 RESULTS

First, we estimated the three theoretically based models on absolute values of dependent variable – scope of social homecare. We examined quality parameters for multiple linear regression analysis. Standardized residuals were not entirely normally distributed. Furthermore, one of the independent variables showed heteroscedascisity. Second, the dependent variable was transformed (ln(Y+1)) and the models were again estimated. Quality diagnostics showed considerable improvement, although the quality parameters were not perfect. We further inspected the values of the regression parameters, their signs and statistical significance. With regard to the regression parameters, both trials showed similar estimates (values of standardized regression coefficients, signs and significance). For the purpose of simplicity of interpretation of the models, we chose the first trial with the original values of scope of social homecare.

In Model 1, the scope of social homecare was regressed on three predisposing variables. The results in Table 2 show that age was the only significant predictor in Model 1. Its coefficient indicates that younger users had a higher scope of social homecare, as predicted, thus partially confirming Hypotheses 1. The three predisposing variables have little explanatory power; approximately 1%. When the enabling variables were included in the equation in Model 2, the

Table 1. Descriptive statistics.

	N	*Mean*	*St. Dev.*	*Min*	*Max*
Scope of social homecare (SHC)	1679	3.92	3.513	0	20
Age	1737	78.02	12.264	32	103
Price of SHC for user/per hour	1790	4.78	1.309	0	9.07
Total costs of SHC /per hour	1790	17.82	1.973	13.35	24.04
Number of Users	1790	123.56	163.312	1	644
Functional impairment index	1679	13.27	5.691	0	22

Table 2. Descriptive statistics II.

		N	%
Gender	0 - Female	1783	68
	1 - Male		32
Education	0 – Elementary school or less	1696	51
	1 - High school or more		49
Income	0 – We can manage with our family income	1624	67
	1 – It is (very) difficult to manage with our family income		33
Lives alone	0 – Lives alone	1888	51
	1 – Does not live alone		49
Has children	0 – Does not have children	1731	21
	1 Has children		79
Temporal availability of SHC	0 – Service is available only in the morning	1888	19
	1 – Service is also available at other times, in the afternoons, at weekends and in holidays		81
Long term disability	0 – None or one	1671	41
	1 – More		59
Difficulties with memory	0 – None, some	1690	73
	1 – Considerable		27

Table 3. Results of multiple linear regression analysis.

	Predisposing/(Model 1)		Enabling/(Model 2)		Need/(Model 3)	
Predictor variables	b	B	b	B	b	B
Predisposing						
Age	-.033	-.113[c]	-.024	-.081[b]	-.030	-.104[c]
Gender	-.242	-.032	-.321	-.043	-.220	-.029
Education	-.183	-.026	-.007	-.001	.246	.035
Enabling						
Income			.202	.027	.228	.030
Lives alone			-.053	-.008	-.955	-.136[c]
Has children			-.970	-.111[c]	-1.239	-.142[c]
Price of service for users			.120	.045	.082	.031
Total cost of service			-.181	-.104[c]	-.130	-.075[b]
Number of users			-.001	-.038	-.001	-.045
Temporal availability of service			-.733	-.086[b]	-.565	-.066[a]
Need						
Functional impairment					.235	.378[c]
Long-term disabilities					.429	.060[a]
Problems with memory					-.356	-.045
R^2	.013[c]		.051[c]		.179[c]	
R^2 change			.038[c]		.128[c]	

* a ≤ 0.05; ** b ≤ 0.01; *** c ≤ 0.001;

effect of age remained significant. In Model 2, the scope of social homecare was regressed on the predisposing and enabling variables. We included three types of enabling factors; family, community and organizational context. The absolute values of predictor variables shifted somewhat, but the signs and statistical significance remained unchanged, While income and living arrangements did not have a significant effect on the scope of social homecare (Hypotheses 2a and 2b not confirmed), availability of informal care from children has predicted and significantly affected the scope of social homecare (Hypothesis 2c confirmed). The fact that a user has children reduced the scope of social homecare by around one task. The price of social homecare for users did not have a significant effect; moreover, its direction was opposite to that predicted (users tended to have a higher scope of social homecare in municipalities where the price was higher – Hypothesis 2d not confirmed). Total costs of service decreased the scope of social homecare, as predicted (Hypothesis 2e confirmed). Users in municipalities that have higher total costs of service received a lower scope of social homecare. The number of users was not significant (Hypothesis 2f not confirmed). The temporal availability of the service had the predicted effect, indicating that the scope of social homecare was higher by one task in the mornings (Hypothesis 2g confirmed). The enabling variables had greater explanatory power than the predisposing variables. The difference in explanatory power between the two models was statistically significant. Finally, we included the need variables in Model 3. The estimations of the parameters of Model 1 shifted again; they were similar to the values in Model 1, except for education, where the regression coefficient changed sign (but remained insignificant). Owing to the association of need with enabling family variables, the impact of availability of informal care now had a greater impact on the scope of social homecare. Respondents that lived alone had a higher scope of social homecare by one task (Hypothesis 2b now confirmed). Similarly, respondents who did not have children had a higher scope of social homecare by approximately one task. Among enabling variables, the total cost of services and temporal availability of social homecare also had a significant effect on the scope of social homecare, but the values of regression coefficients were somewhat lower. The greatest impact of the scope of social homecare was, as assumed, functional impairment. The higher the functional impairment, the higher the scope (Hypothesis 3a confirmed). The effect of this variable on scope was by far the greatest. In addition, the presence of more than two long-term physical or psychological impairments, illnesses or disabilities that limit respondents in daily life activities increased the scope of social homecare (Hypothesis 3b conformed), while the latter was decreased by severe problems with memory, as assumed prior to conducting the study (Hypothesis 3c confirmed). Need explains by far the largest proportion of the variability in the scope of social homecare.

4 DISCUSSION

In this study, we evaluated the role of predisposing and enabling factors and need on the scope of social homecare in Slovenia. We estimated three models in which we included individual factors, community factors and organizational factors. The key findings are that the final model explained 18% of variance in the scope of social homecare (Table 3), which is comparable to the results of other studies with the same respondent group (13, 14) and of similar design. The most important component of the Andersen model was that of need. This explained the largest proportion of the scope of social homecare, which is in agreement with the model (9-12) and its applications to social homecare (13). Some studies have shown that the enabling variables made a greater impact than the need variables, but the dependent variable was hours of care (13). The most important predictor in these studies was income, and the authors suggested that the ability to purchase services would be more important than need in such instances. However, in Slovenia, the price of social homecare for users is subsidized by the municipalities, and therefore the need is more important.

Predisposing variables explained the least amount of variability in the scope of social homecare (Table 3). The only significant predictor was age, as previously assumed. This is a rather unusual result, but respondents in other studies were mostly older people (13, 14, 24), while in our study the youngest respondent was 30 years old. Among enabling variables, the most important factor is availability of informal care, regardless of the study (13-16, 18, 24). Evaluations using a longitudinal design usually show that as the need increases, the number of all types of services increases. In cross sectional studies such as ours, the amount of formal care is lower for respondents who have an immediate and responsive informal care network (13, 19-21).

The novelty of our study, apart from the Slovenian setting, is consideration of community and organizational context. Although the price of social homecare for users is not as important for the scope of social homecare on an individual level (Table 3) as it is on an aggregated level (8), its higher total cost for a municipality would reduce its scope. It may be that organizations that provide social homecare in areas where the geographical accessibility of users is poorer would reduce the scope of services to optimize their total costs. The number of users did not have a significant effect on the scope of social homecare, indicating that users are treated the same way regardless of the scope given by the provider of the service, controlled for all other components of the model. The temporal availability of social homecare had a significant effect on the scope of social homecare on the individual level as opposed to the aggregated level. It appears that availability of informal care in the afternoons, at the weekends and during holidays would decrease the scope of care.

Need explains the largest proportion of scope of social homecare, which is in accordance with the results of other studies of social homecare and formal care in general (9-14, 20, 21). A more comprehensive design could also include characteristics of informal carers, such as in Bass and Noelker (13), which would increase the proportion of explained variance and give more complete information

about determinants of usage of social home care. Another possibility would be to also include other measures of usage, such as number of hours of care. There remains a need to evaluate the usage of social homecare in the general population and to examine determinants that predict contact with social homecare.

5 CONCLUSION

The main conclusion of our study is that the scope of social homecare is determined by similar factors as in other countries, regardless of the novelty of the social service in Slovenia. Nevertheless, as community factors also show a significant effect on scope of social home care, it is advisable that we take a closer look at the procedure of determining the eligibility for social homecare and its scope at the organizational level.

CONFLICT OF INTEREST

The authors declare that no conflict of interest exist.

FUNDING

Study was supported by grants: J5-4080 (B) Community care of the elderly in Slovenia, P5-0200 (B) Quality of Life of Social Groups and 23/12 – Social home care: monitoring and evaluation of social service.

ETHICAL APPROVAL

Not required.

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Units of Measurement

Should be in accordance with International System of Units (SI).

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Avoid abbreviations, with the exception of internationally valid signs for units of measurement. Avoid abbreviations in the title and abstract. The full term for which an abbreviation stands should precede its first use in the text, abbreviation used in further text should be cited in parentheses.

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CONFLICT OF INTEREST (The authors declare that no conflict of interest exist.)

FUNDING (The study was financed by…)

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Jezik prispevka je angleščina. Objavljamo izvirne znanstvene članke, pregledne znanstvene članke, uvodnike, pisma uredništvu in recenzije knjig. Pri izvirnih in preglednih znanstvenih prispevkih morajo biti naslov, izvleček in ključne besede prevedeni tudi v slovenščino.

Naslov, ključne besede in izvleček se oddajajo dvojezično v angleščini in v slovenščini v strukturirana polja. Posebno polje za zapis v drugem jeziku obstaja le za izvleček, preostale podatke vnesite v obeh jezikih v ustrezno isto polje. Prvi izvleček je vselej v angleškem jeziku (do 250 besed - sistem vam besede sproti šteje), drugi pa v slovenskem jeziku (razširjen izvleček – do 400 besed).

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Priporočljiva dolžina prispevka je za uvodnik od 250 do 700 besed; za pismo uredništvu do 1500 besed, za recenzije knjig do 500 besed; za znanstveni članek od 2000 do 4500 besed z razpredelnicami in literaturo vred.

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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, članek morajo intelektualno zasnovati oz. ga kritično pregledati, strinjati se morajo s končno različico članka. Samo zbiranje podatkov ne zadostuje za avtorstvo.

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Izvleček znanstvenega članka naj povzema namen dela, osnovne metode, glavne izsledke in njihovo statistično pomembnost ter poglavitne 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.

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Kategorijo prispevka predlaga z vnosov v ustrezno polje avtor sam, končno odločitev pa sprejme urednik na osnovi predlogov recenzentov. Objavljamo izvirne znanstvene članke, pregledne znanstvene članke, uvodnike, pisma uredništvu in recenzije knjig.

Reference

Vsako navajanje trditev 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 številkami. 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).

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Primeri za citiranje literature:

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Mahy BWJ. A dictionary of virology. 2nd ed. San Diego: Academic Press, 1997.

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Goldberg BW. Population-based health care. In: Taylor RB, editor. Family medicine. 5th ed. New York: Springer, 1999: 32-6.

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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

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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.

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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.

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SLOVENIAN JOURNAL OF PUBLIC HEALTH
ZDRAV VAR 2014 • YEAR 53 • No 4

ORIGINAL SCIENTIFIC ARTICLES

CODEN ZDVAFY • UDK 613 / 614 + 628 • ISSN 0351 - 0026

NIJZ Nacionalni inštitut za javno zdravje
trubarjeva 2, si-1000 ljubljana