

Iveta Rajnicova-Nagyova, Zuzana Katreniakova (eds.)

Reviewed book of scientific papers in extenso

# New challenges for public health and health systems in V4 countries

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**Slovak Republic**

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## FOREWORD

Increased life expectancy and an ageing population represent significant changes in Europe that reflect health care improvements. However, these changes also put pressure on the sustainability of health and social systems and are accompanied by an increased number of years lost due to chronic conditions.

Adding years to life and life to years can be achieved by fostering healthier ways of life, reducing health inequalities, promoting a healthy lifestyle and a culture of prevention among children, promoting active ageing and implementing the chronic care model. The effectiveness of these actions requires a multi-dimensional approach and inter-sectoral collaboration; it is therefore a key public health priority in the 21<sup>st</sup> century.

Citizens in the new EU Member States, including Visegrad four (V4) countries (Czech Republic, Hungary, Poland, and Slovak Republic) have shorter life expectancy and worse health status than people in other EU countries. The similar historical, political and economic contexts of the V4 countries provide them the opportunity to act together more efficiently compared with other EU countries.

The 1<sup>st</sup> V4 Conference on Public Health and 5<sup>th</sup> International SAVEZ Conference (May 2013, Kosice, Slovakia) brought together two specific actions - the 1<sup>st</sup> public health conference at the level of Visegrad four countries and 10<sup>th</sup> anniversary of establishing the Slovak Public Health Association (SAVEZ). Main aim of this event was to support further development of public health systems in the V4 countries and to increase the healthy life years of people living in these countries. Thereafter conference participants were invited to share their research outputs and present their perspectives on new challenges for public health and health systems in V4 countries within the reviewed book of scientific papers in extenso.

*Zuzana Katreniakova, MD, PhD., SAVEZ Chairman*

*Iveta Rajnicova-Nagyova, PhD., SAVEZ Executive Director*

## Child and adolescent public health

### Relative risk of daily dietary consumption in selected food staff among Roma and Non-Roma children

### Relatívne riziko denného výživového príjmu v skupine rómskych a nerómskych detí

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#### Abstract

**Background and aim:** Research data show that the prevalence of obesity is greater among adult Roma, but among children were found trends for stunting. The aim of our study was to compare and evaluate daily dietary practices in two selected children subgroups. We did suppose that our findings will help in preventing further increases in the prevalence of obesity or stunting growth among Roma as well as Non-Roma children.

**Methods:** Cross-sectional study including food intake questionnaires and SES in the family of randomly selected children was performed. In 2 samples we analyzed data from 150 Roma children and 150 Non-Roma children who were living in the vicinity of Roma semi-segregated area. The age of children was 9-13 years. Food questionnaires included daily intake of selected food items e.g. milk and dairy products, meat, eggs, sweets, fruit, vegetables, fast food, sweet drinks etc. Data were processed and analyzed in SPSS, RR relative risk, 95% CI and statistical significance were calculated to compare ethnic differences in food intake.

**Results:** General SES analysis confirmed differently formatted families in Roma and Non-Roma groups. In Roma families were more prevalent smoking, families with more than 4 children, low physical activity and worse background housing conditions.

**Outputs of dietary statistical analysis** confirmed statistical difference between Roma and Non-Roma boys and girls in following food items: milk and dairy products ( $p < 0.001$ ), fruit ( $p < 0.001$ ) and vegetable ( $p < 0.001$ ). Lower statistical significance was found in the items: legumes ( $p < 0.05$ ) and smoked food ( $p < 0.05$ ). In some food items statistical difference were not confirmed, but trends are showing unhealthy nutritional trends among Roma - lower fish and eggs intake, higher sweets and fast food intake.

**Conclusions:** Our findings also show the importance of daily nutritional intake and general overall dietary quality and adequacy in school-age Roma children. Clinicians and public health interventionists should encourage active lifestyles to balance the energy intake of Roma children. Preventive measures are on call including education of mothers in the area of healthy lifestyle. Political actions and stress on priorities of Roma decade inclusion are a base to achieve proper results the area of improved health.

**Keywords:** food dietary intake, children, Roma, Non-Roma.

## **Abstrakt**

### **Úvod**

V minulosti stravovanie Rómov súviselo s ich spôsobom života, kde väčšina pracovala ako drobní remeselníci a v čase sezónnych prác boli využívaní ako lacná pracovná sila v poľnohospodárstve, či pri pomocných prácach v domácnostiach bohatších rodín (8, 9). Tradičná rómska kuchyňa, pokiaľ je možné tento pojem použiť, je z hľadiska racionálnej výživy absolútne nezdravá. Preferuje masné jedlá, mäso horšej kvality, múčne jedlá a takmer vôbec neobsahuje ovocie a zeleninu (12).

Rómska rodina jedla v minulosti iba raz denne: vždy predpoludním sa vybrala matka s nádobou a obchádzala rodiny sedliakov (najčastejšie takých, ktorým chodili pomáhať). Jedlo ktoré od gazdinej dostala, tvorilo hlavné a často jediné jedlo celej rodiny v ten deň. Základom rómskych jedál boli menej hodnotné druhy mäsa (vnútornosti). Za svoje národné jedlo dodnes považujú zemiakmi, krúpami alebo ryžou plnené bravčové hrubé črevo, ktoré uvaria, prípadne upečú (gója), ktoré zajedali plackami (marikľa) pripravenými z múky, vody a soli, upečením priamo na rozžeravenej platni sporáka. Aj keď taká jaternica plnená zemiakmi, v minulosti známa aj medzi chudobnými Slovákmi, stala sa pre Rómov dôležitým jedlom. U Rómov prevládali zväčša jedlá múčne - varené, pretože len málokto vlastnil pec. Strava bola pestrá, s vysokým podielom rastlinných produktov, nízkym podielom mäsa a tuku (5). Dôležitou súčasťou jedálneho lístka boli držková polievka, fazuľová, fazuľový prívarok, guláš z plúcok, slezina na cibulke, držkový perkelt. Rómovia si nerobili zásoby potravín a v dôsledku kočovného spôsobu života sa nevenovali chovu domácich zvierat ani farmárčeniu. Táto situácia sa výrazne nezmenila ani po usadení Rómov, čo v našich podmienkach predstavuje viac ako tri storočia. Hoci v ostatných rokoch prebieha na Slovensku viacero projektov zameraných na podporu samozásobovania rómskych komunít (pestovanie zeleniny, zemiakov), posun k zlepšeniu súčasného stavu je len málo viditeľný a celkovo tak percentuálne nízky.

### **Materiál a metodika**

V prierezovej nutričnej survey bol použitý dotazník pre 300 detí vo veku od 9 – 13 rokov. Prierezový dotazníkový prieskum zahŕňal deti školského veku minoritnej skupiny na sídlisku Luník 9 t.j. rómsku semi-segregovanú komunitu (74 rómskych chlapcov a 76 rómskych dievčat). Majoritnú skupinu rovnakého vekového rozsahu tvorilo 73 nerómskych chlapcov a 77 nerómskych dievčat z 2 základných škôl v okrese Košice- mesto. Dotazník obsahoval základné údaje o stravovacom režime a konzumovaných potravinových komoditách, fajčení, stravovacích a výživových zvyklostiach. Na analýzu štatistiku bol použitý software SPSS

### **Výsledky a diskusia**

Frekvencia rozloženia veku v rómskej a nerómskej detskej populácii (tab. 1) nášho súboru poukazuje na prevažné zastúpenie vekovej skupiny 9 – 12 ročných v súbore, starší rómski žiaci neboli na vyučovaní zastihnutí a tak je ich počet vo vyšších vekových skupinách pomerne nízky.

Tabuľka 1. Frekvencia veku detí vo vyšetrovaných skupinách Rómov a Nerómov

Vek (r.)	Rómovia (%)	Nerómovia (%)
9	27,3	20,7
10	36,0	19,3
11	20,7	20,7
12	12,7	18,7
13	3,3	18,7
Spolu	100,0	100,0

Keďže u rómskych detí sa jedná takmer výlučne o deti z Luníka 9, čo je sídlisková semi-segregovaná lokalita, veľká väčšina odpovedí (tab. 2) zaznamenáva bývanie v panelákovom byte na sídlisku, pravdepodobne náhodnou chybou, respektíve chybou porozumenia v 3 % uvádza u rómskych detí bývanie v rodinnom dome. Nerómske deti z ostatných košických lokalít uvádzajú v 21,3 % bývanie v rodinnom dome, zvyšok uvádza bývanie v panelákovom dome.

Rómska rodina má oveľa vyšší počet detí v rodine ako rodina majoritná (tab. 3), až 52,6 % rodín má 4 a viac detí. V majoritných rodinách na najčastejšie vyskytujú rodiny s dvoma deťmi (52%). Na druhom mieste v nerómskych rodinách sú rodiny len s jedným dieťaťom (24,7%).

Tak isto sa v rómskych rodinách výrazne viac fajčí, len 3,3 % detí uvádza nižšiu expozíciu fajčeniu v rodine, kde sme ako nefajčiarsku hranicu použili u všetkých členov rodiny menej ako 5 vyfajčených cigariet denne (tab. 4).

Tabuľka 2. Typ bývania rómskych a nerómskych detí

Bývanie	Rómovia (%)	Nerómovia (%)
Rodinný dom	3,0	21,3
Panelák	97,0	78,7

Tabuľka 3. Počet súrodencov v rodinách rómskych a nerómskych detí

Počet súrodencov	Rómovia (%)	Nerómovia (%)
0	2,0	24,7
1	4,0	52,0
2	12,7	13,3
3	28,7	8,0
4 a viac	52,6	2,0

Tabuľka 4. Frekvencia fajčenia v rodinách rómskych a nerómskych detí

Fajčenie	Rómovia (%)	Nerómovia (%)
Nefajčiari (0-5ks)	3,3	87
Fajčiari (5-20ks)	36,7	45
Silní fajčiari (viac ako 20ks)	60,0	18

Tabuľka 5. Frekvencia fyzickej inaktivity v rodinách rómskych a nerómskych detí

Telesná inaktivita	Rómovia (%)	Nerómovia (%)
TV > 2 hod.	84,0	22,0
PC > 1 hod.	10,0	37,3
Úlohy > 1 hod.	6,0	40,7

V rómskych rodinách je aj výraznejšie nižšia pohybová aktivita detí. Napriek nezdravým stravovacím zvyklostiam má väčšina detí názor, že sa stravujú zdravo (tab. 6). Ale skutočnosť je, napríklad v príjme ovocia a zeleniny, takmer varovná. Až 18 rómskych detí % detí odpovedá (tab. 7), že ovocie a zeleninu nekonzumuje. Viac ako 50 % respondentov ovocie a zeleninu konzumuje len dvakrát týždenne, čo je nedostačujúce, tak z hľadiska príjmu vlákniny a pektínov ako aj z hľadiska príjmu vitamínov (1, 10).

Konzumácia mlieka a mliečnych výrobkov je základným podkladom rastu detí, tvorby kostí, zubov a celkového fyzického prosperovania. Výsledky dotazníkového prieskumu potvrdili, že takmer 58 percent detských respondentov v mladšom školskom veku buď vôbec mlieko nekonzumujú, alebo ho konzumujú len 1x týždenne (tab. 8). Táto skutočnosť môže negatívne ovplyvňovať rast a zdravie detí (2, 4, 9, 11).

Tabuľka 6. Názory o vlastnom zdravom stravovaní v rodinách rómskych a nerómskych detí

Zdravá výživa	Rómovia (%)	Nerómovia (%)
Áno	85,3	91,3
Nie	14,7	8,7

Tabuľka 7. Frekvencia príjmu zeleniny a ovocia v rodinách rómskych a nerómskych detí

Zelenina a ovocie	Rómovia (%)	Nerómovia (%)
Viac ako 5x týždenne	1,3	53,3
3x týždenne	28,0	32,7
1x týždenne	52,7	11,3
Nejedávam	18,0	2,7

Tabuľka 8. Frekvencia príjmu mlieka a mliečnych výrobkov v rodinách rómskych a nerómskych detí

Mlieko a Ml. výrobky	Rómovia (%)	Nerómovia (%)
Viac ako 5x týždenne	10,7	92
3x týždenne	30,6	8
1x týždenne	48,0	0
Nejedávam	10,7	0

Rómske rodiny vo vyšetrovanej vzorke detí mali vyšší počet detí ako bežné rodiny. Viac ako 96 percent rodín malo viac ako dve deti, čo je maximálny štandard pre majoritnú populáciu v počte detí. V sledovanej vzorke detí bola vysoká prevalencia fajčenia, deti udávali viac-menej bydlisko v paneláku, nakoľko sa jednalo o výskum semi-integrovaných Rómov na mestskom sídlisku v Košiciach Luník 9.

Takmer polovica rómskych detí nenavštevuje žiadne mimoškolské aktivity, aj keď škola má pre ne vytvorené veľmi výhodné podmienky finančne podporované z rôznych zdrojov. Rómske deti až v 47 percentách udávajú pozeranie televízie nad 3 hodiny denne. Napriek všeobecne známemu fakt, že strava Rómov je veľmi simplexná a relatívne nezdravá, si prevažná väčšina rómskych detí myslí, že sa stravuje zdravo. Najvyššie percento rómskych detí udáva, že sa stravujú trikrát denne, ale časť detí dostáva stavu aj menej často, čo môže negatívne vplývať na rast a vývoj detí (2, 3).

Tabuľka 9. Relatívne riziko dennej konzumácie vybraných potravinových skupín nerómskych chlapcov v porovnaní s rómskymi chlapcami

Potravinová skupina	Rómsky chlapci (n=74)		Nerómsky chlapci (n=73)		RR (95% CIRR)	Štatistická významnosť
	%	n	%	n		
Mlieko a ml. výrobky	9,5	7	94,6	70	10,14 (5,00-20,55)	p<0,001
Mäso a mäsové výrobky	6,7	5	89,0	65	13,18 (5,63-30,84)	p<0,001
Údenárske výrobky	37,8	28	19,2	14	0,51 (0,29-0,88)	p<0,01
Ryby a rybie výrobky	6,7	5	13,7	10	2,03 (0,73-5,64)	n.s.
Vajcia	8,1	6	13,6	10	1,69 (0,65-4,41)	n.s.
Strukoviny	6,7	5	19,2	14	2,50 (0,94-6,60)	p<0,05
Zelenina	4,0	3	93,1	68	22,98 (7,57-69,73)	p<0,001
Ovocie	9,5	7	95,9	70	10,14 (5,00-20,53)	p<0,001
Sladkosti	83,7	62	78,1	57	0,93 (0,80-1,09)	n.s.
Fast Food	25,6	19	15,1	11	0,59 (0,30-1,15)	n.s.

Tabuľka 10. Relatívne riziko dennej konzumácie vybraných potravinových skupín nerómskych dievčat v porovnaní s rómskymi dievčatami

Potravinová skupina	Rómske dievčatá (n=76)		Nerómske dievčatá (n=77)		RR (95% CIRR)	Štatistická významnosť
	%	n	%	n		
Mlieko a ml. výrobky	9,2	7	90,9	70	9,87 (4,86-20,06)	p<0,001
Mäso a mäsové výrobky	13,1	10	72,7	56	5,53 (3,05-10,01)	p<0,001
Údenárske výrobky	42,1	32	31,2	24	0,74 (0,48-1,13)	n.s.
Ryby a rybie výrobky	8,0	6	12,9	10	1,65 (0,63-4,30)	n.s.
Vajcia	9,2	7	7,8	6	0,85 (0,30-2,40)	n.s.
Strukoviny	9,2	7	22,1	17	2,4 (1,05-5,45)	p<0,05
Zelenina	8,0	6	93,5	72	11,84 (5,48-25,29)	p<0,001
Ovocie	13,1	10	94,8	73	7,21 (4,03-12,87)	p<0,001
Sladkosti	80,3	61	76,6	59	0,95 (0,81-1,13)	n.s.
Fast Food	26,3	20	15,6	12	0,59 (0,31-1,13)	n.s.

## Diskusia

Klasická rómska strava nemá vo svojej palete ovocie a zeleninu, resp. jej má veľmi málo; tak isto sa do jedálnička veľmi málo zaraďuje mlieko a mliečne výrobky. Tento fakt sa prejavil aj na odpovediach detí, kde len malé percento detí udáva že konzumuje ovocie, zeleninu, mlieko a mliečne výrobky niekoľkokrát týždenne. Potreba príjmu týchto potravinových komodít je v tejto vekovej skupine detí niekoľkokrát denne (1,10).

Štatistická analýza sociálno-ekonomického statusu poukázala na mnohodetnosť rómskych rodín, vysokú prevalenciu fajčenia a nízku pohybovú aktivitu. Z negatívnych výživových zvyklostí boli zistené: minimálne zaradenie ovocia a zeleniny do jedálnička detí, nízka spotreba mlieka a mliečnych produktov, vysoké preferencie spotreby mäsa a mastných jedál. Frekvencia prijímaných potravinových komodít počas dňa v prevažnej miere nebola päťkrát denne. Štatistická analýza nepoukázala na rozdiely medzi chlapcami a dievčatami, neboli potvrdené ani rozdiely medzi mladšími a staršími žiakmi.

## Záver

V celej strednej a východnej Európe žije pomerne vysoké percento rómskeho obyvateľstva, ktoré možno hodnotiť ako tzv. marginálnu skupinu. Táto etnická skupina obyvateľov má veľmi nízke vzdelanie, žije z relatívne nízkych sociálnych dávok a má nízku sociálno-ekonomickú úroveň. Sociálne problémy Rómov predstavujú vysokú ekonomickú závislosť tejto skupiny obyvateľov od štátu a vytvárajú začarovaný kruh, ktorý rozširuje sociálno-ekonomické rozdiely medzi Rómami a väčšinovým obyvateľstvom. Sociálne, environmentálne a návykové faktory sa zreteľne odrážajú aj v úrovni zdravia a tzv. zdravotných indikátoroch (3, 6, 7), napríklad chorobnosť, úmrtnosť, výskyt tak infekčných ako aj neinfekčných

civilizačných ochorení.

V tejto práci bolo hlavným cieľom poukázať na problematiku výživy a stravovacích návykov detí v rómskych detských komunitách a poukázať na mnohé výživové nedostatky, ktoré sa v rodinách detí vyskytujú. Zistené výsledky poukazujú na vysoko nezdravé stravovacie zvyklosti v tejto etnicky špecifickej populácii, ktoré bude nutné smerovať ku striktným zmenám v biologickom zložení stravy, ale nie k všeobecnej redukcii energetickej hodnoty, pretože táto skupina detí zaostáva v raste za celoslovenskou populáciou (2).

Tieto výživové nedostatky spolu so socio-ekonomickou charakteristikou rómskeho príslušníka môžu tvoriť predpoklady pre výskyt závažných civilizačných ochorení a tak isto vedú k skráteniu očakávanej dĺžky života. Dopad sociálnych faktorov je evidentný najmä v modernej a civilizovanej spoločnosti. Od nich sa odvíjajú aj ďalšie nedostatky, najčastejšie nedostatky vo výžive, či zmena postoja ku zdravotníckej starostlivosti. Nedostatky vo výžive sú spôsobené tak návykmi, ak ako aj chudobou a finančným nedostatkom, ale aj nízkou vzdelanostnou úrovňou, kde sa uplatňujú staré predsudky a schéma ta o postojoch k životu, rodine a zdraviu.

### **Pod'akovanie**

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## **Promote healthy eating habits through awareness campaigns in Poland**

### **Propagowanie prawidłowych nawyków żywieniowych poprzez kampanie społeczne w Polsce**

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#### **Abstract**

In Poland, there are many social campaigns that involve food and nutrition. Their aim is to put healthy eating habits in society. Among the campaigns are those that seek to prevent disease, change in health-promoting lifestyle, put in your daily diet foods, preferably affecting the health and social problem noticing.

The aim of this study was to assess the knowledge of young people about social campaigns relating to food and nutrition on the example of the campaign: "I know what I choose," "The labeling of food products GDA" and "Cool kids do not eat junk food".

The survey consisted of elementary school students, junior high, and high school students. Into final analysis of the survey enrolled 463 people.

Results: 63.9% of respondents indicated knowledge of the logo used in the campaign, "I know what I choose." Respondents were asked to the list of foods, which has information of GDA. 72.0% of students, 42.1% of middle school students, high school students 41.9% and 29.4% of primary school children were able to identify the product with GDA.

Conclusions: Among the respondents, a detailed knowledge of each campaign was not satisfactory. Campaigns "Cool kids do not eat junk food," "I know what I choose," were among the most well-known in the group of pupils in primary school and students. GDA campaign was the most know in the group of students, but the ability to properly use the GDA label was small.

Keywords: social campaigns, diet, children.

#### **Streszczenie**

W Polsce obserwujemy wiele kampanii społecznych dotyczących żywności i żywienia, mających na celu wykształcenie prawidłowych nawyków żywieniowych w społeczeństwie. Wśród kampanii możemy znaleźć takie, które mają za zadanie zapobiegać chorobom, zmieniać styl życia na prozdrowotny, wprowadzać w swoją codzienną dietę produkty spożywcze, korzystnie oddziałujące na zdrowia oraz zauważać problem społeczny.

Celem pracy jest ocena wiedzy młodych ludzi na temat kampanii społecznych odnoszących się do żywności i żywienia na przykładzie kampanii: „Wiem co wybieram”, „Programu znakowania produktów i potraw Zalecane Dienne Spożycie GDA” oraz „Fajne dzieci nie jedzą śmieci”.

Materiał i metoda: Badaniami ankietowymi objęto uczniów szkół podstawowych, gimnazjalnych, liceum ogólnokształcącego oraz studentów. Do ostatecznej analizy zakwalifikowano ankiety 463 osób. Wyniki: 63,9% badanych wykazało znajomość znaku graficznego użytego w kampanii „Wiem co wybieram”. Badani zostali zapytani o czym świadczy znak graficzny kampanii „Wiem co wybieram” znajdujący się na danym produkcie spożywczym. Prawidłową odpowiedź – skład produktu jest zgodny z

międzynarodowymi zaleceniami żywieniowymi – zaznaczyło 35,6% badanych. Badani zostali poproszeni o wymienienie produktów spożywczych, na których podane jest GDA. 72,0% studentów, 42,1% gimnazjalistów, 41,9% licealistów oraz 29,4% uczniów szkół podstawowych potrafiło wskazać taki produkt.

Wnioski: Wśród badanych znajomość szczegółowa poszczególnych kampanii była niezadawalająco. Kampanie „Fajne dzieci nie jedzą śmieci”, „Wiem co wybieram” najbardziej znane były wśród uczniów szkół podstawowych oraz studentów. Kampania GDA najbardziej powszechna była w grupie studentów, jednak umiejętność prawidłowego wykorzystania oznakowania GDA była mała.

Słowa kluczowe: kampanie społeczne, dieta, dzieci.

## **Introduction**

In Poland, there are many social campaigns that involve food and nutrition. Their aim is to put healthy eating habits in society. Among the campaigns are those that seek to prevent disease, change in health-promoting lifestyle, put in your daily diet foods, preferably affecting the health and social problem noticing. Advertising is increasingly targeted at younger audiences, and marketing activities can be observed in educational institutions. In recent years, programs to promote individual health promoting eating habits in different age groups ("I know what I choose", „Fish affects everything", "The labeling of food products GDA", „Cool kids don't eat junk food".)

### *I know what I choose – Choices*

The "I know what I choose" is a global initiative designed to help you choose healthy products. It was created to support the World Health Organization (WHO) in its efforts to reduce the growing problem of overweight, obesity and other diet-related diseases. "I know what I choose" is the Polish part of an educational campaign and information on food labeling "Choices". This program was established in 2006. Its purpose was to facilitate consumer choice of food products so that they could arrange a balanced diet. The developers believe that the food industry should improve the composition of their products to be balanced daily diet. The authors of the campaign indicates that the program itself is a response to consumer demand and changing public awareness about the food industry. This program addresses the whole of society - consumers, regardless of age, gender, social status and education.

For consumers, the logo has been designed so that they can easily find the product of the program. Foods in the program must include a certain amount of four nutrients based on international dietary recommendations. These nutrients are saturated fats, trans fatty acids, sugar and salt. [1,2,3,4,5]

In Poland, the initiators of the campaign were the leading food manufacturers. The campaign included television advertising and Internet, billboards (Fig. 1), press releases and information on the campaign website - <http://www.wiemcowyberam.pl>. Logo that has been used in the Polish edition currently appears on more than 100 food products. Polish educational materials and information published on the website of the campaign refers to the dietary recommendations based on the Harvard Healthy Nutrition Pyramid in 2005. The material is 10 tips on how to live healthily, which directly relate to dietary guidelines proposed by the Harvard School of Public Health and the Polish Institute of Food and Nutrition (IZZ).[1,2,5]

Figure 1. Logo of program the "I know what I choose"- Choices [5]



### *The labeling of food products GDA*

Product Branding is one of the elements of nutrition education. The labeling of food products should contain a clear and understandable information on nutrition.

GDA (Guideline Daily Intake) is the information provided on food products. This modern method of labeling foods is determined in approximate percentages level of consumption of various nutrients found in certain foods. Labeling of food products is the caloric value, fat, saturated fat, carbohydrates, total sugars, fiber, protein, salt and sodium. [6,7,8,9,10,11]

"The GDA labeling of food products" has been developed in accordance with the Polish and EU law for the proper labeling of nutritional value. This marking comprises:

- marking the front of the pack - determines the amount of calories, which is located in one portion and the% of GDA GDA presented graphically
- marking of the back of the pack - gives the minimum information that must be included in the package: energy - calories, protein, fat and carbohydrates.

In Poland, the system was designed and implemented in September 2007. The program aims to introduce labeling of nutritional value of food that will be understandable and accessible to the public, the same for all foods and beverages made based on current scientific evidence, and will help to reduce the development of overweight and obesity. [4, 7,8,9,10]

### *"Cool kids do not eat junk food"*

The campaign "Cool kids do not eat junk food" was conducted in September and October 2009 in several cities in Silesia. Action was financed from the budget of the Marshal Office of the Silesian Province. Objective of the program was to encourage children to give up eating fast-food, sweets, crisps, fries, pizza and encourage the change to healthy eating habits. In its implementation have been involved doctors and nutritionists. At the primary school pupils were given badges with indicators BMI and overweight children had prepared a special diet. Within this campaign were used stickers on bins garbage and billboards "Cool kids do not eat junk food." [12]

### **Materials and methods**

The aim of this study was to assess the knowledge of young people about social campaigns relating to food and nutrition on the example of the campaign: "I know what I choose," "The labeling of food

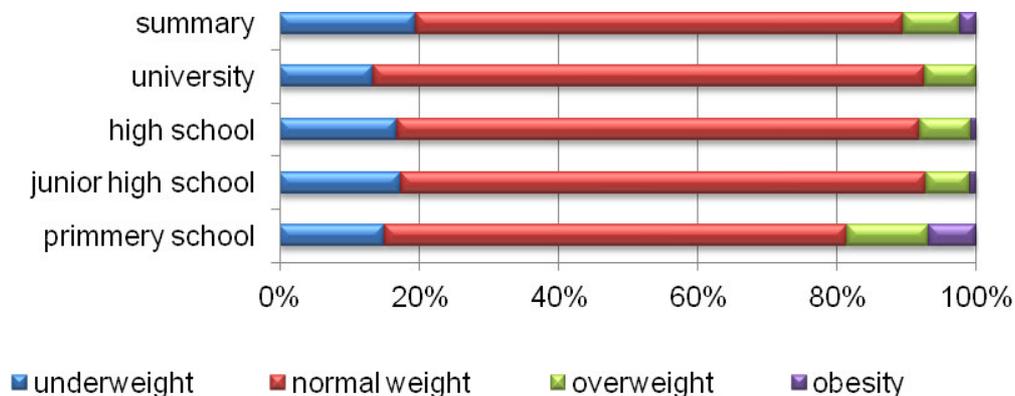
products GDA" and "Cool kids do not eat junk food".

The survey consisted of elementary school students, junior high, and high school students. Into final analysis of the survey enrolled 463 people. The study was conducted based on the author questionnaire. Surveyed were 275 girls and 188 boys, aged 11-27 years. The average age in the whole group was 16.1 years  $\pm$  3.4. For the statistical analysis used a  $\chi^2$  test. The statistically significant level of  $p \leq 0.05$ .

## Results

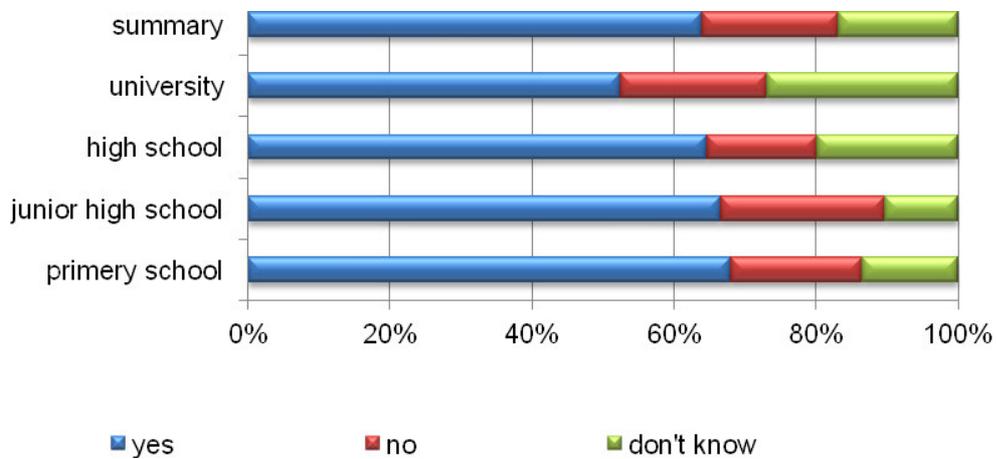
The study group included 463 students: 119 elementary school students (25.7% of the study group), 126 junior high school students (27.2%), 136 high school students (29.4%) and 82 students (17.7%).

Figure 2. Characteristics of the study group according to body weight



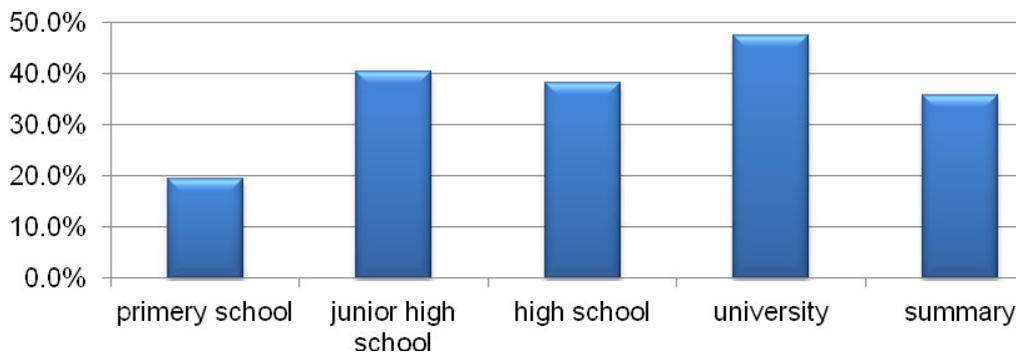
Respondents were asked about their weight and height. The obtained data were calculated according to the formula body mass index (BMI). For the analysis of body weight we used centile charts body mass index for Polish boys and girls (2010). Among primary school children 66.4% of respondents characterized by normal weight, 15.1% underweight, 11.8% overweight and 6.7% obese. In the group of junior high school students 75% were normal weight, 18% underweight, overweight 6% and 1% were obese. In the group of high school students 75% were normal weight, 17% underweight, overweight 7% and 1% obesity. Among students 79% were normal weight, 14% underweight, 7% overweight.

Figure 3. Knowledge of the logo campaign I know what I choose



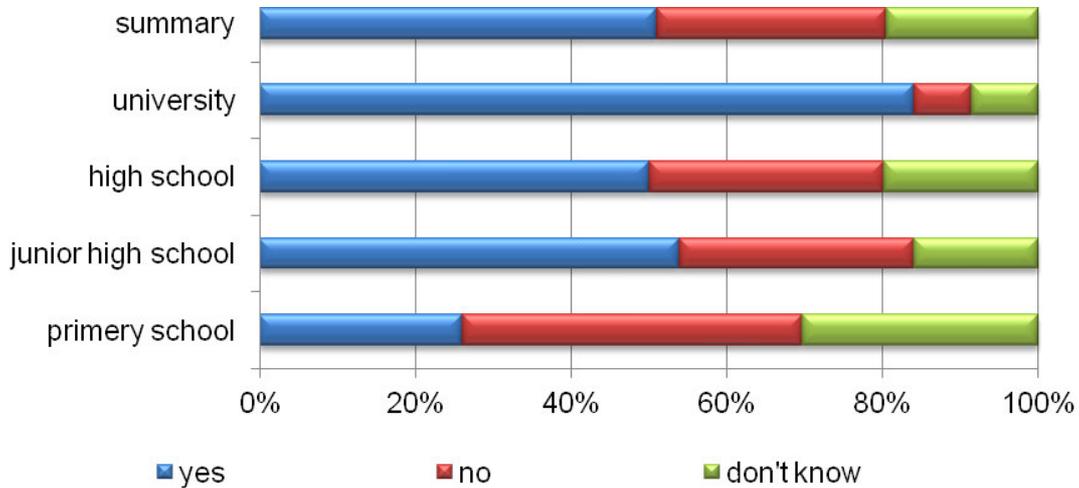
63.9% of respondents indicated their knowledge of the logo used in the campaign, "I know what I choose," including students accounted for 68.1% of elementary school students, 66.7% of junior high school students, 64.7% of high school students and 52.4% of students. Among those who didn't know the logo of the campaign was: 18.5% of the youngest participants in the study, 23.0% of junior high school students, 15.4% of high school students and 20.7% of students. Statistical analysis showed statistically significant differences between the groups.

Figure 4. What does the logo of the campaign "I know what I choose" mean? – knowledge of the logo campaign in respondents group



Respondents were asked: what does a logo of campaign which is located on the food product, mean? The correct answer is the product is in conformity with international nutritional recommendations – this answer marked 35.6% of all respondents, including 19.3% of elementary school students, 40.5% of junior high school students, 38.2% of high school students and 47.6 % of students. Statistical analysis showed statistically significant differences between the two groups.

Figure 5. Replies survey respondents to the question: Have you ever met the GDA labeling of food products?



26.1% of elementary school students, 54.0% junior high school students, 50.0% high school students and 84.1% students responded to question "Have you ever met the GDA labeling of food products?"-"yes." 43.7% of elementary school students, 30.2% of junior high school students, 30.1% of high school students and 7.3% of students didn't meet the GDA labeling of food products. Differences between groups were statistically significant.

Table 1. Where did you see GDA labeling? - respondents answer to this question

	never met with GDA	on all foods	on some foods	read an information of GDA	read/heard in mass media	different
primary school	38,2%	4,2%	12,6%	2,6%	5,8%	1,0%
junior high school	23,6%	13,6%	18,8%	6,3%	10,5%	3,1%
high school	33,0%	9,4%	19,9%	2,6%	13,6%	1,0%
university	5,2%	11,0%	22,5%	2,6%	12,0%	3,7%

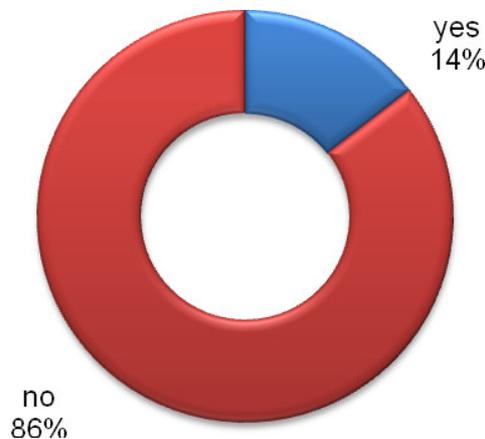
Respondents most often have seen GDA labeling on food products - 141 people. 80 of them read the information or see it in the media such as TV, Internet. 191 respondents had never met with the date of the GDA. Differences between groups were statistically significant.

Table 2. Do you think the GDA (Guideline Daily Amounts) is the same for everyone regardless of age and gender?

	yes	no	don't know
primary school	25,2%	28,6%	46,2%
junior high school	13,5%	57,9%	28,6%
high school	11,8%	65,4%	22,8%
university	3,7%	84,1%	12,2%
summary	14,3%	57,2%	28,5%

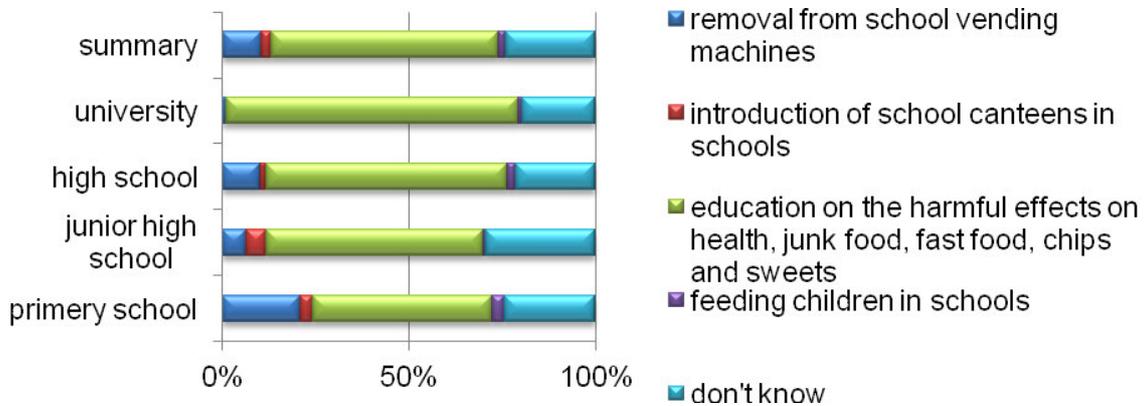
Respondents had to indicate whether the GDA (guideline daily amount) is the same for everyone, regardless of age and gender. In the whole group 14.3% people said “yes”, 57.2% “no” and 28.5% answered “don’t know”. Among elementary school students 25.2% answered "yes", 28.6% "no," and 46.2% "do not know". In the group of junior high school students found that 13.5% of the GDA is all the same, 57.9% answered “no”, and 28.6% said “don’t know”. 11.8% of high school students and 3.7% of students felt that the GDA is the same for everyone. 65.4% of high school students and 84.1% of the students claimed that the GDA distinguished by age and sex. Statistical analysis showed that the difference between the groups are statistically significant.

Figure 6. Use GDA by respondents



Respondents were asked about the use of signs GDA when they buy food products. 11.8% of elementary school students, 16.7% of junior high school students, 13.2% of high school students and 17.1% students use GDA when they make consumer choice.

Figure 7. What is the social campaign “Cool kids do not eat junk food” – knowledge about campaign in the responds group



The figure 7<sup>th</sup> shows the results of knowledge about the campaign Cool kids do not eat junk food. "The correct answer in question “what is the most important think in the campagne “Cool kids do not eat junt food”?” was "education campaign is concerned about the harmful effects on health, eating fast food and crisps and sweets." The correct answer has granted 60.9% of respondents, including 47.9% of elementary school students, 57.9% of junior high school students, 64.7% of high school students and 78.0% of students. 24.0% of respondents couldn't identify any response, including 24.4% of the youngest respondents, 29.4% of junior high school students, 21.3% of high school students and 19.5% of students. 21.0% of pupils in primary schools, 6.3% of junior high school students, 10.3% of high school students and 1.2% of students felt that the program "Cool kids do not eat junk food" refers to removal from school vending machines with soda. The differences in responses between the groups were statistically significant.

## Discussion

In 2009, the Interactive Institute for Market Research (IIBR) conducted a study on the knowledge of the social campaign "I know what I choose." 20.1% of Polish respondents knew the campaign logo, including 86.5% of them associate it with food. 70% of respondents said they would have to purchase products with this logo. The campaign, "I know what I choose" contributed to the increase in sales of food products marked with the logo. Unilever has observed the dynamics of sales of these products by 7 percentage points [1]. In a study conducted in Denmark asked respondents about the benefits resulting from the consumption of products labeled with the "Choices". 63% of respondents felt that being reduced intake of trans fatty acids, 40% saturated fat, 36% sugar and 23% sodium [13].

In the report, the European Consumers' Perception of Foodstuffs Labelling 87% of Poles thought that nutrition information on the label is necessary. Nearly 50% of Poles examined the labels about portion sizes and fat content of the food product. The energy value of food products is confirmed by 35% of respondents. The same report indicated that the majority of respondents do not read nutrition products. This study identified a lack of sufficient awareness among Poles about nutrition information on labels affixed food, and lack the ability to translate this information on the nutritional benefits used in the daily diet. The source of the Poles on nutrition, according to the report European Consumers' Perception of Foodstuffs Labelling was the information appearing on television, magazines and on the packaging of food products [14,15]. Regulation of the Minister of Health on food labeling nutritional value is applied to

the nutritional labeling requirement and the content of protein, carbohydrates and fats in food for caterers and consumers [16].

### **Conclusions**

1. Among the respondents, a detailed knowledge of each campaign was not satisfactory.
2. Campaigns "Cool kids do not eat junk food," "I know what I choose," were among the most well-known in the group of pupils in primary school and students.
3. GDA campaign was the most know in the group of students, but the ability to properly use the GDA label was small.

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## **Attitudes and experiences with drugs among primary school children aged 8 – 15 years in the academic year 2009/10**

### **Postoje a skúsenosti s drogami u žiakov základných škôl vo veku 8-15 rokov v školskom roku 2009/10**

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#### **Abstract**

**Introduction:** Substance use in children is not only a current problem in the world, but also in Slovakia. The aim of the study is to determine attitudes and experiences with drugs among primary school children aged 8-15 years.

**Material and Methods:** The sample consisted of children aged 8-15 years in selected primary schools. Data collection was carried out by questionnaires distributed in the amount of 1,280. We used Chi-Square test and multiple logistic regressions for the data analysis.

**Results:** At least once smoked 28% of respondents and 49% of them smoked more than once in the last month. 46% respondents drank alcohol at least once and more boys than girls drank more than 1 drink of alcohol in the last week ( $p<0.05$ ). The boys and girls stated beer and wine as being quite easily available. The age of respondents and parental support had a significant influence on smoking ( $p<0.05$ ). The age of respondents had a positive influence on alcohol drinking ( $p<0.05$ ). The age of respondents, maternal smoking, friend's alcohol drinking, parental support had significant influence on the attraction to the drug ( $p<0.05$ ).

**Conclusions:** The results of study indicate that there is a need to focus an attention on drug prevention.

**Key words:** drugs, primary school children, smoking, alcohol, prevention.

#### **Abstrakt**

**Úvod:** Užívanie návykových látok u detí je v súčasnosti problémom nielen vo svete, ale aj na Slovensku. Cieľom štúdie je zistiť postoje a skúsenosti s drogami u žiakov základných škôl vo veku 8-15 rokov.

**Materiál a metodika:** Sledovaný súbor tvorili deti vo veku 8-15 rokov vybraných základných škôl. Zber údajov bol vykonaný prostredníctvom dotazníkov rozdáných v počte 1280. Štatistické vyhodnotenie sme vykonali využitím Chi-Square testu a viacnásobnej logistickej regresnej analýzy.

**Výsledky:** Aspoň 1-krát fajčilo cigarety 28% respondentov a 49% z nich fajčilo viac ako 1-krát za posledný mesiac. Aspoň 1-krát pilo alkohol 46% respondentov a viac chlapcov ako dievčat vypilo viac ako jeden pohárik alkoholu za posledný týždeň ( $p<0,05$ ). Chlapci a dievčatá považovali pivo a víno ako pomerne ľahko dostupné. Vek respondentov, podpora zo strany rodičov mali štatisticky významný vplyv na fajčenie respondentov ( $p<0,05$ ). Vek respondentov mal pozitívny vplyv na pitie alkoholu ( $p<0,05$ ). Vek respondentov, fajčenie matky, pitie alkoholu kamaráta, podpora zo strany rodičov mali štatisticky významný vplyv na príťažlivosť drogy ( $p<0,05$ ).

Záver: Výsledky našej štúdie poukazujú na skutočnosť, že je potrebné zamerať pozornosť na prevenciu drog.

Kľúčové slová: drogy, žiaci základných škôl, fajčenie, pitie alkoholu, prevencia

## Introduction

In the recent decades there are a lot of negative social, behavioral and environmental factors such as cigarette smoking, alcohol drinking and drug use (Blum and Nelson-Mmari, 2004). The World Health Organization (WHO) (2010) warns that alcohol drinking among young people is now becoming a growing problem in many countries.

Globally, the number of young smokers is increasing and the WHO together with the Centers for Disease Control and Prevention (CDC) developed the Global Survey on smoking behavior in schoolchildren (Global Youth Tobacco Survey - GYTS), which provides representative data on smoking in children aged 13 to 15 years. In Slovakia, the first GYTS survey was conducted in late 2002 and 2003 in collaboration with the Faculty of Health Care and Social Work, Trnava University (WHO, 2003).

Given that drug use in children is also current problem in Slovakia, we decided to find out the situation about the attitudes and experiences from the view of public health in our study.

The goals of our study were:

- to determine and compare the experiences with smoking and alcohol drinking by sex
- to determine and compare the attitudes to smoking and alcohol drinking by sex
- to analyse the impact of selected factors on drug use among primary school children aged 8-15 years

## Material and methods

The sample in our study consisted of primary school children aged 8-15 years in Trnava, Trenčín, Staškov, Novot', Hybe, Banská Štiavnica and Poprad.

Design of our study was cross-sectional. Data collection was conducted during the June 2010 by questionnaires and on a voluntary basis. Our study was part of the project "*Cross-sectional study of attitudes, habits and awareness of drugs among primary school students aged 8-15 years in Slovakia in the academic year 2009/10*". Questionnaires were distributed in the amount of 1,280 with the response rate of 76% (n=972). We had to exclude 11% of the questionnaires because of missing responses. We also distributed a special type of questionnaires for the 10-15 year old primary school children - Test of drug attraction in the amount of 895 with the return of 79% and 11% were excluded.

We used Chi-Square test to test differences in the proportions of observed phenomena between boys and girls. Testing was conducted using the R-project software. Confidence interval for all results was 95% and the significance level was 0.05.

Test of the attraction to the drug was evaluated by the calculated score. According to this score, we divided respondents into two categories. The first category consisted of respondents for whom the drug is not attractive with the score of 8-21 points and the second category - for whom the drug is attractive with the score of 22-32 points.

To identify the impact of selected factors on the susceptibility to drug use we used a multivariate analysis. We investigated the effect of continuous and categorical independent variables on the dependent variables of binary type and we used logistic regression.

## Results

### *Characteristic of the sample*

The sample consisted of primary school children (13% of the sample from Trnava, 14% from Trenčín, 14% from Staškov, 18% from Novot', 10% from Hybe, 16% from Banská Štiavnica and 15% from Poprad). There was 47% of boys and 53% of girls. The minimum age of respondents was 8 years and maximum 15 years. The median was 12 years (I.Q. = 10; 3.Q = 14).

### *Experiences with the legal and illegal drugs among boys and girls*

In our study group 72% of respondents have never smoked cigarettes. At least once smoked 28% of respondents and 49% of them smoked more than once in the last month (56% boys; 44% girls). 54% of respondents never drank alcohol. 46% of respondents drank at least once and of them during the last week drank more than one drink of alcohol 42% respondents. Statistically significant ( $p < 0.05$ ) more boys (61%) than girls (39%) drank more than one drink of alcohol in the last week.

Respondents of our sample experienced relatively easy access especially to beer (62% boys; 52% girls) and wine (52% boys; 38% girls) and these differences were confirmed as statistically significant ( $p < 0.05$ ). Cigarettes as quite easy available considered 36% boys and 26% girls. Experiences with their difficult accessibility indicated 52% of girls and 41% boys ( $p < 0.05$ ). Illegal drugs considered boys and girls as quite difficult to access, and 11% of boys and 5% of girls stated marijuana as relatively easily accessible.

### *The attitudes to smoking and alcohol drinking by gender*

We found out the respondent's attitudes about what consequences a possible situation would have on them, if the next month they started to smoke cigarettes or drink alcohol. In our sample more girls than boys ( $p < 0.05$ ) would have problems with their parents (78% girls; 70% boys) and with their friends (38% girls; 27% boys) if they would start smoking in the next month. We also found out that more girls than boys ( $p < 0.05$ ) stated they would have problems with parents (80% girls; 73% boys), with friends (42% girls; 30% boys) and would be addicted to alcohol ( $p < 0.05$ ) (51% girls; 42% boys) if they started alcohol drinking in the next month.

### *Multivariate analysis of the effect of selected factors on the susceptibility to drug use*

In our study group we investigated the effect of selected variables on the variable *smoking, alcohol drinking and attraction to the drug*. Dependent variables were *smoking, alcohol drinking and attraction to the drug*. Independent continuous variables were: age of respondents, number of brothers and number of sisters. Independent categorical variables were: gender of respondents, mother's smoking, mother's alcohol drinking, father's smoking, father's alcohol drinking, friend's smoking, friend's alcohol drinking, sibling's smoking, sibling's alcohol drinking, establishment of rules by parents, parent's control, parent's support, friend's support.

Using multivariate analysis, we found out that if the respondents are older, their chance of smoking will increase 1.12 times (95% CI = 1.04 - 1.21), and this effect was confirmed as statistically significant ( $p < 0.05$ ). In respondents who do not have support from parents if they have some problems (OR = 1.67; 95% CI = 1.07 - 2.61), there was statistically significantly ( $p < 0.05$ ) increasing the chance of smoking compared with those who have this support from parents, Table 1.

On the *alcohol drinking* we found out that a positive influence ( $p < 0.05$ ) had the age of respondents (OR = 1.14; CI 95% = 1.07 - 1.21).

Table 1. Results of the multivariate logistic regression analysis selected independent variables on the smoking

Independent variables		$\beta$	OR	CI 2.5%	CI 97.5%	P
age of respondents		0.115	1.12	1.04	1.21	<0.05
parent's support	<i>yes (ref.)</i>		1			
	<i>no</i>	0.515	1.67	1.07	2.61	<0.05

We found out that if respondents are older, the chance of attraction to the drug will increase 1.76 times (95% CI = 1.34 - 2.30) and this effect was confirmed as statistically significant ( $p < 0.05$ ). If mother smokes every day, the chance of attraction to the drug will increase 9.93 times (CI 95% = 1.79 - 55.14) in comparison if mother does not.

If respondents have friend who drinks alcohol every day, there is statistically significant 4.96 times (CI 95% = 2.24 - 11.02) higher chance of attraction to the drug, Table 2.

Table 2. Results of the multivariate logistic regression analysis selected independent variables on the attraction to the drug

Independent variables		$\beta$	OR	CI 2.5%	CI 97.5%	P
age of respondents		0.564	1.76	1.34	2.30	<0.05
mother's smoking	<i>never (ref.)</i>		1			
	<i>every day</i>	2.296	9.93	1.79	55.14	<0.05
	<i>sometimes</i>	1.591	4.91	2.35	10.27	<0.05
friend's alcohol drinking	<i>never (ref.)</i>		1			
	<i>every day</i>	1.602	4.96	2.24	11.02	<0.05
	<i>sometimes</i>	0.972	2.64	1.19	5.86	<0.05
parent's support	<i>yes (ref.)</i>		1			
	<i>no</i>	1.085	2.96	1.47	5.96	<0.05

## Discussion

In Slovakia since 1994 in four-year intervals the survey TAD ("Tobacco, Alcohol, Drugs") was carried for primary school children, high school students and their teachers. There was found out that at least once smoked cigarettes 41.1% of respondents in the age group 11-14 years (Nociar, 2010). In our study group 28% of respondents smoked at least once. Of those 49% smoked at least once in the last month and more boys (56%) than girls (44%), but this difference was not confirmed as being statistically significant.

In our study we also found out which factors affect smoking of respondents. With increasing age, the chance to smoke increased 1.12 times (95% CI = 1.04 - 1.21). This result is similar to the finding of Andrews et al. (2003), who stated that their respondents would increase the chance of smoking 1.10 times (95% CI = 1.04 - 1.18) if are older. Among the respondents in our study who do not have support from parents, if they have some problems, the chance of smoking will increase 1.67 times (95% CI = 1.07 - 2.61). Adamčíková (2007) also stated that students in their study group smoked especially if they had

problems. Sanchez et al. (2010) found out that among girls who felt the lack of attention and care from parents, increased the chance to smoking up to 4.37 times (95% CI = 1.19 - 16.04).

Several authors in the results of their studies indicate that the differences between boys and girls are now reducing when it comes to alcohol drinking (Nociar, 2010; Goodkind et. al, 2009; Bitunjac and Saraga, 2009; Bezinović and Malatestinić, 2009) and point to the alarming number of alcohol intoxication in children (Bitunjac and Saraga, 2009; Toumbourou et al., 2009; Weinberg and Wyatt, 2006). In our study group 46% of respondents drank alcohol at least once. Of these, 42% respondents in the last week drank more than one glass of alcohol and more boys (61%) than girls (39%) drank more than one drink of alcohol in the last week ( $p < 0.05$ ).

Overall, in our group there was prevailing experience with relatively easy access to beer. The popularity of beer among young people also stated Záborský et al. (2006) and found out that beer was the most common in children in the Baltic countries and also showed an increasing trend in use of alcoholic beverages during the 8 years particularly among students from Estonia and Lithuania. Respondents of our sample considered illegal drugs mainly as quite difficult to be available or could not judge. Statistically significant difference in availability of drugs, we found in marijuana which girls considered as harder available than boys. Children usually first received drugs from their friends and relatives to try what effect they would it have on them (Boreham and McManu, 2003). Salamonová (2010) stated that the curiosity was the most common cause of drug use in primary schools in the district Stará Ľubovňa.

The authors of several foreign studies indicate that the older the respondents, the higher the chance they will drink alcohol (Parsai et al., 2009; Toumbourou et al., 2009; Donovan and Molina, 2008). In our sample this chance increased 1.14 times (95% CI = 1.07 to 1.21).

In our study group we also found the attitudes of boys and girls regarding the formation of possible situations/scenarios, if the next month started smoking and drinking alcohol. The important finding was that statistically significantly more girls than boys reported a high chance of problems with parents and friends.

Using the multiple logistic regression analysis, we found that if the respondents are older, there is a statistically significant ( $p < 0.05$ ) increase of the chance to the attraction of drug 1.76 times (95% CI = 1.34 - 2.30). Lopez et al. (2009) stated that if the children have peers, friends who use addictive substances this is very encouraging for them to take addictive substances and neglecting schoolwork and missing a lot of lessons. Effect on attraction to drug use Virtanen et al. (2009) also found among students whose teachers and other school staff smoked and this effect was even stronger if the parents smoked.

## Conclusions

The results of our study indicate that there is a need to focus attention on drug prevention. Because of the experiences with the quite easily availability of beer and wine in our study group, there should be also more controls during the sale of alcohol and not to sell to the younger than 18 years old.

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## **Cardiovascular risk factors prevalence in college students in Trnava**

### **Výskyt rizikových faktorov kardiovaskulárnych chorôb u vysokoškolákov v Trnave**

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#### **Abstract**

**Background and aim:** The aim of this cross-sectional study was to determine the prevalence of selected modifiable CVD RFs in a group of college students of the Trnava University in 2011 and so to contribute to similar studies also dealing with the description of the health status of college students.

**Methods:** During a public event „The Trnava University Healthy Days“ we examined 207 college students (5% of 4226 internal students of the university). The sample consists of 25% of males and 75% of females from four of the five faculties of the Trnava University. The data collection was conducted using a questionnaire and through anthropometric and biochemical measurements (BMI, waist circumference, blood pressure, total cholesterol and triacylglycerides). Statistical significance was set at the level  $p < 0.05$  and assessed using Chisquar and Fischer exact test, t test and Wilcoxon test.

**Results:** The smoking prevalence was similar in both males and females (36%, 37% respectively),  $p > 0.05$ . A lower level of regular physical activity was recorded in females (50%) than in males (66%),  $p > 0.05$ . In males there were recorded higher values of BMI ( $p < 0.001$ ), SBP ( $p < 0.001$ ) and DBP ( $p < 0.05$ ) as compared to females. In females, we recorded higher values of TC ( $p < 0.001$ ) as compared to males. However, all average values of biochemical and anthropometric measurement (except SBP in males) were in normal ranges for both groups.

**Conclusions:** The prevalence of observed modifiable CVD risk factors was relatively low; however, at least 1 to 3 RFs are present in 63% of students. It is important to monitor the development of CVD RFs in college students.

**Keywords:** risk factors, college students, cardiovascular disease

#### **Abstrakt**

**Úvod a ciele:** Cieľom tejto prierezovej štúdie bolo zistiť prevalenciu vybraných modifikovateľných rizikových faktorov kardiovaskulárnych chorôb v skupine študentov Trnavskej univerzity v roku 2011 a tak prispieť k podobným štúdiám, ktoré sa zaoberajú popisom zdravotného stavu vysokoškolákov.

**Materiál a metódy:** Počas verejného podujatia „Dni zdravia Trnavskej univerzity“ bolo vyšetrených 207 študentov TU (5% z celkového počtu 4226 denných študentov TU). Sledovaný súbor pozostáva z 25% mužov a 75% žien zo 4 fakúlt TU. Potrebné údaje boli získané prostredníctvom dotazníkového prieskumu a prostredníctvom antropometrických a biochemických meraní (BMI, obvod pásu, krvný tlak, celkový cholesterol, triacylglyceroly). Na overenie štatistickej významnosti bol použitý chí-kvadrátový test, Fisherov exaktný test, t test, Wilcoxonov test. Za hladinu štatistickej významnosti bola stanovená hladina  $p < 0,05$ .

**Výsledky:** Zaznamenali sme približne rovnaké percento fajčiacich mužov (36%) a žien (37%),  $p > 0,05$ . Pravidelná fyzická aktivita bola zaznamenaná v nižšej miere u žien (50%) ako u mužov (66%),  $p > 0,05$ . U mužov boli zaznamenané štatisticky významne vyššie hodnoty BMI ( $p < 0,001$ ), systolického tlaku ( $p < 0,001$ ) a diastolického tlaku ( $p < 0,05$ ) v porovnaní so ženami. U žien boli naopak zaznamenané

štatisticky vyššie hladiny celkového cholesterolu ( $p < 0,001$ ). Napriek tomu, všetky priemerné hodnoty biochemických a antropometrických meraní (okrem priemerného systolického tlaku u mužov) sa pohybovali v rozmedzí normálnych hodnôt.

Záver: Prevalencia pozorovaných rizikových faktorov KVCH bola relatívne nízka. Napriek tomu 1-3 RF malo 63% študentov. Je dôležité sledovať rozvoj RF KVCH u vysokoškolských študentov.

**Kľúčové slová:** rizikové faktory, vysokoškolskí študenti, kardiovaskulárne choroby

## **Introduction**

Cardiovascular diseases (CVD) annually represent the cause of almost half of all deaths in Europe, in the European Union (Nichols et al, 2012) and for the long time also in the Slovak Republic (Baráková, 2009). Risk factors of chronic diseases such as CVD can be found already in young people and they have a strong influence on the development of CVD in adulthood (Shay et al, 2013). It is therefore important to monitor lifestyle risk factors amongst young people. In Slovakia and central Europe were carried out several studies (Jurkovičová, 2009; Janušová, Szarazová, 2011; Poręba et al, 2008; Antal et al, 2006), dealing with the prevalence of risk factors of CVD in college students, but so far none was targeted at mapping the prevalence of risk factors of CVD among students at the University of Trnava (TU). These facts prompted us to undertake this pilot cross-sectional study. The aim of the study was to find out the prevalence of selected modifiable CVD risk factors in the group of Trnava university students in 2011.

## **Materials and Methods**

The data was collected within a project “The Trnava University Healthy Days” that was conducted in 4 faculties of the TU in Trnava. Each participant who voluntarily participated in the study received information regarding the aims of the project and signed informed consent.

### *Subjects*

In April 2011 a group of 207 students (25% males, 75% females) was examined. This represents some 5% of 4226 internal students of the university. The average age of the sample was 21.4 years (CI 95% 21.2 – 22.6 years). The average age of males was 21.8 (CI 95% 21.3 – 22.2 years) and the average age of females was 21.3 years (CI 95% 21.0 – 21.5 years).

### *Data collection*

The data collection tool was a questionnaire that was an abbreviated and modified version of the CINDI questionnaire. The students that stated they smoke cigarettes were also asked to complete the Fageström Questionnaire for Nicotine Dependence. The anthropometric and biochemical parameters measured were as follows: body mass index (BMI), waist circumference (WC), blood pressure (BP) and serum lipids (total cholesterol and triacylglycerides). To categorise BMI and WC values we used a WHO Report (2008). As a normal BMI we considered values between 18.5 and 24.9. For overweight, we considered BMI values between 25 and 29.9. For obesity, we considered BMI values  $\geq 30$ . As a normal waist circumference for males was set the WC < 94 cm and for females the WC < 80 cm. Blood pressure was measured two times in sequence, 10 minutes apart using a digital device. For the statistical analysis, the average of these two measures was used. The criterion for the systolic blood pressure (SBP) was set as follows: optimal SBP < 120 mm Hg, normal SBP  $\geq 120$  and  $\leq 129.9$  mm Hg, increased SBP  $\geq 130$  and  $\leq 139.9$  mm Hg, high (hypertensive values) SBP  $\geq 140$  mm Hg. The criterion for the diastolic blood pressure (DBP) was set as follows: the optimal DBP < 80 mm Hg, normal DBP was 80 and  $\leq 84.9$  mm Hg, increased DBP  $\geq 85$  and  $\leq 89.9$  mm Hg and high (hypertensive values) DBP  $\geq 90$  mm Hg (Graham et al, 2007). The serum lipids values were examined using a portable analyser for quick determination of selected biochemical parameters. The criterion for borderline values of total cholesterol (TC) was  $\geq 5$  and  $\leq 6$  mmol/l. Increased values of TC was set as  $> 6$  mmol/l. The criterion for borderline values of

triacylglycerides (TAG) was  $\geq 2$  and  $\leq 3$  mmol/l. Increased values of TAG was set as  $> 3$  mmol/l (Jurkovičová, 2005).

#### Statistical analysis

Statistical analysis was performed in R-project. Comparisons between groups were carried out using chi-square test, Fisher exact test, t-test and Wilcoxon test. The significance level was set  $p < 0.05$ . Data are presented as means and proportions. For each mean and proportion a 95% confidence interval was calculated.

## Results

### Smoking and physical inactivity prevalence

In the sample there were 32% (CI 95% 26 – 39%) of smokers, 55% (CI 95% 48-62%) of non- smokers and 13% (CI 95% 8-18%) of former smokers. The proportion of smoking men (36%, CI 95% 23 -52%) and women (37%, CI 95% 29 – 45%) was similar,  $p > 0.05$ . Most students smoked daily less than 5 cigarettes (49%). An increasing number of cigarettes smoked daily corresponded to a decreasing proportion of smokers (5-10 cigarettes- 40%, 11-20 cigarettes- 11%, 21 and more cigarettes- 0%). The smokers have smoked on average for 3.5 years (CI 95% 3-4 years). In the group of smokers who filled also the Fageström Questionnaire for Nicotine Dependence (n=37), a very low and low dependence on nicotine was recorded in 89% (CI 95% 74-96%) smokers, medium dependence was recorded in 8% (CI 95% 2-23%) of them and high dependence in 3% (CI 95% 0,1-16%). Most students reported some physical activity. The proportion of those who performed some physical activity (at least 20 mins.) daily was 18% (CI 95% 13 – 24%). Two or three times per week some physical activity was performed by 35% of students (CI 95% 30 -43%) and 30% (CI 95% 24 -37%) of students performed some physical activity once per week. Two or three times per month 13% students performed some physical activity (CI 95% 9-18%) and 4% (CI 95% 2 -8%) of the students performed some physical activity only several times per year. Males performed some regular physical activity (daily or two – three times per week) as opposed to females (66%, CI 95% 51 – 78%; 50%, CI 95% 42 – 58%),  $p > 0.05$ .

### Anthropometric and biochemical measurements

The averages of anthropometric and biochemical measurements are summarised in table 1. In males there were recorded higher values of BMI ( $p < 0.001$ ), SBP ( $p < 0.001$ ) and DBP ( $p < 0.05$ ) as compared to females. In females, we recorded higher values of TC ( $p < 0.001$ ) as compared to males.

Table 1. Anthropometric and biochemical measurement results

	Males			Females			Both sexes		
	n	Mean	CI 95%	n	Mean	CI 95%	n	Mean	CI 95%
BMI ***	51	23.5	22.8 - 24.3	155	21.4	20.9 - 21.9	206	21.9	21.5 - 22.4
WC <sup>+</sup>	51	79.9	77.7 -82.1	154	68.6	67.3 -69.96	205	71.4	70.1 -72.7
TC ***	49	3.6	3.4-3.7	146	4.3	4.2-4.4	195	4.1	4-4.2
TAG	49	1.5	1.3-1.7	146	1.5	1.4-1.7	195	1.5	1.4-1.6
SBP ***	51	134	131-138	156	116	115-118	207	121	119-123
DBP *	51	80	78-83	156	77	76-78	207	78	77-79

\* significant difference  $p < 0.05$ ; \*\*\*significant difference  $p < 0.001$

<sup>+</sup> the gender difference analysis was not performed given the physiologic differences between males and females

Based on BMI, overweight was recorded in 22% of males and obesity was recorded in 2% of males. In females, overweight was recorded in 7% of females and obesity was recorded in 4% of females. Borderline values of TC were recorded in 12% of females and increased values of TC were recorded in 3% of females. SBP in hypertensive levels was recorded in 31% males and 2% females. DBP in hypertensive levels was recorded in 12% of males and 5% of females. The TC values in the group of males were in normal ranges. Borderline values of TAG were recorded in 22% of males and increased values of TAG were observed in 2% of males. Borderline values of TAG were recorded in 19% of females and increased values of TAG were observed in 5% of females (table 2).

Table 2. Proportion of students in categories of anthropometric and biochemical measurements

	Males		Females		p- value
	%	CI 95%	%	CI 95%	
<b>BMI</b>					
· <i>underweight</i>	0	0-9	17	12-25	p<0.001
· <i>normal weight</i>	76	62-87	72	64-79	
· <i>overweight</i>	22	12-36	7	3-12	
· <i>obesity</i>	2	0.1-12	4	2-9	
<b>WC</b>					
· <i>normal</i>	94	83-98	92	88-95	NS
· <i>increased</i>	6	1-17	8	5-14	
<b>TC</b>					
· <i>normal</i>	100	91-100	85	78-90	p<0.001
· <i>borderline</i>	0	0-9	12	7-18	
· <i>increased</i>	0	0-9	3	1-8	
<b>TAG</b>					
· <i>normal</i>	76	61-86	76	68-83	NS
· <i>borderline</i>	22	12-37	19	13-26	
· <i>increased</i>	2	0.1-12	5	3-11	
<b>SBP</b>					
· <i>optimal</i>	8	3-20	67	59-74	p<0.001
· <i>normal</i>	33	21-48	23	17-31	
· <i>increased</i>	28	17-43	8	5-14	
· <i>high</i>	31	20-46	2	0.5-6	
<b>DBP</b>					
· <i>optimal</i>	52	39-67	63	56-72	NS
· <i>normal</i>	22	12-36	19	13-26	
· <i>increased</i>	14	6-28	13	8-19	
· <i>high</i>	12	5-25	5	2-9	

One of the five selected CVD risk factors (smoking, overweight/obesity, blood pressure  $\geq 140$  and/or  $\geq 90$  mm Hg, TC  $\geq 5$ mmol/l and TAG  $\geq 2$  mmol/l) was present in 47% of males and 39% of females (table 3).

Table 3. Proportion of the students with 0 – 5 risk factors accumulation (smoking, overweight/obesity, high blood pressure, borderline and increased TC and TAG values)

	Males n=49	Females n=142	p- value
	%		
0 RF	27	40	
1 RF	47	39	
2 RF	14	18	<0.05
3 RF	12	3	
4 RF	0	0	
5 RF	0	0	

## Discussion

The presented study deals with the prevalence of CVD risk factors among students at the TU. A number of other published studies (Jurkovičová, 2009; Janušová, Szarazová, 2011; Poręba et al, 2008; Antal et al, 2006) suggest that this is a highly topical issue. We found out that the prevalence of selected CVD risk factors in our cohort was relatively low but it is necessary to consider the cumulation of risk factors in individuals.

In the group of 207 students of TU, 32% were smokers. The gender differences were not significant (36% males, 37% females) for smokers. High nicotine dependence was recorded in 3% of smokers. In the sample of Jurkovičová (2009) study, the prevalence of smokers was 17% of college students and there were more male smokers (22%) than female smokers (14%). The higher prevalence of male smokers (26%) in comparison to female smokers (18%) was described also by Štefková et al (2011) and Janušová & Szarazová (2011) (24% males, 15% females). The high prevalence of smoking in our sample can be explained by the fact that in the group of smokers, we considered also occasionally smoking students.

An adverse trend is a long term problem regarding physical activity of the students based on their subjective assessment (Štefániková et al, 2003). This problem is obvious also in our study. Although most students reported some physical activity, the proportion of those daily performing some physical activity at least 20 minutes was only 18%. The proportion of students performing some physical activity once per week or less was 47%. Similar results regarding low physical activity (in a similar age group) has been reported also by other authors (Janušová et al, 2008; Poręba et al, 2008). Physical activity has nonnegligible impact on health (Vuori, 2010). Despite the low physical activity there were recorded high proportions of normal values of BMI and waist circumference in our sample. The mean values of anthropometric and biochemical measurements were in the normal range. In females we recorded, with an exception of higher values of TC, better results than in males. The similar results were recorded also in the study of Jurkovičová (2009). In that study 4590 Slovak college students participated. Results are also similar with a study that was conducted in Budapest (Antal et al, 2006). The normal average values of TC may be explained by compensation mechanisms that are particularly effective in young healthy people (Štefániková, 2003).

### *Limits of the study*

This pilot cross-sectional study has a several limitations. Firstly, the selection of participants was not random. This was a result of the public and open nature of “The Trnava University Healthy Days”. Another limit of the study was the survey instrument – the questionnaire, which was based on the CINDI questionnaire. However, it still was not standardised. The next limitation is the fact that the measured values of blood lipids might not be exact. This is also a result of public and open nature of the event. The measurements were conducted from 9 AM to 3 PM. As a result some students did not comply with the condition to be examined whilst fasting. This was also the cause of not measuring the value of glucose in blood serum, which would also have been interesting to determine.

### **Conclusions**

In our study we recorded a relatively low prevalence of CVD risk factors (with an exception of high smoking and physical inactivity prevalence). Looking at the accumulation of risk factors, however, it is obvious that 1 to 3 risk factors are present in 63% of students. Therefore, it would be appropriate to implement some elements of health promotion and primary prevention interventions into the university life in order to maintain this state or its potential to improve. This intention could be fulfilled through repeating university activities such as our one, which was aimed towards education in the field of CVD risk factors and other chronic diseases. Also, there should be the opportunity in the university to choose physical activity at least as a non-compulsory subject in the curriculum. These measures might be appreciated at least in the group of students who, in our questionnaire, stated that they are interested in improving their health (60% of students would like to stop smoking and 41% of them tried in last month to increase their physical activity). However, if consider the results of other studies in populations of Slovak students, we find out that the situation in the CVD risk factors prevalence in this population is not favorable despite the interventions, which are carried out in this area. Because recent evidence suggests that interventions aimed at the population level only to inform the population about CVD risk factors and their possible effect does not reduce mortality, we recommend other ways fighting CVD. Effective legislation, tobacco, salt and trans fats in foods control, correctly food labeling and advertising control could be effective in the fight against CVD and could save costs (Ford, Capewell, 2011; Capewell, O’Flaherty, 2011).

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## **The effect of personality traits and psychosocial training on burnout syndrome among healthcare students**

### **Vplyv osobnostných premenných a sociálno psychologického tréningu na syndróm vyhorenia u študentov pomáhajúcich profesií**

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#### **Abstract**

The aim is to explore the role of personality factors influencing students who experience burnout syndrome; as well as the effect of psychosocial training on the level of burnout and personality predictors among university students of health care professions.

A quasi-experimental pre-test/post-test design was used for evaluating the effect of psychosocial training. Altogether 111 university students divided into experimental and control group were included in the study (average age 20.7, SD= 2.8; 86.1% females). The SBI (School Burnout Inventory), the SOC (Sense of Coherence questionnaire), and Rosenberg's Self-esteem scale were employed. Linear regression and the analysis of variance were applied for the statistical analysis of data.

The results show that socio-psychological training had a positive impact on the level of burnout, as well as on the personality factors related to burnout. After completing the training, the level of burnout in the experimental group significantly decreased (95 % confidence interval: 0.93, 9.25), while in the control group no significant change was observed. On the other hand, sense of coherence in the research group had increased (95 % confidence interval: -9.11, 2.64). No significant changes were found with regard to self esteem levels in either research or control group.

Psychosocial training proved to be an effective supportive method for positively influencing burnout among students of the health care professions. Since coping strategies used during the study tend to be associated with the strategies applied later in work; this method can be considered as an effective supportive tool in the prevention of burnout in the helping professions.

Keywords: burnout syndrome, self-esteem, sense of coherence, students of health care professions, psychosocial training, professional development

#### **Abstrakt**

Cieľom štúdie bolo preskúmať úlohu osobnostných faktorov ovplyvňujúcich syndróm vyhorenia u študentov, rovnako ako vplyv psychosociálneho výcviku na úroveň vyhorenia a osobnostné prediktory u vysokoškolských študentov zdravotníckych profesií.

Kvázi-experimentálny pre-test/ post-test dizajn bol použitý pre vyhodnotenie efektivity psychosociálneho výcviku. Do výskumu bolo zahrnutých 111 študentov vysokých škôl rozdelených do experimentálnej a kontrolnej skupiny (priemerný vek 20,7, SD = 2,8; 86,1% žien). Bol použitý Dotazník vyhorenia v škole (SBI, School Burnout Inventory), Dotazník zmyslu pre integritu (SOC, Sense of Coherence questionnaire), a Rosenbergová škála sebaúcty (RSE, Rosenberg Self esteem scale). Lineárna regresia a analýza rozptylu boli využité pre štatistickú analýzu dát.

Výsledky ukazujú, že sociálno-psychologický výcvik mal pozitívny vplyv na úroveň syndrómu vyhorenia, rovnako ako na osobnostné faktory súvisiace so syndrómom vyhorenia. Po absolvovaní tréningu, úroveň

syndrómu vyhorenia sa v experimentálnej skupine významne znížila (95% interval spoľahlivosti: 0,93, 9,25), zatiaľ čo v kontrolnej skupine nebola pozorovaná žiadna významná zmena. Na druhej strane, zmysel pre integritu sa vo výskumnej skupiny sa zvýšil (95% interval spoľahlivosti: -9,11, 2.64). Žiadne významné zmeny neboli nájdené v úrovni sebaúcty v oboch skupinách- výskumnej ani kontrolnej skupine.

Psychosociálny výcvik sa ukázal byť účinnou podpornou metódou s pozitívnym vplyvom na syndróm vyhorenia medzi študentmi zdravotníckych profesií. Vzhľadom k tomu, že stratégie zvládania uplatňované počas štúdia môžu byť podobné ako stratégie zvládania neskôr uplatňované v profesionálnom živote, táto metóda môže byť považovaná za účinný podporný nástroj v prevencii vyhorenia v pomáhajúcich profesiách.

**Kľúčové slová:** syndróm vyhorenia, sebaúcta, zmysel pre integritu, študenti zdravotníckych profesií, psychosociálny tréning, profesionálny rozvoj

## **Introduction**

Emotional exhaustion is a key component of burnout syndrome and is associated with having a lack of resources, positive emotions and encouragement, which leads to a loss of energy and excessive fatigue. Together with a depersonalisation that is characterised by cynicism, a loss of idealism and a negative approach to clients, exhaustion negatively impacts the quality of care that is provided for clients and the quality of life among healthcare professionals (Maslach & Leiter, 2008; Pines, 2002). A systematic review of studies on the relationship between burnout and the risk of somatic health (Melamed et al., 2006) identified strong evidence of a burnout impact on health outcomes. Hypertension, ischemic heart disease, metabolic syndrome, and an impaired hypothalamic-pituitary-adrenal axis can result from burnout, as well as sleep disturbance, inflammatory processes, immune system disorders, blood coagulation and risky health behaviours.

Specific job characteristics are considered to be the primary risk factors for burnout, especially in high-demand jobs in which workers have little control over job situations, receive insufficient rewards, have low levels of social support, perceive unfairness in decision-making processes, or value conflict with the organisation (Maslach & Leiter, 2008). However, the onset of burnout syndrome is moderated by personality characteristics. Characteristics that protect against burnout include positive and active coping strategies (Jenaro et al., 2007). In the helping professions, a systematic review by Alarcon et al. (2009) found a significant negative association between low self-esteem and high levels of emotional exhaustion. In a study by Ablett and Jones (2007), sense of coherence was found to be an important factor that influences well-being and work commitment among palliative care staff.

Recent research has focused on the risk for and prevention of burnout among health care professionals and students. Similar to work environments, school requires regular structured activities that are associated with expected levels of achievement (Salmela-Aro et al., 2009). In the health care professions, educational institutions attempt to improve student retention rates, and the successful completion of school becomes a demanding task that pressures students. The question of mental health, stress management abilities and coping strategies among students becomes relevant.

There is little research on the effectiveness of psychosocial interventions to prevent burnout among students. Most of the studies on burnout prevention programs are focused on health care professionals. A positive effect of psychosocial training on burnout syndrome components has been reported among mental health personnel, such as forensic nurses (Doyle et al., 2007; Ewers et al., 2002), where personnel were trained to cope with stress and vulnerability and to develop engagement and coping strategies. Using a participatory action approach with oncology personnel, Le Blanc et al. (2007) found that a team-based intervention program with a staff support group significantly decreased the levels of key burnout syndrome components (i.e., emotional exhaustion and depersonalisation). Using a social-cognitive

approach, a self-efficacy-based intervention has successfully decreased burnout levels and has enhanced engagement and self-efficacy levels among university students (Breso et al., 2011).

The first aim of this study was to explore the relationship between personality characteristics (self-esteem and sense of coherence) and burnout syndrome among students in health care professions. The second aim of the study was to determine whether psychosocial training that focuses on the enhancement of interpersonal and communication skills among university students moderates burnout and enhances protective personality characteristics, such as self-esteem and sense of coherence.

## **Methods**

A quasi-experimental pre-test/post-test design was used to evaluate the effect of psychosocial training. The research sample consisted of 111 undergraduate university students who were divided into an experimental group (58 students) and a control group (53 students). All participants were full-time university students in the field of psychology (69.8%) and nursing/midwifery (30.2%). The mean age of the students was 20.7 years (SD 2.8), and 86.1% of the participants were female. The intervention involved 6 months of psychosocial training that was included in the university curriculum as an optional course. Participants from both groups completed questionnaires before and after the psychosocial intervention. The response rate at the follow-up was 88.5%. All participants were provided with information about the study aims, and ethical approval was obtained from the university ethics committee.

The psychosocial training was focused on improving skills that support effective social interactions and communication. A positive change in interpersonal skills is mediated by participation in group activities that are facilitated by a trained psychologist. The group activities include specific group techniques and activities that imitate real-life situations. The following issues were incorporated into the training: self-perception, non-verbal communication, social skills, stress management and coping techniques, burnout and burnout prevention, professional identity, and relaxation techniques. In the first phase, the training spanned 3 months, with an 8-hour session every 3 weeks. Following a 3-month break, the second phase of the training followed the same format.

The School Burnout Inventory (SBI) (Salmela-Aro et al, 2009) is a short, 9-item questionnaire that focuses on the self-evaluation of the most common burnout symptoms; higher scores indicate higher levels of burnout. The authors of the questionnaire proposed three subscales of the questionnaire: common exhaustion while completing schoolwork, cynicism about the meaning of school and a sense of inadequacy at school. The SBI questionnaire showed high structural, item, and scale reliabilities and good concurrent validity (Salmela-Aro et al., 2009). In the present study, Cronbach's alpha was 0.83.

A 13-item version of Antonovsky's (1993) Sense of Coherence (SOC) questionnaire was used to measure the "sense of coherence" concept. This relatively stable personality trait refers to a person's ability to cope with stressful situations; people with a high sense of coherence tend to perceive life as comprehensible, manageable and meaningful. A higher score on the questionnaire indicates a higher sense of coherence and a better ability to cope with stressful situations. In the present study, Cronbach's alpha was 0.81.

Self-esteem was assessed using the Slovak version of the Rosenberg Self-Esteem (RSE) scale (Rosenberg, 1965). The ten-item scale includes 5 positive and 5 negative statements about a respondent's attitude about him/herself. The sum self-esteem score ranges from 10 to 30 (using items that are scored between 0 and 3), and higher scores indicate higher self-esteem. Good psychometric properties have been reported for the Slovak version of the RSE scale (Sarkova et al., 2006). In the present study, Cronbach's alpha was 0.79.

Hierarchical linear regression models were employed to examine the effect of personality traits (self-esteem and sense of coherence) on students' burnout syndrome. Burnout was treated as the outcome variable, while self-esteem and sense of coherence were treated as predictor variables in the linear model.

The effect of the psychosocial training on personality predictors and burnout levels was assessed with an analysis of variance. All statistical analyses were performed using SPSS 18.0.1 for Windows.

## Results

Personality characteristics related to burnout were identified using a cross-sectional analysis of the baseline data. A linear regression model that controlled for the effect of age and gender showed that self-esteem was significantly related to burnout syndrome ( $\beta = -0.33$ ; 95 % CI: -1.13, -0.32; total explained variance 10.9 %). However, when sense of coherence was included in the model ( $\beta = -0.39$ ; 95 % CI: -0.50, -0.12), self-esteem was no longer a significant predictor of burnout syndrome. The total explained variance in the final model was 19.2 % (Table 1).

Table 1. Linear regression models with the effect of personality traits (self-esteem and sense of coherence) on burnout syndrome.

Model 1	B coefficient	95 % CI
<b>Self-esteem</b>	-0.33	<b>(-1.13, -0.32)</b>
Total explained variance		10.9 %
Model 2	B coefficient	95 % CI
<b>Self-esteem</b>	-0.38	(-0.61, 0.44)
<b>Sense of coherence</b>	-0.39	<b>(-0.50, -0.12)</b>
Total explained variance		19.2 %

Statistically significant effects are in **bold** ( $p \leq 0.01$ ).

Longitudinal data were analysed to explore the effect of psychosocial training on burnout syndrome levels and personality characteristics. An analysis of variance showed a statistically significant decrease in burnout syndrome levels among students who participated in the psychosocial training (95 % CI: 0.83, 9.26), but there were no significant differences in burnout levels among the students who received no psychosocial training. Likewise, there was a significant increase in sense of coherence levels among students who participated in the psychosocial training (95 % CI: -9.11, -2.64), and there were no significant differences in sense of coherence levels among the students who received no psychosocial training. However, the level of self-esteem showed no significant changes in either group (Table 2).

Table 2. Analysis of variance for the pre-test/post-test differences in the experimental and control groups.

		Mean score Pre-test	Mean score Post-test	95 % CI
<b>Burnout</b>	Experimental	29.7 ( $\pm 9.9$ )	24.7 ( $\pm 5.7$ )	<b>(0.93, 9.25)</b>
	Control	26.7 ( $\pm 7.9$ )	27.2 ( $\pm 6.2$ )	(-6.96, 1.94)
<b>Self-esteem</b>	Experimental	19.0 ( $\pm 4.2$ )	20.9 ( $\pm 3.7$ )	(-4.18, 0.30)
	Control	18.7 ( $\pm 4.2$ )	19.3 ( $\pm 4.1$ )	(-2.30, 1.73)
<b>Sense of coherence</b>	Experimental	59.9 ( $\pm 11.9$ )	66.2 ( $\pm 9.1$ )	<b>(-9.11, -2.64)</b>
	Control	59.8 ( $\pm 10.3$ )	58.2 ( $\pm 11.2$ )	(-4.51, 7.99)

Statistically significant effects are in **bold** ( $p \leq 0.01$ ).

## **Discussion**

Results showed that the concept of sense of coherence was particularly relevant in relation to burnout, whereas the predictive power of self-esteem was not statistically significant. These results are consistent with previous studies that have also shown that sense of coherence and personal integrity are associated with burnout syndrome among nurses (Nordang et al., 2010) and social workers (Kalimo et al., 2003). The results of the present study confirmed this relationship, which is consistent with the hypothesis that sense of coherence is associated with burnout. Sense of coherence is characterised by an understanding that the world is logically understandable, meaningful, consistent and relatively predictable and safe (Madarasová Gecková et al., 2008). This personal tendency for an optimistic perception of the outside world is a positive resource for coping with stressful situations, which reduces the risk of burnout. Relationships between burnout syndrome and personality characteristics are complex; a high sense of coherence and self-esteem do not automatically ensure resistance to burnout. According to Nordang et al. (2010), personality traits moderate the effect of stressful situations on the individual, and the overall result is influenced by a number of other factors, such as characteristics of the work environment and social support (Kalimo et al., 2003).

The results of this study show that providing university students in health care professions with psychosocial training may result in significant improvements in burnout syndrome, which is consistent with the results of similar studies among health care professionals (Doyle et al., 2007; LeBlanc et al., 2007; Ewers et al., 2002). The psychosocial training is likely to benefit school achievement and student well-being. Positive changes in burnout levels are associated with positive appraisals of the demands of studying and general improvements in social and coping strategies. These changes are also related to the development of a strong professional identity, which is accompanied by a reduction in the frustration and hopelessness that can contribute to the stress and burnout processes. Coping strategies related to the demands of studying may be associated with the same coping strategies that are later applied in the workplace. Improving one's ability to manage stress can prevent burnout syndrome in practise. However, to confirm this hypothesis, consecutive longitudinal studies are required.

There are several limitations to the current study, including the selection process and sample size. The validity of the observed data is limited to a set of students in selected fields. Additionally, the principal researcher delivered most of the training and collected the data, which may have created an unavoidable bias. However, one benefit of the study is that personality characteristics of burnout have not been systematically investigated in the context of students. Finally, studies on the effectiveness of psychosocial training to prevent burnout among students are lacking.

## **Conclusions**

Research findings on the positive effects of psychosocial training on burnout syndrome levels among students should be applied in practise to implement intervention programmes in health care curricula. These programmes should aim to improve skills and reinforce positive strategies for coping with stress and heavy workloads.

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## **Chronic diseases, health related quality of life and quality of care**

### **Health quality - life quantity**

### **Jakość zdrowia - wartość życia**

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#### **Abstract**

Healthy Life Years is an interdisciplinary indicator which occurs not only in the context of health analyses, but also in political or economic areas. The interdisciplinary character of this indicator is, then, a part of the trend called "health in economy" according to which health status of citizens contributes to economic growth. Therefore, a question of the border of workers' productivity is a crucial issue. At which moment do they still participate in creating the national product and when do they become a burden for the system i.e. the recipients of social security benefits?

This study compares the healthy life years indicator with life expectancy (in both cases, data at the moment of birth and the age of 65 were taken into consideration) and retirement age before and after the introduction of the new reforms.

All three indicators undergo increase in all the countries of the Visegrád Group, but healthy life years indicator grows relatively more slowly than the remaining two. Furthermore, there are considerable differences between individual countries (in the case of HLY, Slovakia compares particularly unfavourably) and gender of the citizens (to the disadvantage of men).

Therefore, healthy life years should become a crucial measure of effective and productive population as well as one of the main variables in economic analyses. After this period, a person becomes not only the contribution payer, but also the recipient of social security benefits.

Keywords: Healthy Life Years, retirement age, life expectancy

#### **Streszczenie**

Wskaźnik długości życia w zdrowiu jest wskaźnikiem interdyscyplinarnym wpisującym się nie tylko w obszar analiz zdrowotnych, ale także politycznych czy ekonomicznych. Interdyscyplinarność tegoż wskaźnika wpisuje się zatem w trend „zdrowie w gospodarce”, według którego stan zdrowia obywateli winien przyczyniać się do wzrostu gospodarczego. Kluczową kwestią jest zatem pytanie gdzie istnieje granica produktywności pracowników? W którym momencie uczestniczą oni jeszcze we współtworzeniu produktu narodowego, a w którym stają się już jedynie obciążeniem dla systemu- beneficjentami świadczeń z tytułu zabezpieczenia społecznego?

W badaniu dokonano porównania wskaźnika długości życia w zdrowiu oraz oczekiwanej długości życia (w obu przypadkach uwzględniono dane w momencie urodzenia i w wieku 65 lat) oraz wieku emerytalnego przed i po wprowadzeniu nowych reform.

Wszystkie trzy wskaźniki ulegają wydłużeniu we wszystkich krajach Grupy Wyszehradzkiej, jednak długość życia w zdrowiu rośnie stosunkowo wolniej niż dwa pozostałe wskaźniki. Nadto, istotne są także różnice pomiędzy poszczególnymi krajami (w przypadku HLY szczególnie niekorzystnie wypada Słowacja) i płcią obywateli (na niekorzyść mężczyzn).

Długość życia w zdrowiu winna zatem stać się kluczowym miernikiem efektywnej i produktywnej populacji, a także jedną z kluczowych zmiennych w analizach gospodarczych. Bowiern po ustaniu tego okresu osoba staje się już nie tylko płatnikiem składek, ale także beneficjentem świadczeń z zakresu zabezpieczenia społecznego.

Słowa kluczowe: wskaźnik długości lat życia w zdrowiu, wiek emerytalny, oczekiwana długość życia.

## **Introduction**

Healthy life years is a superior and highly desirable value - as is maximum professional productivity (in temporal and nominal terms). Currently, on the one hand, there is an economically-determined need to promote professional activity of the elderly (which is indicated by, for example, present demographic situation). On the other hand, there is the social security system which somewhat enables earlier professional deactivation for persons in near-retirement age (L. Gromulska, 2008). The determination of the age border beyond which productivity of workers diminishes is of key significance. When introducing subsequent reforms, attention was primarily paid to job seniority (as the main factor) and life expectancy (Czupryna A, 2000). However, it is worth emphasising that increasing life expectancy is not necessarily accompanied by complete well-being and productivity of an individual. Hence, the key issue in terms of workers' productivity should be not only job seniority, but also their health condition with particular attention paid to near-retirement period.

The connection between health and economic growth was pointed out by the European Union in the petition to establish the programme called "Health for Growth" which reads as follows: "Health problems constitute one of the main causes of absence at work and earlier retirement. Maintaining the society healthy and active for a longer period of time has positive influence on efficiency and competitiveness. Increasing the healthy life years is an initial requirement if Europe is to successfully reach the employment rate of 75% among persons aged from 20 to 64 and prevent early retirement due to illnesses. Moreover, maintaining persons above the age of 65 healthy and active may influence their participation in the labour market and lead to potential and considerable savings in the health care budgets." ("Health for Growth Programme").

In the period when public systems developed, relatively few people managed to reach the retirement age. The mean life span at that time equalled 45 years and the retirement age constituted between 60-70 years. Hence, according to the principle, the persons who reached the retirement age were indeed unable to maintain themselves. At present, the principles underwent a considerable metamorphosis. One may then conclude that due to such changes, the retirement system became a part of allocation of earnings and not the way to financially support the decrepit old age. Bearing in mind the above considerations, it seems valid to ask whether it is justified to take away a part of the created product from the workers and give it to the people who, according to economic considerations, are still able to participate in creating it (Góra, 2003).

## **Materials and methods**

This study compares three statistical values: healthy life years indicator, life expectancy and retirement age established in the social security systems of the countries belonging to the Visegrád Group. The first and second indicators include values adequate for the time of birth and at the age of 65 published by the Eurostat.

## **Results**

The lowest values of life expectancy (both at the time of birth and at the age of 65) are noted in Hungary (at the moment of birth: W=78.7; M=71.2; at the age of 65: W=18.3; M=14.3). The highest values are noted in Poland (for women W0= 81.1; W65= 19.9) and in the Czech Republic (for men M0= 74.8; M65= 15.6).

In the case of healthy life years, however, the lowest values are observed in Slovakia (HLY W0= 52.3, HLY M0= 52.1; HLY W65=2.9, HLY M65= 3.5) and the highest - in the Czech Republic (HLY W0= 63.6, HLY M0= 62.2; HLY W65= 8.7, HLY M65= 8.4).

The retirement age is comparable in all the countries of the Visegrád Group. Nevertheless, taking into consideration the implemented reforms, the retirement age that underwent the greatest increase concerns Polish women (from the age of 60 to 67).

Taking into account the correlation of the retirement age and healthy life years estimated at the time of birth, it needs to be emphasised that the health condition of Slovakian and Hungarian citizens will worsen before they reach the retirement age (in Slovakia it will be approximately 9.8 years and in Hungary - 3.5). The longest period of time in good health while retired (HLY at the age of 65) belongs to the citizens of the Czech Republic (13.7 years for women and 11.4 for men), and the shortest - to the Slovaks (5.9 years for W and 6.5 years for M).

What is more, the mean period of drawing pension will last for 17.2 years in the countries of the Visegrád Group. Nonetheless, when considering not only the quantity of the retirement period, but also its quality, it occurs that for a half of this period, both women and men will remain in an incomplete well-being (approximately 55% for W and 50% for M). At the same time, the differences between individual countries are relatively significant and fluctuate from 39% in the case of the Czech citizens to 72% for Slovakian women. This means that the border of complete well-being (based on HLY indicator) for people aged 65, is above the retirement age, but differs considerably between individual countries. As has been already mentioned, currently, the shorter period in good health when retired belongs to the citizens of Slovakia, and the longest one - to the Czech Republic. However, as a result of the implemented reforms concerning increasing the retirement age, the Poles and Hungarians will be in the least favourable situation whereas, again, the Czech men and women will retain the most favourable conditions.

## **Discussion**

The rules based on which the retirement age has been established so far included two indicators: life expectancy and job seniority. In the Czech Republic and Slovakia, in establishing the retirement age for women additionally, the number of children has been taken into consideration. However, it appears to be necessary to include the factor of health condition of workers in near-retirement age and estimating their productivity as well as costs of pausing their activity on the labour market or withdrawing from it.

It occurs that the increase of the life span is not necessarily accompanied by complete well-being. What is more, in the countries whose citizens present the longest life span, a relatively longer period is characterised by incomplete well-being (e.g. in Finland, the retired spend only 9 years in good health whereas in Sweden - 15 years). In the view of the presented data, it needs to be emphasised that the retired Slovaks spend only 3 years in good health, which is the lowest value in the entire European Union and it considerably differs from the average of the Visegrád countries (Eurostat, 2010).

It is also surprising that, despite their shorter life span, retired men remain in good health longer (such a tendency is not present solely in Poland).

Such differences in the values unambiguously prove that there is health inequality not only in the Visegrád Group, but also in the entire European Union. They may be caused e.g. by the diversity in the access to

health care or the level of the citizen's wealth, which translates into the deterioration of the citizens' health and consequently, into the limitation of their productivity (J.M. Romeder at all, 1977).

## **Conclusions**

In the period of intense reforms connected with retirement age, the importance of the complete health of workers, which determines their productivity, needs to be emphasised. According to the classical principles of public social security systems, they should financially support the basic needs of persons at the time of infirmity dictated by the old age i.e. at the time when such a person ceases to be able to maintain him- or herself.

In such a context, particular attention should be paid to the healthy life years indicator (HLY) which determines the possible upper limit of the productive age (i.e. possible retirement age) and the commencement of more intensified usage of the social security system.

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## **Quality of life in patients with a chronic disease within the framework of the chronic care model: the LORIDIS project**

### **Kvalita života pacientov s chronickou chorobou v kontexte komplexného modelu starostlivosti o chronicky chorých: projekt LORIDIS**

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#### **Abstract**

**Background:** One of the greatest challenges that health systems face globally is the increasing burden of chronic diseases. Despite the clinical differences across these chronic conditions, each illness confronts patients and their relatives with the same spectrum of needs: to alter their behaviour; to deal with the social and emotional impacts of symptoms, disabilities, to take medicines; and to interact with medical care over time. In order to provide better support for patients, health professionals, policy makers and institutions are increasingly recognizing the need to respond to those with complex health needs and are initiating new models of service delivery designed to achieve better coordination of services across the continuum of care. The aim of the LORIDIS project is to gain deeper insight into causal mechanisms operant within the process of chronic disease management.

**Methods:** Cross sectional and longitudinal data from over 7000 patient records across 8 chronic diseases are collated. Degree of functional decline, patient-level processes, intra-individual and extra-individual resources and the health outcomes are evaluated. For the analyses advanced statistical procedures are applied; namely exploratory and confirmatory factor analysis, multilevel analysis and structural equation modeling.

**Results:** Specific types of intra-individual and extra-individual resources have been identified. Special attention was paid to the factors that are closely related to patient's self-management such as noncompliance, socio-economic inequalities, ethnicity, ageing, social participation and coping.

**Conclusions:** Healthcare still builds largely on acute, episodic models of care that is ill equipped to meet the long-term and fluctuating needs of those with chronic illness. Chronic illness requires complex models of care, involving collaboration among professions and institutions that have traditionally been separate. The outcomes of the LORIDIS project provide empirical evidence that can facilitate decision making concerning improved models of healthcare delivery in the chronically ill.

#### **Abstrakt**

**Úvod:** Chronické choroby predstavujú jednu z najväčších výziev pre súčasné zdravotnícke systémy. Napriek klinickým rozdielom každá chronická choroba kladie na pacienta a jeho blízkych množstvo podobných úloh: zmena správania, vyrovnanie sa so sociálnymi a emocionálnymi dôsledkami symptómov, disabilita, liečba a jej vedľajšie účinky, interakcia so zdravotníckym personálom. Tvorcovia politik a zdravotnícki pracovníci preto, v snahe poskytnúť čo najlepšiu pomoc pacientom, hľadajú nové modely zdravotnej starostlivosti, ktoré by boli adekvátnejšie pre ľudí s komplexnými zdravotnými potrebami, a ktoré by viedli k lepšej koordinácii zdravotníckych služieb. Cieľom projektu LORIDIS je hlbšie pochopenie kauzálnych mechanizmov fungujúcich v procese manažovania chronických chorôb.

**Metódy:** Databázu tvorili prierezové a longitudinálne dáta z vyše 7000 individuálnych patientskych záznamov, pokrývajúcich 8 chronických chorôb. Hodnotená bola úroveň funkčného stavu, intra-individuálne zdroje, extra-individuálne zdroje a zdravotné výsledky. Pre analýzu dát boli použité postupy pokročilej štatistiky, exploratórna a konfirmatórna faktorová analýza, multilevel analýza a modelovanie štrukturálnych rovníc.

**Výsledky:** Identifikované boli špecifické typy intraindividuálnych a extraindividuálnych zdrojov. Zvláštna pozornosť bola venovaná faktorom úzko prepojeným na self-manážment pacientov ako sú nespolupracujúce správanie, socioekonomické nerovnosti, etnicita, starnutie, sociálna participácia a coping.

**Záver:** Súčasné zdravotnícke systémy sú postavené na akútnom, epizodickom modeli starostlivosti, ktorý nie je adekvátny pre naplnenie komplexných potrieb osôb s chronickým ochorením. Chronická choroba si vyžaduje komplexné modely starostlivosti, zahŕňajúce spoluprácu medzi odborníkmi a inštitúciami, ktoré boli tradične oddelené. Výstupy z projektu LORIDIS poskytujú empirické dôkazy, ktoré môžu uľahčiť rozhodovanie o vylepšených modelov poskytovania zdravotnej starostlivosti o chronicky chorých.

**Keywords:** chronic disease, chronic condition management, healthcare model, quality of life

## **1. Introduction**

### *1.1 Burden of chronic disease*

One of the greatest challenges that health systems face globally in the twenty-first century is the increasing burden of chronic diseases (WHO 2002). Advances in healthcare that keep people alive while controlling, although not curing, their conditions have led to growing numbers of people surviving with chronic disease. Some years ago chronic diseases were considered to be a problem of the rich and elderly population. Yet while ageing of populations is a significant driver of increases in chronic disease, it is important to emphasize that the perception that chronic illness is an 'old people's' fate no longer applies. Many chronic diseases and conditions are linked also to lifestyle choices such as smoking, sexual behaviour, diet and exercise, as well as to genetic predispositions, resulting in increasing numbers of young and middle-aged people developing some form of chronic health problem. The consequences are not trivial. In 2006, 20%-40% of the population in the European Union aged 15 years and over reported a longstanding health problem and one in four currently receives medical long-term treatment (TNS Opinion & Social 2007). In addition, it is estimated that in 2002 60% of all disability-adjusted life years (DALYs) attributable to chronic disease were lost before the age of 60 (Nolte and McKee 2008, WHO 2004). The economic implications of chronic illness are also serious. Chronic diseases depress wages, earnings, workforce participation and labour productivity, as well as increasing early retirement, high job turnover and disability. Given this background, policy-makers across Europe are increasingly searching for interventions and strategies to tackle chronic disease that better respond to those with complex health need and are initiating new models of service delivery (Busse et al. 2010, Suhrcke et al. 2008, Ouwens et al. 2005).

### *1.2 Chronic Care Model (CCM)*

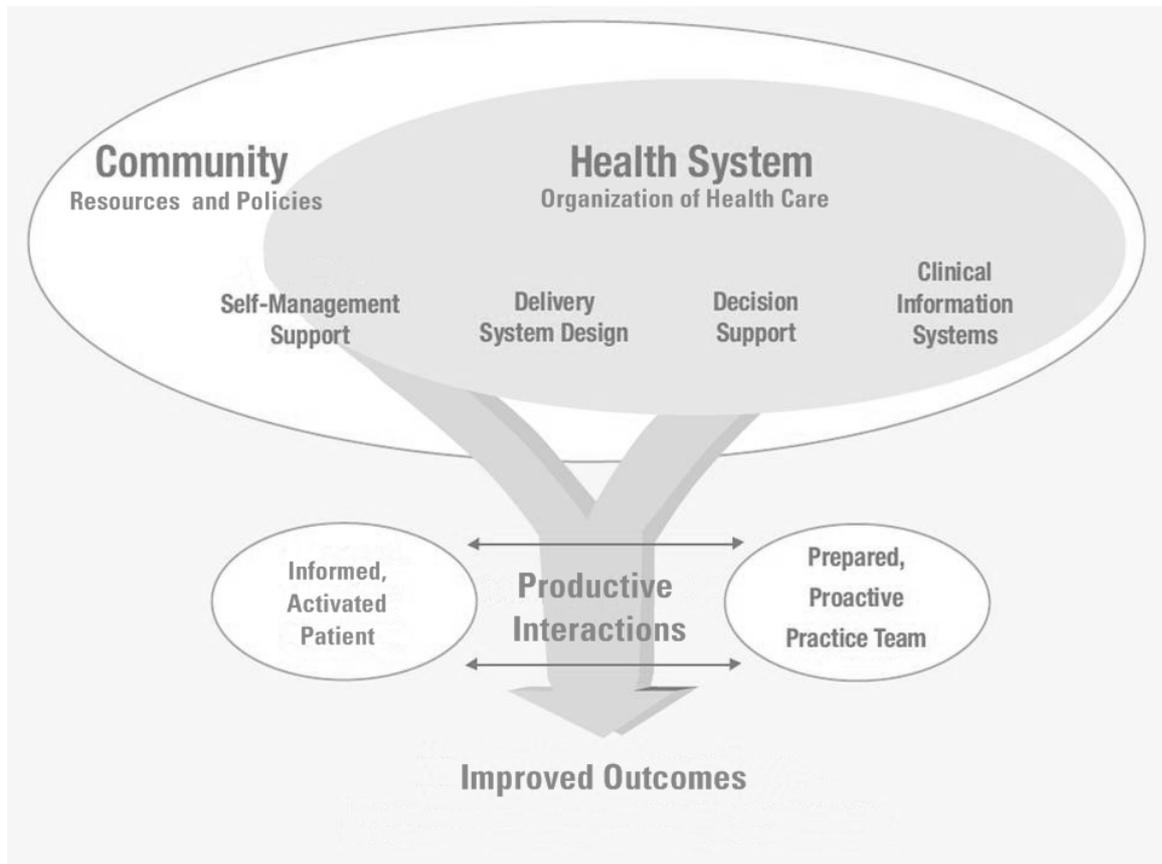
The common theme in chronic condition is that they confronts patients with a spectrum of needs that requires them to alter their behaviour and engage in activities that promote physical and psychological well-being, to interact with healthcare providers and adhere to treatment regimens, to monitor their health status and make associated care decisions, and to manage the impact of the illness on physical, psychological and social functioning (Clark 2003). It is clear that these goals are unlikely to be accomplished by means of the traditional approach to healthcare that is largely built around an acute, episodic model of care and is ill-equipped to meet the requirements of those with chronic health problems.

What is needed however is a complex response over an extended time period that involves coordinated inputs from a wide range of health professionals and access to essential medicines and monitoring systems, all of which need to be optimally embedded within a system that promotes patient empowerment. A model of care that takes a patient-centred approach by working in partnership with the patient and other healthcare personnel to optimize health outcomes (Nolte and McKee 2008).

In 1999 Wagner and colleagues presented perhaps the most influential framework for chronic disease care, *the Chronic Care Model (CCM, Figure 1)*. This model comprises four interacting system components considered key to providing good care for chronic illness: self-management support, delivery system design, decision support and clinical information systems. These are set in a health system context that links an appropriately organized delivery system with complementary community resources and policies (Wagner et al. 2005).

Patient's *self-management*, one of the key elements of CCM, has been the result of increasing recognition that reduced risk and improved outcomes cannot depend solely on the actions of health professionals but are also contingent on the individual's own actions. Self-management activities are usually undertaken by the patient between planned contacts with healthcare practitioners and services. These activities involve managing symptoms, treating the condition, coping with the physical and psychosocial consequences inherent in living with a chronic condition and making lifestyle changes (Glasgow et al. 2003). The aim of self-management is to minimize the impact of chronic disease on physical health status and functioning, and to enable people to cope with the psychological effects of the illness (Lorig and Holman 1993).

Figure 1. Chronic Care Model (Wagner et al. 2005)



### 1.3 Quality of life

This relative shift from ‘cure’ to ‘care’ has also been reflected in changing paradigm of measuring the outcomes of healthcare. What matters nowadays is how the patient feels; rather than how healthcare professionals think they feel. So in addition to the so-called ‘objective’ measures of health such as morbidity, mortality, symptoms response or survival rates, quality of life issues have emerged as important parameters when evaluating the outcome of healthcare. This is especially important for patients with a chronic incapacitating condition, for whom quality of life is a critical outcome measure, since complete cure of disease is often unlikely. As Sullivan (1992) pointed out, with an incurable condition the realistic goal of care is to provide a life that is as comfortable, functional and satisfying as possible. Consequently, for these people the therapy is/should be evaluated in terms of whether it is more or less likely to lead to an outcome of a life worth living (Bowling 2005, Bowling 2001).

Health-related quality of life (HRQoL) is increasingly used as an outcome measure in clinical trials, effectiveness research, and research on quality of care. Factors that have facilitated this increased usage include the accumulating evidence that measures of HRQL are valid and reliable, the publication of several large clinical trials showing that these outcome measures are responsive to important clinical changes, and the successful development and testing of shorter instruments that are easier to understand and administer. Because these measures describe or characterize what the patient has experienced as the result of medical care, they are useful and important supplements to traditional physiological or biological measures of health status (Wilson and Clarke 1995, Bowling 2005).

### 1.4 Purpose of the study

The main aim of the LORIDIS project is to gain knowledge in the field chronic disease management by disentangling routes of causal influence between the physical, mental and social aspects of chronic disease.

## 2. Methods

### 2.1 Theoretical framework

The conceptual framework of the LORIDIS project follows the Verbrugge and Jette’s model (Figure 2) of the ‘Disablement Process’ (1994), which describes the ‘dynamics of disablement’, i.e. the main pathway that links pathology, impairment, functional limitations, disability and quality of life. In more detail, this model (1) describes how chronic and acute conditions affect functioning in specific body systems, generic physical and mental actions, and activities of daily life, and (2) describes the personal and environmental factors that speed or slow disablement, namely, risk factors, interventions, and exacerbations. The model also takes into account the ‘*feedback loops*’ in this process, i.e. dysfunction spirals and secondary conditions, that is new pathologies triggered by a given disablement process (Verbrugge and Jette 1994).

### 2.2 Sample and procedure

The project has collected both cross-sectional and longitudinal data related to specific chronic diseases as well as data on healthy controls. Baseline cross-sectional data on eight chronic diseases and longitudinal data on four diseases have been collected to create a comprehensive dataset consisting of over 7000 individual records (Table 1). All data were collected by questionnaire, health records and information from medical doctors. Consecutive participants were recruited on a voluntary basis from hospital clinics in Kosice and were mainly from the eastern part of Slovakia. Each dataset had a specific set of inclusion and exclusion criteria.

Figure 2. Model of ‘The Disablement Process’ (amended from: Verbrugge and Jette, 1994)

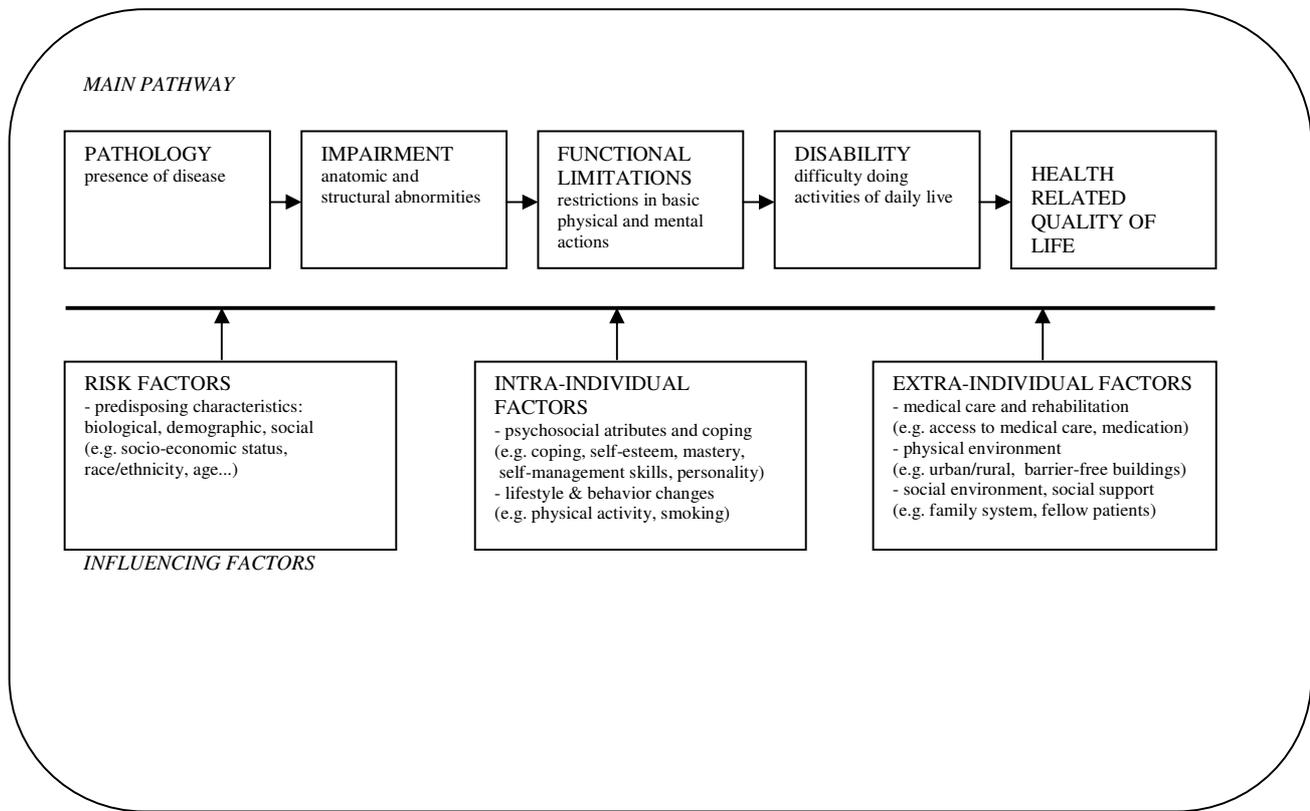


Table 1. Overview of cross-sectional and longitudinal data: the LORIDIS project

	<b>Sample / Diagnosis</b>	<b>Cross-sectional data I</b>	<b>Cross-sectional data II</b>	<b>Longitudinal data</b>
1	Rheumatoid arthritis	274	0	269
2	Kidney transplantation	360	0	652 <sup>1</sup>
3	Dialyzed patients	395	0	150
4	Parkinson's disease	190	35 <sup>2</sup>	0
5	Sclerosis multiplex	223	214	0
6	Coronary artery disease	563	408	522 <sup>3</sup>
7	Urban population - healthy adults	0	1296	0
8	Urban population - healthy adolescents	0	1111	0
9	Cystic fibrosis	47	0	0
10	End stage renal disease – children	0	41	0
	<b>Total</b>	<b>2052</b>	<b>3424</b>	<b>1593</b>

*Cross-sectional data I: collected within APVV-20-038305 project (2006-2009) and other projects*

*Cross-sectional data II: collected within APVV-0220-10 project (2011-2014) and EURO-URHIS 2*

*Longitudinal data: collected within APVV-0220-10 project (2011-2014)*

<sup>1</sup>summary figure for data collected at 3, 12, 24, 36, 48, 60, and 60+ month after kidney transplantation

<sup>2</sup>summary figures for complete dataset (n=178) and data for MDS-UPDRS validation (n=176)

<sup>3</sup>summary figure for data collected at 3-6 and 12-24 month after coronary angiography (CAG)

### 2.3 Measures

Measuring instruments used within this project cover all aspects of a delineated theoretical model. Next to clinical data derived from medical files data from following domains were collected: *General Quality of Life (QoL)*, *Health and Well-being Measures* (e.g. SF36, WHOQoL, Cantrill's ladder), *Functional Status*, *Pain*, *Fatigue Measures* (e.g. Karnofsky Performance Status Scale, Groningen Activity Restriction Scale, McGill Pain Questionnaire). *Personal Resources* (e.g. Rosenberg Self-esteem Scale, Type-D Personality, Coping Self-Efficacy, Vitality). *Social Resources*, *Social Participation* (e.g. Social participation scale, Social Network Delineation Questionnaire). A detailed listing of all scales to be used within this project including information on psychometric properties can be found in a monograph published by LORIDIS team in 2009 (Nagyova et al. 2009).

### 2.4 Statistical analyses

With regard to statistical analyses, in addition to standard statistical tests such as coefficients of correlations, t-tests, analysis of variance or regression analyses we employ more advanced statistics, in particular exploratory and confirmatory factor analysis, MTMM (multi-trait multi-method matrix), structural equation modeling and multilevel analysis.

## 3. LORIDIS study outcomes

Below some of the most recent results of the LORIDIS project are highlighted.

### 3.1 Standardisation of measuring instruments

A study by Skorvanek et al. *Validation of the Slovak version of the Movement Disorder Society – Unified Parkinson's Disease Rating Scale (MDS-UPDRS)* (Česká a Slovenská Neurologie a Neurochirurgie 2013, 76: 463-468) deals with validation of the Slovak version of the functional status measure in patients with a Parkinson's disease. The outcomes of the exploratory and confirmatory factor analyses provided support for the hypothesis that Slovak version of the MDS-UPDRS has adequate psychometric properties and is relevant for use in Slovak Parkinson's disease patients.

### 3.2 Clinical risk factors and predisposing risk factors

The aim of the study by Sudzinova et al. was to examine whether there are any differences in medical risk factors and the severity of coronary heart disease (CHD) in Roma compared with non-Roma CHD patients. Compared with non-Roma, Roma patients had significantly more risk factors and more severe types of CHD. They were treated less frequently with statins and beta-blockers, were more frequently left on pharmacotherapy and surgically revascularised. These differences remained after controlling for education, gender and age. Roma CHD patients have a worse risk profile at entry of care and seem to be undertreated compared with non-Roma CHD patients (*Sudzinova et al. Roma coronary heart disease patients have more medical risk factors. and greater severity of coronary heart disease than non-Roma, Int J Public Health 2013, 58, 3:409-15*).

A study by Skorvanek M et al. *Clinical determinants of primary and secondary fatigue in patients with Parkinson's disease* (*J Neurol 2013; 260:1554-61*) explored the differences between determinants of fatigue associated with mood disorder or excessive daytime somnolence (secondary fatigue) and in fatigue not associated with these symptoms (primary fatigue) in Parkinson's disease (PD). Determinants of primary and secondary fatigue differed significantly. While secondary fatigue was significantly associated with higher age, male gender, worse motor disability and anxiety, primary fatigue was not significantly associated with any of these symptoms. These results support the concept of primary and secondary fatigue in PD.

### 3.3 Extra-individual and intra-individual resources

The aim of the study by Mikula et al. was to examine the association between social participation and the physical and mental components of quality of life (PCS, MCS) in patients with Multiple Sclerosis. Disability (EDSS) and participation were significantly associated with PCS (EDSS  $\beta = -0.44$ ,  $p < 0.05$ ; participation  $\beta = -0.30$ ,  $p < 0.05$ ) but not with MCS. Only disease duration ( $\beta = -0.33$ ,  $p < 0.05$ ) was significantly associated with MCS. Social participation is associated with PCS, which highlights the importance of MS societies and a social network for the quality of life of patients with MS (Mikula et al. *Social participation and health related quality of life in patients with multiple sclerosis. Psychology & Health* 2013, 28, Suppl. 1:269-270).

A study by Prihodova et al. explored perceived health status in patients with chronic kidney failure and continued in comprehensive longitudinal approach combining multiple factors in evaluating post-transplant factors and their impact on future perceived health and patient outcomes. Low health-related quality of life and poor adherence shortly after transplantation significantly increase the risk of mortality and graft loss at up to 11 years' follow-up (Prihodova et al. *Health-related quality of life 3 months after kidney transplantation as a predictor of survival over 10 years: a longitudinal study, Transplantation, in print*).

A study by Mikula et al. *Coping and its importance for quality of life in patients with multiple sclerosis* (Disability and Rehabilitation, article in press) have shown that coping is significantly associated with mental quality of life, but not with physical quality of life. Stopping unpleasant emotions and thoughts seems to be the most important type of coping in multiple sclerosis patients. Thus, patients, their caregivers and their physicians should be educated about this type of coping and its positive association with mental quality of life.

For more LORIDIS study outcomes please visit: [http://www.mc3.sk/?publication\\_categories=publications](http://www.mc3.sk/?publication_categories=publications)

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## **Adherence in patients in the first year after kidney transplantation and its impact on graft loss and mortality: a prospective study**

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### **Abstract**

Poor adherence in kidney transplant recipients remains the leading preventable cause of graft loss and mortality.

Adherence was assessed using collateral reports – a combination of self-evaluation by the patient and an estimate of the patient's adherence by his/her nephrologist. 297 patients (47.8±12.8 years, 58.9% men) provided sociodemographic and medical data and completed the ESRD Symptom Checklist. At follow-up (average 7.1 years) data on patients and graft survival was taken from medical records. Multinomial regression analysis and Cox regression were performed.

67.4% of the patients were mutually considered to be fully adherent. Poor adherence was associated with a 3.25-times higher risk of mortality in the follow-up period. Female patients with higher education, a higher number of perceived side-effects of corticosteroids, better perceived cardiac and renal function, higher perceived family social support and lower support from significant others in their first year post-KT were more likely to have fully adhered to their prescribed immunosuppressive treatment.

Non-adherence to the prescribed immunosuppressive medication in the first year after successful kidney transplant was associated with a 3.25-times higher likelihood of death in the following 12 years compared with the well-adherent patients.

Keywords: kidney transplantation, adherence, mortality, social support, side effects.

### **Abstrakt**

Porušovanie predpísanej imunosupresívnej liečby u pacientov po transplantácii obličky zostáva najčastejšou preventabilnou príčinou straty štepu a úmrtnosti.

Dodržiavanie predpísanej liečby bolo posúdené kombináciou sebahodnotenie pacienta a hodnotenia nefrológa. 297 pacientov (47,8 ± 12,8 rokov, 58,9% mužov), poskytlo sociálno-demografické a medicínske údaje a vyplnili ESRD Symptom Checklist. Následne (priemer 7,1 rokov) údaje o prežití štepu a pacienta boli prevzaté z lekárskeho záznamov. Multinomiálna regresná analýza a Coxová regresia boli vykonané.

67,4% pacientov ohodnotených ako celkom dodržiavajúcich liečbu. Zlé dodržiavanie liečby bolo spojené s 3,25 krát vyšším rizikom úmrtnosti. Ženské pohlavie, vyššie vzdelanie, vyššia úroveň pociťovaných vedľajších účinkov kortikosteroidov, vyššia vnímaná funkcia srdca a obličiek, vyššia vnímaná sociálna opora od rodiny a menšie podpora zo strany významných druhých v prvom roku po transplantácii boli spojené s úplným dodržiavaním predpísanej imunosupresívnej liečby.

Porušovanie predpísanej imunosupresívnej liečby v prvom roku po úspešnej transplantácii obličky bolo spojené s 3,25 krát vyššou pravdepodobnosťou úmrtia v nasledujúcich 12 rokoch v porovnaní s pacientami, ktorí neporušovali predpísanú liečbu.

**Kľúčové slová:** transplantácia obličiek, dodržiavanie liečby, úmrtnosť, sociálna opora, nežiaduce účinky.

## **Introduction**

Kidney transplantation (KT) is established as the best treatment modality for patients with end-stage renal disease due to its superior effect on quality of life, mortality and cost in comparison with other renal replacement therapies (Wolfe et al. 1999, Laupacis et al. 1996). However, KT requires strict adherence to a lifelong medical regimen of immunosuppressive treatment. Adherence has been shown to prevent rejection and loss of a transplanted graft, consequent impairment of physical or mental functions, unnecessary pain or early death, a higher number of hospitalizations and higher costs of treatment (Dickenmann et al. 2002, Butler et al. 2004, Laederach-Hofmann, Bunzel 2000, Brickman, Yount 1996, Denhaerynck et al. 2005). Nevertheless, rates of adherence vary from 50-90%, and poor adherence to immunosuppressive treatment is still the leading preventable cause of graft loss (Denhaerynck et al. 2009, Schafer-Keller et al. 2008).

Recent studies have stressed the consequences of subclinical non-adherence and have indicated that even a minor deviation from the prescribed medication is sufficient to lead to worse clinical outcomes (Takemoto et al. 2007, Nevins, Thomas 2009, De Geest et al. 1998, De Geest et al. 1995). According to Laupacis et al. patients at 3 months post-KT report new symptoms related to the side-effects of immunosuppressive treatment (Laupacis et al. 1996). In the study of Nevins and Matas nonadherence appeared early and affected half of all patients during the first 6 months after KT; it was also associated with increased acute rejection rates and eventual graft loss (Nevins, Matas 2004).

The aim of this study was to explore the predictive value of adherence in the first year after KT as a determinant of both graft loss and mortality over 12 years. Furthermore, we focused on the association of sociodemographic factors, medical factors (kidney function, side-effects) and social support with different levels of adherence, assessed by the method most commonly used in the clinical environment: patient-rated and physician-rated adherence in the first year after KT.

## **Material and methods**

### *Sample*

All consecutive patients from the Louis Pasteur University Hospital Transplantation centre in Kosice, Slovakia, who met the inclusion criteria (have a functioning graft, be a minimum of three months and a maximum of one year after transplantation, have no psychiatric disease, including severe dementia and mental retardation, listed in their medical records and have signed an informed consent form) were asked to participate. Out of the total number, 325 met the inclusion criteria and were asked to participate. Of these, 8% (26) refused to participate, and of the remaining 299 a further 0.6% (2) provided incomplete data; thus, the final number of participants was 297 (91.4%). The Mann-Whitney U-test and Chi-square analyses did not indicate significant differences between respondents and non-respondents regarding age and gender. Data collection was performed from the year 2002 to the year 2013. The local Ethics Committee approved the study.

### *Sociodemographic data*

Age, gender, education, average income and marital status were obtained in a structured interview. Educational background was categorised as: primary, secondary and university education. Average

income was categorised based on the minimum wage in Slovak Republic as follows: low (lower than 1.5 times the minimum wage); average (1.5 times to 2 times the minimum wage) and high (higher than 2 times the minimum wage). Marital status was represented living alone (single, divorced, widowed) and cohabitating (married/living in a cohabitating relationship). Only gender, education and marital status were used in the analysis.

#### *Medical data*

Information about kidney function, time since transplantation (in months) and number of acute rejection episodes was taken from patient medical records. The estimated glomerular filtration rate (eGFR) was calculated using the CKD-EPI formula (in milliliters per minutes) (Levey, Stevens 2010, Levey et al. 2009).

#### *All-cause graft loss and mortality*

At follow-up, information about each patient's status was taken from medical records and categorised as either with functioning graft, graft loss or deceased.

#### *Adherence*

Evaluation of adherence was based on collateral reports – a combination of the self-evaluation by the patient and an estimate by his/her nephrologist based on their check-ups and clinical results (Laederach-Hofmann, Bunzel 2000, Schafer-Keller et al. 2008, Rosenberger et al. 2005, Greenstein, Siegal 1998). Both patients and nephrologists were asked to rate the adherence of the on a scale from 1 to 5 over the past month, as follows 1 (patient did not break the prescribed regimen over the past month), 2 (once over the past month), 3 (2-3 times over the past month), 4 (once per week over the past month) and 5 represented very poor adherence (more than 2 times a week). The reports were then combined.

#### *Side effects of treatment*

Side-effects of immunosuppressive treatment were assessed using the End-Stage Renal Disease Symptom Checklist – Transplantation Module (ESRD SCL-TM) (Franke et al. 1999), which consists of 6 subscales: limited physical capacity, limited cognitive capacity, cardiac and renal dysfunction, side effects of corticosteroids, increased growth of gums and hair, and transplantation-associated psychological distress. Cronbach's  $\alpha$  varied from 0.83 to 0.89.

#### *Perceived social support*

Patients completed the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al. 1988), assessing perceived availability and satisfaction with support received from either family, friends or a "significant other." The Cronbach's  $\alpha$  ranged from 0.90 to 0.93.

#### *Data analysis*

Frequencies, means and standard deviations were calculated for the sample description. The Mann-Whitney U-test, Kruskal-Wallis Test and Chi-square test were used to test the differences in age and gender between respondents and non-respondents as well as between the adherence groups in patients. Two Cox regression analyses consisting of gender, age, education and adherence were performed to determine the association between adherence as an independent variable in the first year post-KT and graft loss and mortality at follow-up. Finally, multinomial regression analysis was performed to identify the determinants of excellent and good adherence. Adherence was set as the dependent variable, with the poor adherence group set as a reference. Gender, education and family status were set as factor variables, and age, number of acute rejection episodes, eGFR, ESRD-SCL-TM subscales and the MSPSS subscales were set as covariants in the main-effect model. IBM SPSS 20 for Windows was used to analyse the data (IBM company, Chicago, Illinois, USA).

**Results**

Our sample was split into 3 adherence groups: Group 1: “Excellent adherence” (67.4% of the sample) consisting of patients where both patients and nephrologists reported not missing any doses over the past month; Group 2: “Good adherence” (26.3% of the sample) one or both reported 2; and Group 3: “Poor adherence” (6.3% of the sample): one or both scored 3 or over. (Figure 1)

Figure 1. Adherence groups according to patients’ own and a nephrologist’s evaluation

		Patient’s evaluation			
		1 (no deviation from prescribed regimen over the past month)	2 (forgot or delayed one dose over the past month)	3 (forgot or delayed 2 or more times over the past month)	
		243 81.9%	50 16.8%	4 1.3%	
Nephrologist’s evaluation Please rate patients’ adherence to their immunosuppressive treatment over the last month	1 (estimates patients did not deviate from prescribed regimen over the past month)	233 78.5%	200 67.4%	29 9.8%	1 1.3%
	2 (estimates patients forgot or delayed one dose over the past month)	49 16.5%	37 12.5%	12 4%	0
	3 (estimates patients forgot or delayed 2 or more doses over the past month)	15 5%	6 2%	9 2%	0

Significant differences were found when comparing the Excellent adherence and Good adherence groups in the self-reported adverse effects in three scales of ESRD-SCL-TM: Limited Cognitive capacity ( $p \leq 0.01$ ), Increased Gum and Hair Growth ( $p \leq 0.01$ ) and Transplantation related Psychological Distress ( $p \leq 0.05$ ) and all subscales of Perceived Social Support Scales ( $p \leq 0.01$ ) (Table 1.)

Table 1. Characteristics of the sample

	Excellent adherence N=200 N(%) or AM±SD	Good adherence N=78 N(%) or AM±SD	Poor adherence N=19 N(%) or AM±SD
<b>Sociodemographic variables</b>			
<b>Gender</b>			
Men	113 (56.5)	55 (70.5)	15 (78.9)
Women	87 (43.5)	23 (29.5)	4 (21.1)
Age	46.71±12.81	50.64 ±11.97	52.22 ±14.36
<b>Education</b>			
Primary	19 (9.5)	16 (20.5)	6 (31.6)
Secondary	94 (47)	37 (47.4)	8 (42.1)
Post-secondary	87 (43.5)	25 (32.1)	5 (26.3)
<b>Income</b>			
Low (≤1.5 times the min. wage)	107 (53.5)	58 (74.4)	12 (63.2)
Average (1.5-2 times the min. wage)	40 (20)	2 (2.6)	2 (10.5)
High (≥2 times the min. wage)	53 (26.5)	18 (23)	5 (26.3)
<b>Family status</b>			
Living alone (Single / Divorced/ Widowed)	67 (33.5)	33 (42.3)	8 (42.1)
Cohabiting (Married/ In a cohabiting relationship)	133 (66.5)	45 (57.7)	11 (57.9)
<b>Medical variables</b>			
Time from KT (months)	7.69±3.49	7.69±3.39	8.13±4.35
Kidney function (eGFR - Levey, ml/min)	55.7±18.57	56.86±20.43	49.23±16.88
Number of acute rejection episodes	0.44±0.57	0.67±0.63	0.33±0.65
<b>Type of acute rejection episodes</b>			
None	131 (65.5)	35 (44.9)	15 (79)
Cellular	17 (8.5)	9 (11.5)	-
Humoral	7 (3.5)	12 (15.4)	-
Combined	4 (2)	2 (2.6)	-
Biopsy not performed	41 (20.5)	20 (25.6)	4 (21)
<b>Organ donor</b>			
Deceased	183 (91.5)	75 (96.2)	19 (100)
Living	17 (8.5)	3 (3.8)	-
<b>Dialysis before KT</b>			
Hemodialysis	145 (72.5)	64 (82.1)	17 (89.5)
Peritoneal dialysis	33 (16.5)	2 (2.6)	2 (10.5)
Both	21 (10.5)	12 (15.3)	-
Duration of dialysis (years)	3.34±2.52	3.5 ±2.83	3.12±2.33
<b>Primary kidney disease</b>			

Glomerulonephritis	80 (40)	30 (38.5)	2 (10.5)
Tubointerstitial nephritis	35 (17.5)	20 (25.6)	2 (10.5)
Polycystic kidneys	13 (6.5)	3 (3.8)	3 (15.8)
Diabetes mellitus	14 (7)	11 (14.1)	4 (21.1)
Systemic diseases	16 (8)	5 (6.4)	6 (31.6)
Other or unknown causes	42 (21)	9 (11.5)	2 (10.5)
<b>Current immunosuppressive protocol</b>			
Pred <sup>1</sup> + CsA <sup>2</sup> + Aza <sup>3</sup>	2 (1)	-	-
Pred + CsA + MMF <sup>4</sup>	134 (67)	45 (57.7)	17 (89.5)
Pred + MMF + Tac <sup>5</sup>	44 (22)	23 (29.5)	-
CsA + MMF	12 (6)	6 (7.7)	2 (10.5)
Tac + MMF	2 (1)	-	-
Sir <sup>6</sup> + MMF + Pred	3 (1.5)	-	-
Tac + Sir + MMF + Pred	3 (1.5)	2 (2.6)	-
CsA	-	2 (2.6)	-
<b>Side-effects Immunosuppressive treatment (ESRD-SCL TM)</b>			
Limited physical capacity	1.36±0.8	1.57±0.68	1.58±0.69
Limited cognitive capacity**	0.97±0.71	1.32±0.64	1.06±0.74
Side effects of corticosteroids	1.03±0.75	1.15±0.76	0.86±0.63
Cardiac and renal dysfunction	0.88±0.75	1.1±0.64	1.16±0.82
Increased growth of gums and hair**	0.59±0.59	0.96±0.92	0.63±0.78
KT-related psychological distress*	1.12±0.71	1.38±0.72	1.34±0.62
<b>Social support (MPSS)</b>			
Social Support - Family **	25.34±2.66	23.87±3.96	24.38±2.27
Social Support - Friend *	22.29±3.45	20.67±3.87	21.38±2.79
Social Support - Significant Other *	24.85±3.66	23.27±3.56	23.32±4.18
<b>Mortality</b>			
Average follow-up (years)	7.59±2.11	8.5±2.23	7.69±2.14
Patient mortality	23 (11.5)	12 (15.4)	7 (36.8)
Graft loss	9 (4.5)	2 (2.6)	2 (10.5)

<sup>1</sup>Pred – prednisone; <sup>2</sup>CsA – cyclosporin A; <sup>3</sup>Aza – azathioprin; <sup>4</sup>MMF – mycophenolate mofetil; <sup>5</sup>Tac – tacrolimus; <sup>6</sup>Sir – sirolimus; MPSS - Multidimensional Scale of Perceived Social Support, ESRD-SCL TM - End-Stage Renal Disease Symptom Checklist – Transplantation Modul, \* p≤0.05, \*\*p≤0.01,

#### *Graft loss and mortality*

The  $\chi^2$  of the Cox regression model 1 for graft loss was 10.86. Age (HR 0.94, p≤0.05) and female gender (HR 0.09, p≤0.05) contributed significantly to this model. The risk of graft loss increased by 9.4% for each year of age; on the other hand, the risk of graft loss decreased by 9% among females.

The  $\chi^2$  of the Cox regression model 1 for mortality was 6.18, with adherence as the single factor significantly contributing to this model. The risk of death was 3.25-times higher in patients in the poor adherence group as opposed to the excellent adherence group. (Figure 2, Table 2)

Figure 2. Differences in patients' mortality according to patients' adherence groups

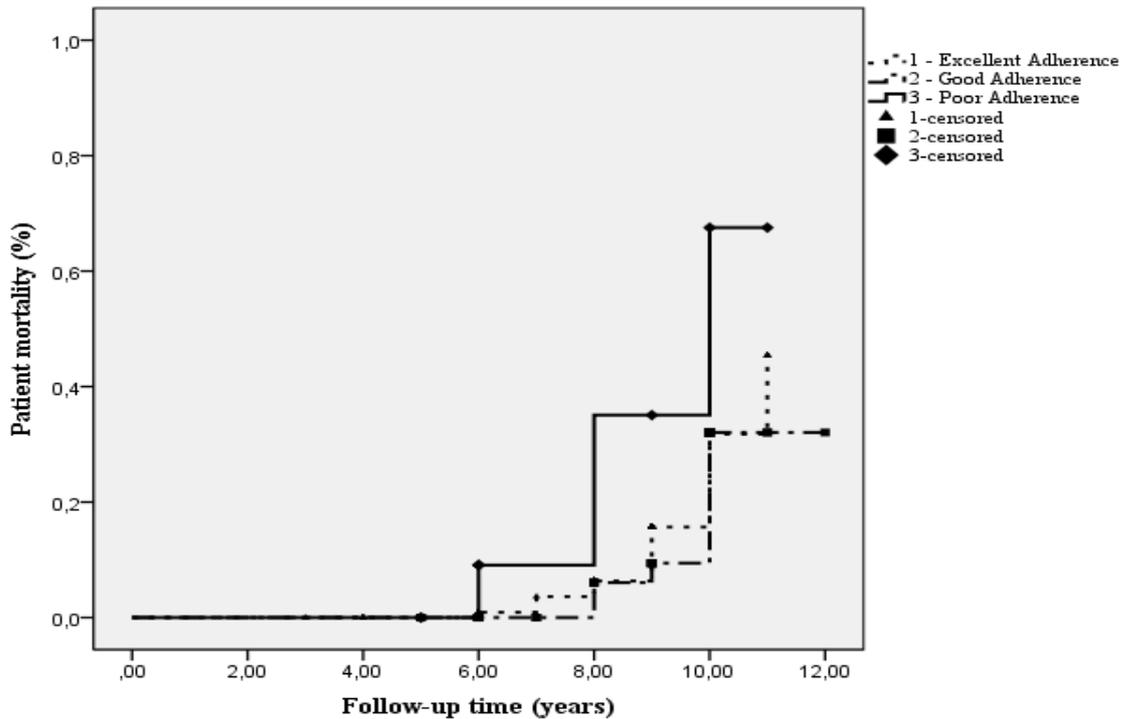


Table 2. Final models of Cox regression containing predictors of graft loss and mortality

		Score		
Model for graft loss (N=297)		2Log Likelihood		$\chi^2$
		50.76		10.86**
		Wald	HR	95%CI for HR
Age		4.21*	0.94	(0.89-1)
Gender	Female		Reference	
	Male	4.97*	0.09	(0.01-0.75)
Adherence		ns		
		Score		
Model for mortality (N=297)		2Log Likelihood		$\chi^2$
		207.8		6.18*
		Wald	HR	95%CI for HR
Age		ns		
Gender		ns		
Excellent Adherence			Reference	
Good Adherence		ns		
Poor Adherence		4.84*	3.25	(1.14-9.31)

*Factors associated with excellent and good adherence*

Female patients with higher education, a higher number of perceived side-effects of corticosteroids (ESRD-SCL-TM), better perceived cardiac and renal function (ESRD-SCL-TM) and higher perceived family social support in their first year post-KT were more likely to belong to the excellent adherence group than to the poor adherence group. Similarly, patients reporting a higher number of perceived side-effects of corticosteroids (ESRD-SCL-TM), better perceived cardiac and renal function (ESRD-SCL-TM) and higher perceived family social support in their first year post-KT were more likely to belong to the good adherence group than to the poor adherence group. The model produced by multinomial regression explained 42.7% of variance (Table 3).

Table 3. Multinomial regression analysis: factors associated with excellent and good adherence in the first year post-KT

	Factors associated with excellent adherence <sup>†</sup>			Factors associated with good adherence <sup>†</sup>		
	Wald	Exp (B)	95%CI	Wald	Exp (B)	95%CI
Intercept	ns			ns		
Age	ns			ns		
Gender <sup>1</sup>	4.37*	0.003	(0.00-0.7)	ns		
Family status	ns			ns		
Education <sup>2</sup>						
Primary	5.47*	0.007	(0.00-0.45)	ns		
Secondary	ns			ns		
Kidney function (eGFR)	ns			ns		
Number of acute rejection episodes	ns			ns		
Limited physical capacity	ns			ns		
Limited cognitive capacity	ns					
Side effects of corticosteroids (ESRD-SCL-TM)	8.04**	154.03	(4.73-5013.73)	6.52**	89.87	(2.84-2839.95)
Cardiac and renal dysfunction (ESRD-SCL-TM)	5.11*	0.02	(0.00-0.58)	4.94*	0.16	(0.00-0.62)
Increased gum and hair growth	ns			ns		
KT-related psychological distress	ns			ns		
Social support - Family (MSPSS)	7.56**	2.73	(1.33-5.59)	5.06*	2.3	(1.14-4.76)
Social support - Friends	ns			ns		
Social support - Significant Other (MSPSS)	ns			ns		

Nagelkerke pseudo R<sup>2</sup> = 42.7%

<sup>†</sup> Reference category: poor adherence group; <sup>1</sup> Reference category: Female gender; <sup>2</sup> Reference category: University; \* p≤0.05; \*\* p≤0.01; ESRD-SCL-TM: End-Stage Renal Disease Symptom Checklist; MSPSS: Multidimensional Scale of Social Support

## **Discussion**

This study explored the different levels of adherence as reported by patients and physicians in the first year after kidney transplantation and the long term clinical consequences of poor adherence in terms of graft-loss and mortality and factors associated with adherence as well.

In line with the literature, the vast majority of the patients (67.4%) rated themselves and were considered by their physicians as fully adherent to their prescribed immunosuppressive regimen, with only 26.3% admitting to skipping/or being suspected of skipping or changing one dose over the past month, and only 6.3% admitting/being suspected of skipping or changing more than 2 doses over the past month (Butler et al. 2004, Denhaerynck et al. 2005). Clinical consequences such as graft loss have been confirmed as being linked to poor adherence (Denhaerynck et al. 2009, Nevins, Matas 2004, Morrissey, Flynn & Lin 2007); however, this was not confirmed in our sample, at least not when comparing the excellent and good adherence group. Nevertheless, the percentage of patients in the poor adherence group who lost their graft was very high (10.6%) and was potentially overshadowed by the high mortality in this group (36.8%), which was confirmed to be predicted by poor adherence in the first year. Patients who admitted or were considered to have skipped/alter only as many as 2 doses per month in their first year after kidney transplantation were 3.25-times more likely to die. It is quite possible that patients who are not adhering to their immunosuppressive treatment have a tendency to skip their other medications, too, which in turn can increase their odds of dying. Unfortunately, were not able to verify this theory.

In spite of the slight differences between the groups regarding their adherence, the multinomial regression produced models with some differences between the excellent and good adherence group. Both groups reported a higher number of perceived side-effects of corticosteroids (ESRD-SCL-TM), better perceived cardiac and renal function (ESRD-SCL-TM) along with higher perceived family social support and lower support from significant other in their first year post-KT in comparison with the poor adherence group. However, only the excellent adherence group consisted of significantly more females and patients with higher education. In line with DiMatteo's findings, family social support was found to be associated with better adherence (DiMatteo 2004). Similarly, the more support patients received from their families, the more likely they were to fully adhere to their prescribed medication and vice versa – the less support from family patients perceived, the more likely they were to break their prescribed regimen.

### *Strengths and limitations*

The main strength of this study is the combination of sociodemographic, medical and psychosocial variables in a prospective follow-up for a minimum of 3 and a maximum of 12 years. The Louis Pasteur University Hospital Transplantation centre in Kosice, Slovakia, where this study was carried out, accounts for over all transplantations carried out in an area of about 1.5 million inhabitants, and for this study all consecutive patients fitting the criteria were asked to participate to prevent selection bias. We used collateral reports to assess adherence, the most cost-effective way of monitoring adherence in a clinical environment. The main limitation of this study is the limited information we have on patients who dropped out prior to the start of this study due to graft loss or mortality and hence possible poor adherence. Similarly, it is difficult to determine the adherence rates in patients who did not agree to participate in the study.

### *Conclusions*

The results show that medical staff need to target patients who admit to skipping/changing even as little as one dose every 2 weeks in their first year after transplantation due to the potential severe consequences. Special attention should be paid to the side-effects reported by patients and to their social support network.

## Acknowledgement

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## Social participation and health related quality of life in patients with multiple sclerosis

### Sociálna participácia a kvalita života spojená so zdravím u pacientov trpiacich sklerózou multiplex

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#### Abstract

**Background:** Social participation is an integral part of everyday life in society; however evidence about its association with Health Related Quality of Life (HRQoL) in MS patients is lacking. Aim of this study is to explore whether social participation is associated with physical and mental components of Health related Quality of Life (PCS, MCS) in patients with multiple sclerosis controlled for age, gender, disease severity and disease duration.

**Methods:** The sample consisted of 136 consecutive MS patients (response rate: 72.8%; 72.7% women; mean age 40.7±9.6). Patients completed the Short-Form Health Survey (SF-36) for measuring PCS and MCS and the Participation Scale, which measures the level of social participation. Disability was assessed using the Expanded Disability Status Scale (EDSS). The associations between Participation and PCS and MCS, controlled for socio-demographic and clinical variables, were analysed using linear regression.

**Results:** PCS was significantly associated with age, disease duration, EDSS and participation. MCS was significantly associated with disease duration and participation. The regression model for PCS explained 51% of the overall variance, in MCS it was 15%.

**Conclusions:** Participation is significantly associated with both PCS and MCS. We found that it is prominently associated with PCS, suggesting a possibility for intervention.

**Keywords:** Multiple sclerosis, Social participation, Health related Quality of Life

#### Abstrakt

**Úvod:** Aj keď je sociálna participácia neoddeliteľnou súčasťou každodenného života jedinca v spoločnosti, jej vplyv na kvalitu života súvisiacu so zdravím u pacientov so sklerózou multiplex (SM) bol skúmaný len málo. Cieľom tejto štúdie je preto preskúmať či je sociálna participácia asociovaná s fyzickým a mentálnym komponentom kvality života súvisiacej so zdravím (PCS, MCS) u pacientov trpiacich SM, kontrolované pre vek, pohlavie, funkčnú disabilitu a trvanie ochorenia.

**Metódy:** Výskumný súbor pozostával zo 136 pacientov so SM (návratnosť dotazníkov: 72.8%; 72.7% žien; priemerný vek 40.7±9.6). Pacienti vyplňali dotazník Short-Form Health Survey (SF-36), ktorý meral PCS a MCS a taktiež dotazník Participation Scale, ktorý meria úroveň sociálnej participácie. Funkčná disabilita bola meraná pomocou Expanded Disability Status Scale (EDSS). Asociácie medzi participáciou

a PCS a MCS, kontrolované pre socio-demografické a klinické premenné boli analyzované pomocou lineárnej regresie.

Výsledky: PCS bolo signifikantne asociované s vekom, trvaním ochorenia, EDSS a participáciou. MCS bolo signifikantne asociované s trvaním ochorenia a participáciou. Regresný model vysvetlil 51% celkovej variancie v rámci PCS, v rámci MCS to bolo 15%.

Záver: Participácia je signifikantne asociovaná aj s PCS aj s MCS. Predovšetkým silná asociácia s PCS predpokladá možnú intervenciu v tejto oblasti.

**Kľúčové slová:** Skleróza multiplex, Sociálna participácia, Kvalita života súvisiaca so zdravím

## **Introduction**

Multiple Sclerosis (MS) is the most common neurological disease in young adults with disabling consequences. MS is a continuous disease, with diffuse changes in the white and grey matter, breakdown of myelin, and damage to axons [1]. These changes manifest in a wide range of symptoms including immobility, loss of eyesight, loss of independence, problems in relationships or in sexual intimacy as symptoms having the worst impact on their health related quality of life (HRQoL) [2].

HRQoL is a multidimensional concept that includes an individual's perception of physical and mental components of HRQoL. In the case of MS, this concept is especially relevant as the physical limitations inherent to the disease like the loss of personal independence, the loss of a job, fatigue, etc. are closely tied to social functioning as well [3]. Social participation is associated with HRQoL in people with disabilities [4-6] and is affected by impairments and activity limitations in interaction with environmental and personal factors [7]. Social participation is closely linked to self-esteem, life satisfaction and mental health status which make it a very important factor for HRQoL [8,9].

Because of these associations and lack of studies in this field of research aim of this study is to explore the association of social participation with the physical and mental dimension of HRQoL in patients with MS controlled for socio-demographic variables, disease duration and disease severity.

## **Methods**

### *Participants*

Out of 136 consecutive MS patients from the Neurology department of the L. Pasteur University hospital in Košice, 37 (64.8% women and 35.2% men) refused to participate in the study (response rate 72.8%). Patients who met the McDonald criteria were eligible for the study [10]. Exclusion criteria were psychiatric diagnosis, Mini-Mental State Examination (MMSE) <24, pregnancy and the inability to speak Slovak. Data collection took place between April 2011 and December 2012. There were no statistically significant differences between responders and non-responders in terms of gender or age.

### *Procedure*

This cross-sectional study consisted of a self-reported questionnaire, a semi structured interview and a neurological examination. The invitation letter, the written informed consent form, the non-response sheet and the questionnaires were sent to participants' homes by postal mail. Patients were reminded about the questionnaire by a phone call two weeks later. During this phone call, interview and neurological examination was arranged as well. One neurologist carried out the neurological examination and a trained interviewer conducted the semi-structured interview, gaining information on age, gender, education and disease duration among other variables. Examinations took place at the Neurology outpatient clinic.

The local Ethics Committee approved the study before it started. Each patient provided a signed informed consent to participate prior to this study.

### *Measures*

All questionnaires used in this study were translated from the original language. Next, backwards translation was made to ensure that the meaning was not lost in translation. Final changes in the translated version were made accordingly.

### *Socio-demographic and clinical variables*

Socio-demographic and clinical variables were retrieved from medical records and via interview. During statistical analyses, the age of patients at the time of data collection was used. Besides age, data on disease duration (in years), EDSS (score ranges from 0.0 to 10.0 with higher score indicating more severe disability), education (elementary, high school, university) and type of MS were retrieved from medical records as well. Patients in sample suffered from relapse-remitting (R-R) type of MS, the secondary-progressive (S-P) type [11], and from the clinically isolated syndrome (CIS). CIS is defined as the first attack of neurological symptoms, as about 85% of people with this syndrome later develop definitive MS [12].

### *Social participation*

This variable was measured by the Participation scale (p-scale) which includes 18 items intended for people with stigmatised conditions [13]. Each item consists of two questions. The first question goes into some aspect of social participation in comparison to one's peers, for example: "Do you take as much part in casual recreational/social activities as do your peers?" If participants answer "Yes" or "Irrelevant/I don't want to, I don't have to" their answer is scored 0. If the answer is "Sometimes" or "No" the next question is: "How big problem is it to you?" Summary score can range from 0 to 90; a higher score indicates more restriction in social participation. Authors also created, based on score, five categories of restrictions in social participation: No restrictions, Mild restrictions, Moderate restrictions, Severe restrictions and Extreme restrictions [13]. We treated participation as a continuous variable. Cronbach's alpha for the p-scale in our sample was 0.88.

### *Health-related quality of life*

HRQOL was assessed using the 36-item Short-Form (SF-36) health survey [14]. The SF-36 includes multi-item scales to measure 8 dimensions. In addition, one question covers changes in health status over the past year (one item). All item scores are coded and transformed into a scale of 0 (poor health) to 100 (optimal health). The Physical Component Summary (PCS) and the Mental Component Summary (MCS) were calculated, also ranging from 0 to 100. A higher score indicates better health in both dimensions. In our study Cronbach's alpha was 0.92 for the PCS and 0.93 for the MCS.

### *Statistical analyses*

Firstly, descriptive analyses of the study variables were carried out. Next, multiple linear regression analysis (the enter method) was used to examine the relationships between level of social participation as independent variable, and both PCS and MCS scales as dependent variables. The associations between the variables were controlled for age, gender, education, disease duration and EDSS. Statistical analyses were performed in IBM SPSS 20.

## Results

A basic description of the study population is given in Table 1 (n=99). The MS respondents averaged 40.71 years old and consisted of 72.7 % women. The mean EDSS score was 3.24, a mean disease duration of 7.66 years. The majority of the patients (81.4%) belonged to relapse-remitting clinical type (Table 1).

Table 1. Characteristics of the study population (N=99)

Variables	N (%)	Mean	SD	Range
Age (years)	99	40.71	9.56	18-61
Gender				
male	27(27.3%)			
female	72(72.7%)			
Education				
elementary	6(6.2%)			
high school	72(74.2%)			
university	19(19.6%)			
Disease duration (years)		7.66	5.96	1-28
MS type				
CIS	4(5.7%)			
RRMS	57(81.4%)			
SPMS	9(12.9%)			
EDSS		3.24	1.27	1-6.5
Participation	99	22.31	17.37	0-60
1	40(40.4%)			
2	15(15.2%)			
3	13(13.1%)			
4	24(24.2%)			
5	7(7.1%)			
Quality of life				
PCS	99	37.96	11.22	18.56-60.0
MCS	99	42.95	12.02	18.88-67.24

CIS – Clinically Isolated Syndrome; RRMS – Relaps-Remitting Multiple Sclerosis; SPMS – Simple Progressive Multiple Sclerosis; EDSS – Expanded Disability Status Scale; 1 – No restrictions; 2 – Mild restrictions; 3 – Moderate restrictions; 4 – Severe restrictions; 5 – Extreme restrictions; PCS – Physical Component Summary; MCS – Mental Component Summary;

Missing values: EDSS: (22.2%), Education: (2%), MS type: (29.3%),

Linear regression analyses (Table 2) were used to determine associations between different levels of social participation and both PCS and MCS, controlled for age, gender, education, disease duration and EDSS. The outcomes of multiple linear regression indicate that social participation is an important factor in explaining variance in both PCS and MCS. Age, gender, education, EDSS and disease duration seem to be important only for PCS, while the association of these variables with the exception of disease duration with MCS was very limited.

Table 2. Multiple linear regression (enter method) between participation and the PCS and MCS dimensions of the SF-36 controlled for age, gender, education, EDSS and disease duration

	PCS			MCS		
	Beta	F change	Adjusted R <sup>2</sup>	Beta	F change	Adjusted R <sup>2</sup>
Model 1		5.03*	0.14		0.34	-0.02
Age	-0.40*			-0.00		
Gender	-0.06			0.08		
Elementary Education	-0.01			-0.04		
Secondary Education	-0.07			-0.10		
Model 2		7.65*	0.36		1.70	0.05
Age	-0.28*			-0.10		
Gender	-0.07			0.02		
Elementary Education	-0.02			-0.08		
Secondary education	-0.00			-0.14		
EDSS	-0.51*			0.09		
Disease duration	0.10			-0.32*		
Model 3		11.49*	0.51		2.86*	0.15
Age	-0.21*			-0.04		
Gender	0.06			0.01		
Elementary Education	0.06			-0.05		
Secondary Education	0.05			-0.09		
EDSS	-0.48*			0.12		
Disease duration	0.18*			-0.26*		
Participation	-0.40*			-0.34*		

R<sup>2</sup> – explained variance; Gender - male gender was set as reference; Education – university education was set as reference; EDSS – expanded disability status scale; \*p<.05, Discussion

Our results provided evidence that social participation is an important factor in explaining the variability of both components of health related quality of life.

When it comes to PCS, people with chronic diseases who very often suffer some kind of mobility impairment, consider their HRQoL better when they still manage to integrate into community compared with those whose social activity is low. People with an increased participation can have a higher PCS because of more participation in social life, or this participation can be result of minimal obstacles in PCS

and thus allowing to participate more [15]. Age, EDSS and disease duration explained a significant amount of variance as expected as they are closely tied to physical functioning and physical roles [16].

Our findings indicate that higher levels of participation are associated with better mental quality of life. This might be a result of participation that on its turn is associated with lower levels of apathy, depression and higher levels of cognition and self-efficacy. All those might contribute to a good mental quality of life [17].

#### *Strengths and Limitations*

The main strength of this study is the approach on social participation on the basis of peer's comparisons with Health Related Quality of Life. This, although without control group, gives us better understanding of social participation in one's specific conditions and not only comparison with general average population. Some limitations should be noted, however. Although the women-to-men ratio in MS is 2:1, in our sample the ratio was higher (72.7% women), so the results may better explain the HRQoL among women than among men. Also, patients with a lower disease severity (mean EDSS 3.24) were more likely to participate in the study, while patients with a more serious disability were more likely to refuse to participate.

#### **Implications**

According to our results, isolation and avoiding social activities are associated with lower HRQoL in patients with multiple sclerosis. Hiding from social activities may seem comfortable and easy by eliminating stress from pursuing obstacles of health problems in participation, but this study shows us that people who don't engage in social participation have worse quality of life. Thus, patients with multiple sclerosis should be educated about ways in which social activities can benefit them and should be encouraged to engage in social participation even if physical obstacles make it more difficult. It can be also beneficial for caretakers of these patients to encourage them to engage in social activities, visit family, friends or clubs for MS patients.

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#### *Declaration of Interest Statement*

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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## **The Evaluation of Quality of Life of Patients with Oncological Disease in Various Settings of Provided Care**

### **Hodnocení kvality života pacientů s onkologickým onemocněním**

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#### **Abstract**

The aim of the study was to find out the subjective evaluation of QoL of patients with an oncological disease in palliative care and to compare it in relation to the settings of provided care.

The sample was made up of 125 patients with an oncological disease. The data were collected in three different settings: an oncological clinic, a hospice and home care.

For the evaluation of QoL the EORTC QOL-C30 questionnaire was used. The average age was 67.4 years. In the overall evaluation of QoL the respondents were most satisfied with mental (62.8) and cognitive (60.0) functions. The average score of overall QoL was 42.8, thus making less than 50%. The symptomatic scale showed that patients suffered most from fatigue (63.9), pain (52.5) and loss of appetite (44.5). The patients in home care pointed out surprisingly a worse level of symptoms in comparison with the patients in a hospice and at the oncological department, apart from constipation and financial distress. Also the overall QoL was evaluated worse by the patients in home care (38.4) in comparison with the patients at the oncological department (41.3) and in a hospice (66.9). Repeated measurement revealed a decreased level of QoL in all domains ( $p < 0.05$ ).

Keywords: quality of life, oncological disease, palliative care

#### **Abstrakt**

Cílem výzkumu bylo zjistit subjektivní hodnocení kvality života pacientů s onkologickým onemocněním v paliativní péči a porovnat podle prostředí poskytované péče.

Metodika: Výzkumný soubor tvořilo 125 pacientů s onkologickým onemocněním, u nichž je vhodné vzhledem k progresi nemoci poskytování paliativní péče. Sběr dat byl proveden ve třech různých prostředích: onkologická klinika, Hospice a domácí péče. Kritériem výběru zařazení do výzkumného souboru bylo onkologické onemocnění, Karnofského skóre < 50.

Pro měření kvality života byl použit dotazník EORTC QOL-C30. Průměrný věk činil 67,4 let. Při celkovém hodnocení kvality života byli respondenti nejvíce spokojeni s psychickými (62,8) a kognitivními funkcemi (60,0). Průměrné skóre celkové kvality života činilo 42,8, tedy méně než 50 %. Při hodnocení symptomatické škály uvedli pacienti největší problém s únavou (63,9), bolestí (52,5) a ztrátou chutí k jídlu (44,5). Pacienti v domácí péči uvedli překvapivě horší úroveň symptomů ve srovnání s pacienty v hospici a na onkologickém oddělení, kromě zácpy a finanční tísně. Také celkovou kvalitu života hodnotili hůře pacienti v domácí péči (38,4) ve srovnání s pacienty na onkologickém oddělení (41,3) a v hospici (66,9). Při opakovaném měření se kvalita života pacientů snížila ve všech doménách ( $p < 0,05$ ).

Key words: quality of life, oncological disease, palliative care

## **Introduction**

Current medicine considers the quality of life a suitable indicator of physical, mental and social health and it serves for evaluating the efficiency of care, examining the impact of a disease on patient's life and for the research in the influence of socioeconomic conditions on the health of population (Dragomírečká, Bartoňová, 2006). The most frequently used term is "*health related quality of life*", i.e. the quality of life influenced by health. This term can be specified as a subjective feeling of life wellbeing which is associated with a disease or an injury, treatment and its side effects (Hnilicová, 2005).

In the oncological care, particularly in patients who have exhausted the possibilities for treatment, the evaluation of life quality is of utmost importance. After terminating the oncological care, patients are provided palliative symptomatic care. According to the latest definition of palliative care by WHO (2002), a higher emphasis is put on the prevention of suffering. According to the definition, palliative care is an approach improving life quality of patients and their families who face the problems associated with a life-endangering disease by preventing and mitigating their suffering by means of timely discovery, evaluation and addressing of pain and other physical, psycho-social and spiritual problems (Sepúlveda et al, 2002). The emphasis is not put on life duration, but on its quality.

Girgis et al. (2006) also considers the emphasis on life quality of patients at the end of their life to be the main principle of palliative care. The stimulus to study life quality is connected with the progress of treatment which can result in a longer term of survival at the presence of undesired treatment effects having a negative effect on patient's life quality.

The aim of our pilot research was to find out a subjective evaluation of life quality of patients with an oncological disease in palliative care and to compare it by environments where the care is provided. The research was financed by the grant of IGA MZ CR - NT 13417 - 4/2012 – Identification of the Needs of Patients and Family Members in Palliative Care in Relation to Life Quality.

## **Materials and Methods**

The research sample consisted of 125 patients with an oncological disease for whom the provision of palliative care is suitable with regard to the progress of the disease. Data were collected at three different settings: an oncological clinic, a hospice and home care. The criterion for being included in the research sample was an oncological disease with exhausted possibilities for oncological treatment, Karnofsky score < 50.

To measure life quality, the EORTC QOL-C30 questionnaire was used which contains 28 questions grouped in the following areas: the functional scale (14 questions), the symptomatic scale (13 questions) and 2 separate questions evaluating the global health condition of the patient and the global life quality. The life quality domain score ranges from 0 to 100. A higher number means a better evaluation of life quality; however with the symptomatic scale it means a higher/worse level of symptoms. The EORTC QOL – C30 questionnaire was evaluated according to the manual (Fayers et al, 2001).

## **Results**

### *Social-demographic characteristics of the sample*

The research sample consisted of 125 respondents, 71 men and 54 women. The average age was 67.4 years ( $s = 13.3$ ), the age ranged from 42 to 94 years. The social-demographic characteristics of the sample are given in Table 1.

Table 1. Social-demographic characteristics of the sample

	Oncological dept. n = 52 n (%)	Home care n = 37 n (%)	Hospice n = 36 n (%)	Global n = 125 n (%)
<b>Sex</b>				
Man	31 (60)	23 (62)	17 (47)	71 (57)
Woman	21 (40)	14 (38)	19 (53)	54 (43)
<b>Age</b>				
40 – 59 years	23 (44)	2 (5)	10 (28)	35 (28)
60 – 69 years	17 (33)	2 (5)	10 (28)	29 (23)
70 – 79 years	9 (17)	15 (41)	13 (36)	37 (30)
80 and more years	3 (6)	18 (49)	3 (8)	24 (19)
Average age	60,4	78,6	65,9	67,4
<b>Religion</b>				
No religion	35 (69)	21 (57)	23 (64)	79 (63)
Christianity	16 (31)	16 (43)	13 (36)	45 (37)
Others	0 (0)	0 (0)	0 (0)	0 (0)

*Evaluation of life quality*

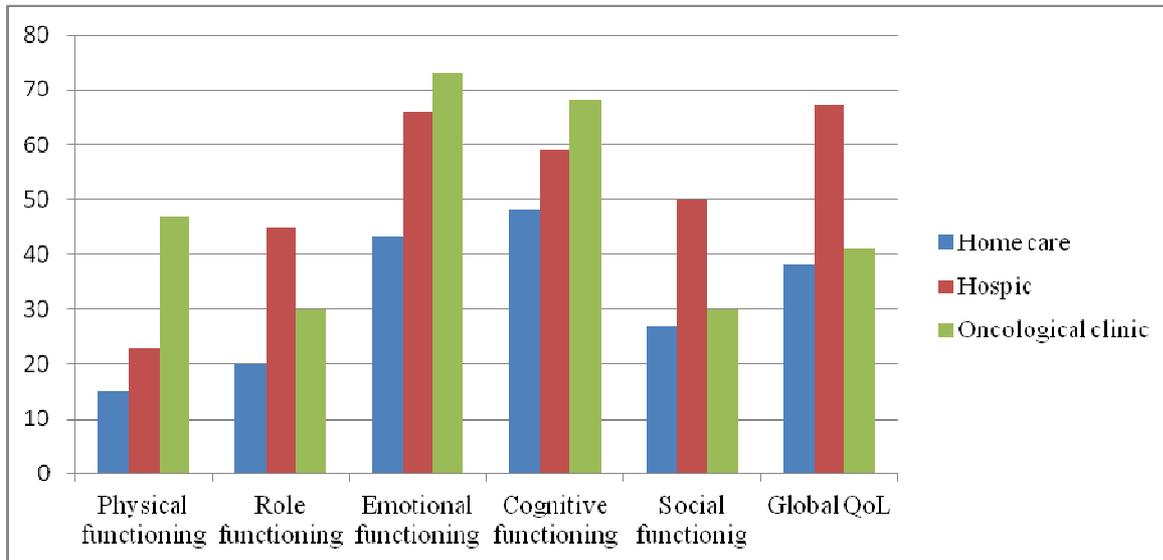
In the global evaluation of life quality the respondents were most satisfied with mental (emotional) (62.8) and cognitive functioning (60.0). The average score of global life quality was 42.8, i.e. less than 50%. In the evaluation on the symptomatic scale, patients in palliative care stated fatigue (63.9), pain (52.5) and loss of appetite (44.5) as the biggest problems. Patients in home care evaluated life quality as the worst in all domains of the **functional scale** as well as in the global evaluation of life quality. Patients in a hospice evaluated the global life quality as the best (66.9). Differences are given in Table 2 and Graph 1.

Table 2. Evaluation of the life quality functional scale by means of the EORTCQOL-30 questionnaire

Domains	Home care average* (s)	Hospice average* (s)	Oncological unit average* (s)	Global average* (s)
Physical functioning	14.8 (15.0)	23.1 (24.1)	46.5 (24.7)	29.8 (25.2)
Role functioning	19.8 (18.8)	44.6 (21.2)	29.5 (21.8)	30.9 (22.7)
Emotional functioning	43.2 (27.6)	66.2 (17.9)	73.4 (15.5)	62.8 (23.2)
Cognitive functioning	48.2 (21.2)	59.0 (17.8)	67.9 (16.1)	60.0 (20.1)
Social functioning	27.0 (20.5)	50.4 (20.9)	30.4 (22.1)	35.6 (23.1)
Global QoL	38.4 (12.8)	66.9 (13.4)	41.3 (14.5)	42.8 (23.3)

s – standard deviation, \*the range of the functional scale domain score is 0-100, a higher number means a higher life quality

Graph 1. The evaluation of the difference in life quality functional scale by the place of the provided care



The range of the functional scale domain score is 0-100, a higher number means a higher life quality

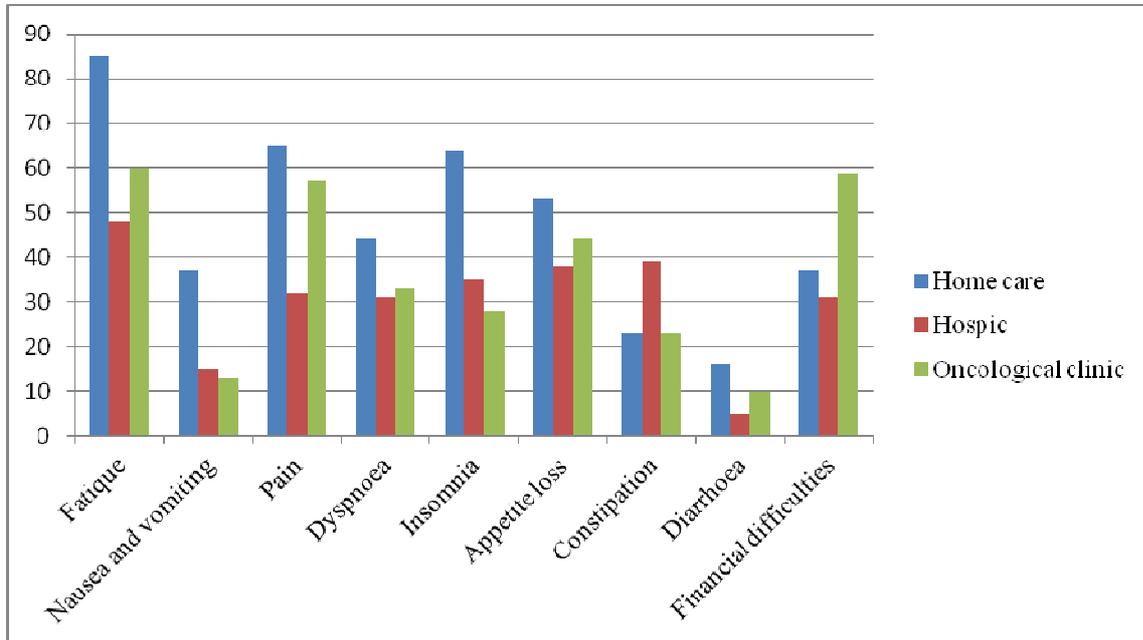
Patients in home care also stated a worse level of symptoms compared to the patients in a hospice and at an oncological department, except for constipation and financial distress. Patients at an oncological department stated a worse symptomatic level than patients in a hospice in pain and financial distress (see Table 3 and Graph 2).

Table 3. Evaluation of life quality symptomatic scale by the EORTCQOL-30 questionnaire

Domains	Home care score* (s)	Hospice score* (s)	Oncological unit score* (s)	Global score* (s)
Fatigue	84,9 (17,2)	47,5 (0,5)	59,7 (15,5)	63,9 (21,7)
Nausea and vomiting	37,4 (22,7)	15,2 (0,7)	12,5 (12,3)	20,7 (20,4)
Pain	65,3 (28,3)	32,4 (0,5)	57,4 (20,7)	52,5 (25,5)
Dyspnoea	44,1 (33,4)	30,6 (12,1)	32,7 (25,1)	35,5 (25,6)
Insomnia	63,9 (28,7)	35,1 (23,5)	28,1 (22,5)	39,7 (29,1)
Appetite loss	53,2 (27,8)	37,8 (28,5)	44,2 (25,3)	44,5 (26,9)
Constipation	23,4 (25,9)	38,8 (30,6)	23,1(24,3)	27,7 (26,9)
Diarrhoea	16,2 (26,8)	4,5 (7,9)	9,6 (23,2)	9,3 (21,7)
Financial difficulties	36,9 (28,1)	30,6 (26,5)	59,0 (32,1)	43,7 (31,4)

s – standard deviation, \*the range of symptomatic scale domain score is 0-100, a higher number means a worse symptomatic level

Graph 2. The evaluation of the difference in the life quality symptomatic scale by the place of provided care



The range of the symptomatic scale domain score is 0-100, a higher number means a worse symptomatic level

## Discussion

The goal of palliative care is to improve life quality of patients and their close relatives. Quality palliative care depends on understanding the needs of dying patients and their close relatives and on the effort to satisfy them. The research in palliative care is not paid too much attention in the Czech Republic. The Dying and Palliative Care in the Czech Republic (situation, reflexion, outlooks) research implemented by Cesta domů (Way Home), a hospice civic association, was an important and rare research (Kalvach, 2004). The Faculty of Medicine of the Ostrava University therefore implements a research in the evaluation of life quality and needs of patients in palliative care within a IGA MZ CR project.

When evaluating life quality in this research, patients in palliative care evaluated the global life quality at 43%. The global life quality was evaluated as the best by patients in a hospice (67%), as the worst by patients in home care (38%). Johnsen et al. (2009) evaluated life quality of 977 patients with advanced tumours in Denmark. The global life score was established at 66, i.e. similar to the patients in CR residing in a hospice. A high life quality of patients in a hospice (score 75) was determined in the United States by Bretscher et al. (1999). At repeated measurements approximately 8–2 weeks before patient's death, life quality did not significantly worsened.

When evaluating the life quality symptomatic scale at patients in our research, the patients in home care stated a worse level of symptoms. At the repeated measurement the respondents evaluated their life quality in all functional scale domains and in five items of the symptomatic scale (fatigue, pain, dyspnoea, loss of appetite, financial distress) as significantly worse. When comparing life quality of terminally ill patients in home care and in hospital, Peters and Sellick (2006) found out a higher life quality at patients at home care. The higher life quality was based on the possibility to maintain at least the minimum social life. As in our research, both the groups of patients stated pain, fatigue and weakness as the most serious symptoms. Our research however proved a worse quality at patients in home care. Svidén (2009) also

compared life quality of patients in home palliative care and a control group of patients without home care. They did not find any significant differences in life quality of both groups of patients.

## Conclusion

An interesting finding of this pilot research is a lower life quality at oncological patients in home care who have exhausted the possibilities for oncological treatment. Although the home environment is usually evaluated as the most suitable one, without sufficient support of a multidisciplinary team the patient can evaluate their life quality at the end of their life as worse than in a hospice (and even worse than at an oncological department in our research). With regard to the fact that the capacity of home hospice care is not able to cover the care for all patients in home care, employees of home care agencies should also be trained in palliative care. It would be suitable to strengthen therapeutic communication between patients and nursing personnel or volunteers in home care agencies with the possibility for a more active use of free time. The efficient treatment to pain at patients in home care and cooperation with general practitioners are also necessary.

For further evaluation, it is necessary to monitor life quality at oncological patients repeatedly and on a higher number of respondents. This is a task of the IGA MZ CR project in 2013 and 2014.

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## **EPOCA study: The next step in child-oriented approach in pediatric rheumatology practice**

### **Štúdia EPOCA: Ďalší krok v prístupe orientovanom na dieťa v pediatrickej reumatologickej praxi**

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#### **Abstract**

Parent/patient-reported outcomes (PROs) in juvenile idiopathic arthritis (JIA) still represent a relatively new point of view in everyday practice. Conventional measurements still remain essentially research tools and have not been routinely used in most pediatric rheumatology centers. Relatively recently developed multidimensional questionnaire for the assessment of children with JIA in standard clinical care incorporates both traditional and non-traditional PROs. Its international use is one of the primary objectives of ongoing EPOCA (Epidemiology, treatment and Outcome of Childhood Arthritis) study of the Pediatric Rheumatology International Trials Organization (PRINTO) network.

Translation and cross-cultural adaptation of the Juvenile Arthritis Multidimensional Assessment Report (JAMAR) to the language of each participating country are the main tasks of the each National coordinating center of PRINTO network in Phase I. National coordinating centers are allowed to involve also other centers of the participating countries into the Phase II - Validation. In the Slovak National coordination center in Kosice, we successfully completed translation and cross-cultural adaptation as well as data collection for validation of JAMAR in 2012.

Keywords: juvenile idiopathic arthritis, multidimensional questionnaire, patient-reported outcomes

#### **Abstrakt**

Rodičom alebo pacientom hodnotené výsledky (PROs) liečby juvenilnej idiopatickej artritídy (JIA) sú stále ešte relatívne novým prístupom v každodennej praxi. Konvenčné merania ostávajú hlavne výskumnými nástrojmi a nie sú bežne používané vo väčšine pediatrických reumatologických centier. Relatívne nedávno vyvinutý multidimenzionálny dotazník na hodnotenie pacientov s JIA v bežnej klinickej praxi zahŕňa tradičné, ale aj netradičné PROs. Jeho medzinárodné rozšírenie je jednou z hlavných úloh prebiehajúcej štúdie EPOCA (Epidemiológia, liečba a následky artritídy u detí) siete PRINTO (Medzinárodná spoločnosť pre štúdie v pediatrickej reumatológii).

Preklad a kultúrna adaptácia Multidimenzionálneho dotazníka pre juvenilnú artritídu (JAMAR) do jazyka každej zúčastnenej krajiny sú kľúčové úlohy Národného koordinačného centra, v každej krajine jedného, zo siete PRINTO vo fáze I. Do fázy II – Overovania, môžu byť Národným koordinačným centrom prizvané aj ďalšie centrá. V slovenskom Národnom koordinačnom centre v Košiciach sme v roku 2012 úspešne ukončili preklad a kultúrnu adaptáciu dotazníka, rovnako ako zbieranie údajov pre overovaciu fázu.

Kľúčové slová: juvenilná idiopatická artritída, multidimenzionálny dotazník, pacientom hodnotené výsledky

## Introduction

Rheumatic diseases in childhood by their chronic course, side effects of treatment and possible long-term consequences affect not only physical, but also mental health of patients and their families. Epidemiology, Treatment and Outcome of Childhood Arthritis (EPOCA) is a multinational study. At first sight it may seem that it deals with already well-known facts, but in reality EPOCA is a return to fundamental questions that can help to improve the health care of pediatric patients.

Classification systems of childhood arthritis have undergone complex evolution. In the North America the nomenclature created by the American College of Rheumatology (ACR) used the term Juvenile Rheumatoid Arthritis (JRA) to name arthritis with the onset before the age of 16 years which lasts for at least 6 weeks. Based on the number of the affected joints there existed three types of it: polyarticular, pauciarticular or systemic. Other types of childhood arthritis were classified as spondyloarthropathies. On the other side of the Atlantic the nomenclature created by the European League Against Rheumatism (EULAR) used the term Juvenile Chronic Arthritis (JCA) to name arthritis with the onset before the age of 16 years which lasts for at least 3 months. Also JCA recognized three types of it according to the clinical picture of the disease at its beginning, but in addition it had several subtypes (Cassidy, 1997). In 1997 (Petty et al, 1997) The International League of Associations of Rheumatology (ILAR) introduced the term juvenile idiopathic arthritis (JIA) in an effort to end the heterogeneity in nomenclature. JIA covers a heterogeneous group of arthritides of unknown cause which begins before the age of 16 and lasts for at least 6 weeks. The current JIA classification from the year 2004 (Petty et al, 2004) based on inclusion and exclusion criteria describes 7 types:

1. Systemic JIA
2. Oligoarthritis
3. Polyarticular arthritis, rheumatoid factor negative
4. Polyarticular arthritis, rheumatoid factor positive
5. Psoriatic arthritis
6. Enthesitis-related arthritis
7. Undifferentiated arthritis

Even this most recent classification has been facing criticism of some authors (Ravelli et al, 2005) who argue that antinuclear antibodies (ANA) should be one of the main criteria for the classification.

Problematic classification is one of the causes why such basic feature as the prevalence of different types of JIA is hard to verify. In different countries the presence of various forms of JIA is different, e.g. polyarticular forms prevail in India, while in Western countries it is the oligoarthritis which prevails (Aggarwal, Misra, 1994). Worldwide prevalence of JIA is estimated to be approximately 1:1000 children (Ravelli, Martini, 2007).

Although physiotherapy and ergo therapy play a crucial role in preventing complications of JIA, this treatment is only additional and without pharmacological suppression of inflammation would be pointless. Despite the large number of therapeutic options available for the management of JIA, ranging from the first-line non-steroidal anti-inflammatory drugs (NSAIDs) or corticosteroids through the second-line disease-modifying anti-rheumatic drugs (DMARDs) to the third-line biological agents, for a long time JIA belonged to so-called therapeutic orphans. This term was first time used by H. Shirket in 1968 to express the lack of studies on the safety, dosing and effectiveness of drugs, approved for adults, in children. Until 2011 there were not established any widely accepted guidelines. In 2011 ACR (Beukelman et al, 2011) published the recommendations for initiation of treatment and safety monitoring of the therapeutic agents, but individual therapeutic categories are not perfectly consistent with JIA types. The availability of

biological agents, even drugs for intraarticular application, across the world is another problem. The surgical therapy of children is a rare option for its often irreversible consequences.

In the past, a different a different set of outcome measurements was used in different trials. A multidimensional approach in outcome assessment was rarely followed. Necessity to compare the findings during the development of biological agents led in 1997 (Giannini et al, 1997) to design a simple system for the assessment of efficacy adopted by ACR as a system for evaluation of the effectiveness of drugs in pediatric rheumatology practice (Albornoz, 2002). This system, known as the American College of Rheumatology Paediatric 30 Criteria (ACR Paed 30), is based on the change of 6 basic criteria (core set) during the treatment. 2 of 6 are dealing with patient's subjective feelings:

1. Parent's or patient's global assessment of overall well-being,
2. Functional ability (Childhood Health Assessment Questionnaire – CHAQ).

So far, this system has been recognized as the essential in the scientific research but is not so frequently used in standard clinical practice to assess the patient's status and to monitor the therapeutic response and course of the disease over time.

## Materials and Methods

Relatively recently devised new questionnaire, named JAMAR - Juvenile Arthritis Multidimensional Assessment Report, for outcome assessment should be simple, easy to apply and multidimensional in nature (Filocamo et al, 2011).

JAMAR incorporates the traditional parent/patient-reported outcomes (PROs), e.g. functional ability, and some non-traditional PROs, e.g. proxy- or self-assessment of number of involved joints, in two versions (parent's and the patient's one). JAMAR includes: the Juvenile Arthritis Functionality Scale (JAFS) (0=normal; 45=the worst), the Pediatric Rheumatology Quality of Life Scale (PRQL) (0=the best; 30=the worst); three 21-circle visual analogue scales (0=the best; 10=the worst) for parent's/patient's rating of well-being, intensity of pain, disease activity; parent's/patient's assessment of presence and duration of morning stiffness; disease status (remission, flare or continued activity); description of side effect of medications; therapeutic compliance; difficulties at school; and satisfaction about disease outcome. Its international use in standard clinical practice is one of the primary objectives of EPOCA study, getting information about epidemiology, treatment and outcome of JIA is its secondary objective.

PRINTO is an international network which main purpose is to foster, facilitate, and conduct high-quality research in the field of pediatric rheumatology (Ruperto, Martini, 2004). The PRINTO international coordinating center of EPOCA study is hosted by the Istituto G. Gaslini of Genoa, Italy. Its chief role is to coordinate the National coordinating centers of the PRINTO network.

Ethics committee approval depends on the national laws. All data are handled anonymously and parent's/guardian's and patient's (as appropriate) consent to the participation in the study is indicated at the end of the questionnaires.

Phase I: Translation and cross-cultural adaptation of the questionnaires into the national language of the participating country from the English is the task of the National coordinating centers which have to follow standard methodology:

*Forward translations* should be done by at least 2 independent translators into their native language. They should be fluent in English, but of different educational levels, background, sex and at least 1 of them should not be health professional. They have to use vocabulary to be understood by an 8-10-year old child (for the patient version of the JAMAR). *First unified forward translation* based on consensus with the participant not involved in the translation procedures. *Back-translation* of the first unified version should be done by at least 2 independent back-translators with English as their first language and fluent in the

idioms and colloquial forms of the source national language. This system should improve the quality of the final version of the questionnaires, by pointing out any misunderstandings of the first translation. *Review of backward translations* by PRINTO Coordinating center staff to check if they are in accordance with the original English version. *Second unified forward version* based on meeting of all the forward and backward translators. *Pre-testing in target population using the probe technique* on 10 parents of patients with JIA and 10 children, of different educational level and background, to ensure parents' and children's understanding. Review of all questions misunderstood by 20% or more of the parents or children done by the National coordinating center as well as the appropriate revision. *Final unified forward version* in case of need of modifications of the Second unified forward version.

Phase II: Validation, a large-scale data collection phase using the Final unified forward version of the questionnaires, follows the process of cross-cultural adaptation. Each center is asked to enrol 100 non-selected consecutive patients meeting the ILAR criteria for JIA or, if the center does not expect to see at least 100 patients within 6 months, all non-selected consecutive patients meeting the same criteria seen within the first 6 months after the validation starts. Collected retrospective data are: demographic data (sex, date of birth, ethnicity, date of disease onset, date of the first observation at the study center, date of the study visit); detailed registration of the ILAR criteria, including descriptors/exclusions and occurrence of iridocyclitis; results of ANA determinations; drug therapies received by the patient from disease onset to cross-sectional assessment. Collected cross-sectional data, besides parent and child version (for children aged > 8-10 years) of JAMAR, are: number of swollen joints, tenderness/pain on motion, restricted motion, and active disease in 71 joints; physician's global assessment of disease activity on a 21-circle visual analogue scales (0=the best; 10=the worst); physician's rating of disease status (remission, flare, continued disease activity) and disease evolution on category scales; Juvenile Arthritis Damage Index (JADI) of articular damage (JADI-A) and of extraarticular damage (JADI-E); acute phase reactants (assessment of erythrocyte sedimentation rate and/or C-reactive protein). In order to verify the reliability of the instrument, 10 parents at each center is asked to fill in the questionnaire at home within 2 days after the visit and send them to the center by mail. Moreover, each center is asked to enrol around 100 healthy children aged 7-8 years up and their parents. All data collection has been made through internet using a data-security system and the National coordinating centers are allowed to involve other centers into phase II.

## Results

The Slovak National coordination center in Kosice is able to present only preliminary results of EPOCA study. Questionnaires translations and cross-cultural adaptation into Slovak language were successfully finalized in 2011. Data collection for the forthcoming validation was successfully completed in 2012. The number of enrolled JIA patients was 87 (50 girls vs. 37 boys). Percentage of different types of JIA in accordance with published papers on JIA in Western countries – the most (42.5%) patients suffered from oligoarticular form. A total of 146 JAMAR (63 children's + 83 parents' version) questionnaires were completed. Also 100 healthy controls were enrolled.

## Discussion

Analyses of collected data (demographic features, frequency of ILAR categories, frequency of iridocyclitis, frequency of ANA at different titres, frequency of therapeutic interventions, and outcome status) will be presented and compared by country, by continent and by geographic area, e.g. Western Europe, after the completion of data collection in all participating countries.

In January 2013 there were 55 adaptations available. Validation was completed in 23 of 161 PRINTO participating centers, enrollment of patients still has been in process in 93 centres. Considering the great

interest the deadline for the finalizing of data collection has been postponed until July 31, 2013, with the intention to publish the results by the end of 2013.

In Slovakia, except the National coordination center in Kosice, center in Bratislava had participated in the project and in January 2013 its data collection for validation was also successfully completed.

Child-reported outcomes in pediatric rheumatology practice were a long time neglected topic. We believe that ongoing EPOCA study with quick, simple and understandable new instrument, named JAMAR, is a further step towards a brighter future of children suffering from arthritis.

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## **Relation between the quality of life of patients with cardiovascular disease and nursing care according to the conceptual model**

### **Súvislosť medzi kvalitou života pacientov s kardiovaskulárnym ochorením a ošetrovateľskou starostlivosťou podľa konceptuálneho modelu**

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#### **Abstract**

The effect of nursing care according to the Roy adaptation model (RAM) on quality of life (QOL) of patients in experimental group and without nursing care according to the conceptual model in control group were tested in a sample of 100 patients with cardiovascular disease (CVD patients) in a Medical ward of Rail hospital in Kosice. The study started in February 2010 and was completed in June 2010. Generic WHOQOL-BREF instrument was used for the self-assessment of the patients' QOL. The questionnaire was completed at two specific time points: during patient admission (phase A) and when patients were discharged from hospital (phase B). Results suggest that the nursing care according to RAM brought better benefit for QOL of CVD patients (confirmed statistically significant differences of mean raw score in QOL domains - psychological, social relationship and environment). Our findings support the hypothesis of the potential impact of nursing care according to nursing model on the quality of life of CVD patients.

Key words: quality of life, CVD patient, Roy adaptation model, standard nursing care

#### **Introduction**

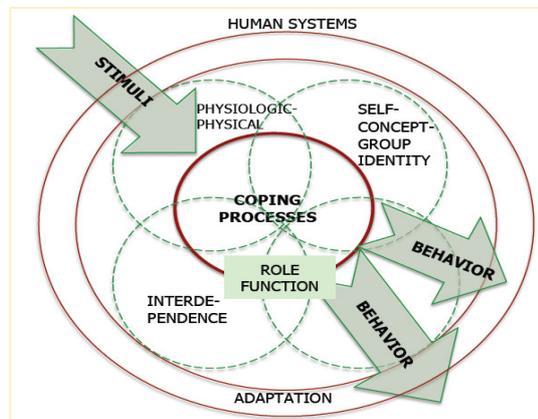
The main interest of Nursing as a scientific discipline is a human being seen as biological, psycho-social complex with spiritual dimension. Hanzlikova (2005) specifies nursing as using clinical decisions in providing nursing care, which enables people to improve, protect or restore health, to cope with their health problems and to achieve the best possible quality of life despite illness, disability, until death. Following this definition we would like to say that it is closely related to the health, illness, the care of person and on the other side, we can see its multi-level view of human, the possibility of enforcing each individual in life and this is related to QOL as a global concept. We find several definitions of authors in the literature, who want to explain the concept of QOL in the best possible way. However, there is no generally accepted definition of QOL. We know that QOL has a subjective and objective aspect, which is emphasized by the World Health Organization (WHO). Its definition is currently the most accepted.

Since the second half of the last century the concept of QOL is being studied in various disciplines. The significant increase of interest in this issue is also recorded in Nursing (Gurkova, Ziakova, 2009). Based on our theoretical knowledge, clinical experience and published results mainly by foreign authors aimed to implement nursing theories and models in clinical practice; we want to identify relationship between the practical use of nursing models and their potential impact on patient QOL. The main aim of study was to measure QOL in patients' suffering from CVD and to identify differences in the QOL of CVD patients in two different approaches of clinical practice: RAM in the first group and standard nursing care in the second group.

Roy adaptation model for nursing was developed by Callista Roy in 1976 and it is worldwide used model in nursing research, education and clinical practice. The process of adaptation is a central category of

RAM. Each new life situation that we experience has an impact on our level of adaptation. Adaptation is a system of activities to promote personal integrity and a positive impact on health (Kycinova, 2003). The RAM describes human as bio-psycho-social being according to Roy, Andrews (1999) who adapt as systems on environmental stimuli which can be seen in Figure 1. Those stimuli are classified as focal, contextual, and residual. Focal stimuli are those most immediately confronting the person; contextual stimuli are other factors that contribute to the situation; and residual stimuli are other unknown factors that may influence the situation. Adaptation occurs in four response modes: physiologic, role function, self-concept, and interdependence. The physiologic mode focuses on basic necessary needs in maintaining the physical and physiologic integrity of human beings. The self-concept mode addresses individuals' conceptions of their physical and personal selves, including emotions and moods. The role function mode is concerned with individual performance of activities associated with various roles they take on in society. The interdependence mode deals with development and maintenance of satisfying affective and interpersonal relationship with significant others.

Figure 1. Human adaptive system (Roy, Andrews, 1999)



Many foreign authors (such as: Nuamah et al, 1999; Bacan, Akyol, 2008) dealt with examining of the impact of nursing care according to the RAM on patients QOL. RAM has become for us the instruction for the nursing care of patients in our country with regard to the relationship between the various adaptation modes under consideration of conceptual model. These adaptive modes correspond by its content with domains included in the concept of QOL (physical health, physiological, social relationship, and environment). We believed that adequate nursing care according to RAM (individual, complex, taking into account the entire criteria of conceptual model) will affect the QOL of CVD patients.

CVD remains the leading cause of death in the European Union, accounting for over 2 million deaths each year (Cowburn, Bhatnagar, Logstrup, 2009). According to WHO statistics, the SR is among the states reporting the highest death rate from CVD, which are also the leading cause of death in Slovakia (Snincak, 2009). The consequences of diseases of the circulatory system in Slovakia are particularly serious because of reduced QOL, chronic course and the high cost of long-term treatment (NCVPP, 2010). Described indicators have become the reason for the inclusion of CVD patients in our study sample.

## Materials and Methods

The study sample consisted of 100 patients, who were divided into two groups: experimental group (EG) consisted of 50 patients, who received nursing care according to the RAM and control group (CG) consisted of 50 patients, who received standard nursing care. Data were collected from February to June in

2010. CVD patients who were admitted to the Medical ward in Rail hospital in Kosice were included into the study. Inclusion criteria for patients were: patient admitted with Coronary heart disease or Hypertension,  $\geq 45$  years of age and  $\leq 59$  years of age with respect to the population standard in the manual of WHOQOL-BREF, assumption of the hospitalization for 7 days).

The Managing Director and the principal Nursing Officer approved the study before its start. Each patient provided an informed consent form to participate in this study. We carried out controlled nursing experiment, whose task was to explain which one of several approaches of nursing care is most effective. The data were collected via standardized questionnaire WHOQOL-BREF, we used Czech version of questionnaire validated by authors Dragomericka, Bartonova (2006). This questionnaire contains a total of 26 questions, produces a profile with four domain scores (physical health, physiological, social relationship, environment) and two individually scored items about an individual's overall perception of QOL and health. The four domain scores are scaled in a positive direction with higher scores indicating a higher quality of life (WHOQOL-BREF, 1997).

In EG we used nursing documentation according to RAM by authors Kycinova, Ondrejka (2005) modified for research purposes and the main aim of nursing interventions was to achieve adaptive behavior of patient in four adaptive modes of RAM. In CG we used nursing documentation for Medical ward used in all hospitals in Slovakia and in this group patient's needs were met in biological, psycho-social and spiritual dimension.

Nursing care according to the RAM or without nursing conceptual model was provided every day during 7-day hospitalization and we have evaluated quality of life of selected patients during patient admission (phase A) and at discharge from hospital (phase B). Data were analyzed using the statistical program SPSS 15.0 and we used descriptive and inductive statistical methods. Due to the negative output of Skewness test, we used non-parametric data processing technique. We used Wilcoxon test for statistical comparison between the first and repeated measurement in both study groups. Statistically significant correlation between both study groups was confirmed by Mann-Whitney test.

## Results

A basic description of the sample is given in Table 1 (n=100). The study sample consisted of 50 patients with Coronary heart disease and 50 patients with Hypertension, who were hospitalized in Medical ward of Railway Hospital in Kosice. Total sample consisted of 50 men and 50 women. Respondents in experimental group had averaged  $53.74 \pm 4.69$  years of age and in control group had averaged  $53.44 \pm 4.70$  years of age.

Table 1. Description of the sample (n=100)

	Gender	Medical Diagnosis		Age (Mean $\pm$ SD) Age range
		Coronary heart disease	Hypertension	
		n		
EG	Men	25	25	$53.74 \pm 4.69$ $\geq 45 - \leq 59$
	Women			
CG	Men	25	25	$53.44 \pm 4.70$ $\geq 45 - \leq 59$
	Women			

EG - experimental group, CG - control group

Results in graph 1 shows that total mean raw score of domains QOL in CVD patients of EG in phase B was higher than the initial total mean row score in phase A. There was a decrease total mean raw score of domains QOL in CVD patients of CG in phase A. The findings indicate that the nursing care according to RAM brought better benefit for the QOL of CVD patients.

Graph 1. Total mean raw score of QOL domains during patient admission and at discharge from hospital of both study groups

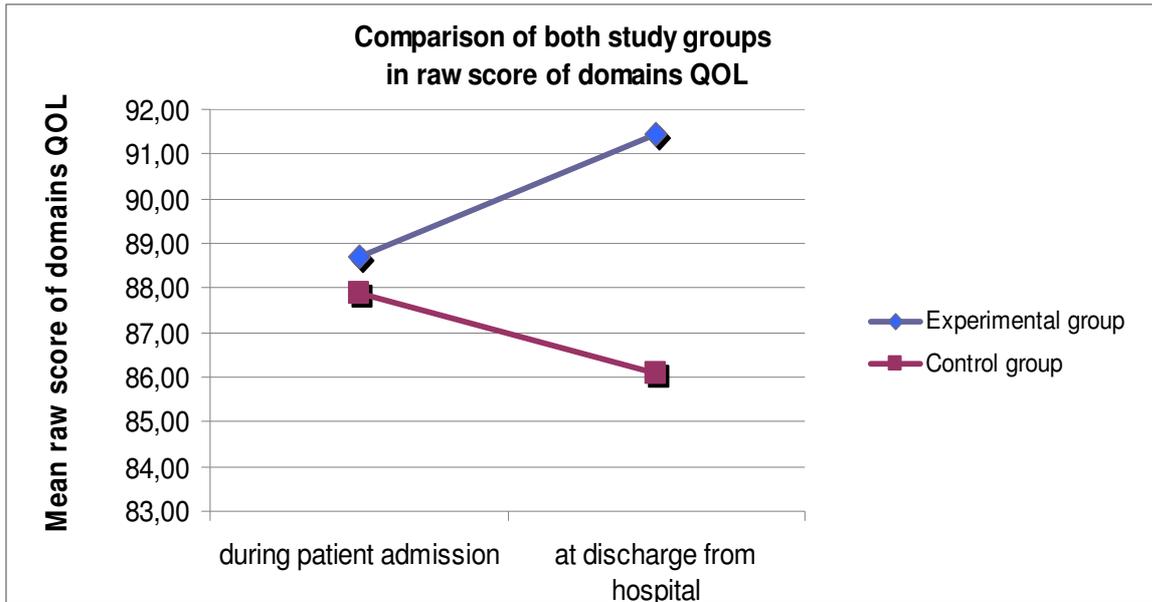


Table 2 presents significant improvement of QOL in domains psychological, social relationship and environment (confirmed statistically significant differences in mean row score) due to nursing care according to RAM in patients of the EG at discharge from hospital.

Table 2. Domains D1, D2, D3, D4 in phase B

		EG	CG		
		mean ± SD	mean ± SD	z	p
D1	Physical health Raw Score	25.42 ± 2.86	24.48 ± 3.54	-1.54	0.133 n.s.
D2	Psychological Raw Score	23.40 ± 2.67	21.86 ± 3.04	-2.421	<b>0.015*</b>
D3	Social relationship Raw Score	12.36 ± 1.54	11.22 ± 1.73	-3.328	<b>0.001***</b>
D4	Environment Raw Score	30.58 ± 3.12	28.80 ± 3.10	-2.854	<b>0.004**</b>

EG - experimental group, CG - control group \*  $p \leq 0.05$  \*\*  $p \leq 0.01$  \*\*\*  $p \leq 0.001$

n.s. - non significant

Mean score items of Q1 and Q2 (Table 3) was recorded higher in patients of EG at discharge from hospital. Statistically significant differences in mean score of individually items of both patient groups in phase B was recorded higher only item Q2 ( $p \leq 0.007$ ).

Table 3. Individual items Q1, Q2 in phase B

		EG	CG		
		mean $\pm$ SD	mean $\pm$ SD	z	p
Q1	Overall QOL	3.82 $\pm$ 0.66	3.60 $\pm$ 0.64	-1.872	0.061 n.s.
Q2	General health	3.30 $\pm$ 0.81	2.90 $\pm$ 0.79	-2.719	<b>0.007**</b>

EG - experimental group, CG - control group \*  $p \leq 0.05$  \*\*  $p \leq 0.01$  \*\*\*  $p \leq 0.001$

n.s. - non significant

## Discussion

Researchers working in the field of health care deal with measuring results of providing health services and interventions. At present what matters most is how patients feel. Objective scale of health condition is also QOL. It is particularly important in patients with chronic disease, because complete cure is unlikely for them (Nagyova, 2011).

Our aim of this study was to explore whether there is relation between the QOL of CVD patients and nursing care according to the RAM. The effect of both provided approaches of nursing care (RAM and standard nursing care) showed positive results in patient's health condition and impact on QOL domain - physical health. We assume a significant influence of medication and duration of patients' hospitalization in both study groups; consequently there was improvement of patients' health status regardless of method of nursing care provided. The CVD patients in EG had higher mean raw score for three QOL dimensions compared with patients in CG. This difference was especially high for physiological domain ( $p \leq 0.015$ ), social relationship ( $p \leq 0.001$ ), and environment ( $p \leq 0.004$ ).

Very important in psychological domain of QOL is spiritual dimension of life. Zucha, Caplova (1994) emphasizes the interconnectivity QOL and meaning of life. Zamboriova (2009) shows that meaning of life is not lost even when the human has serious health problems. Create a strong, supportive and safe social networking has been for long time associated with an increase in happiness and well-being of humans (Pitt, Deldin, 2010). As a support person/system 35% of patients in EG indicated his/her partner and on the second place son/daughter. Nursing professionals were also included between support persons.

By monitoring of mean item score of Q1 there weren't recorded statistically significant differences ( $p \leq 0.061$ ) in both patients group at discharge from hospital. These results can signalize that overall health in patients with chronic diseases is very relative, because the QOL may be affected by other aspects. QOL is largely influenced by health and may mean very different values for different people (Litomericky, 1996). Gurkova, Ziakova (2009) analyzes that the concept of QOL can be vary in different life periods and life situations, and therefore we can talk about specific aspects of QOL.

## Conclusions

QOL measurement gives health care providers an additional tool for the assessment of the impact of specific clinical decisions on the health status of patients, particularly those who suffer from chronic

disabling disease like CVD (Spiraki et al, 2008) and other diseases. Presented research study focused on application of RAM in clinical practice shows its contribution. The use of RAM in patients hospitalized in Medical ward will illustrate how nurse can challenge a patient's adjustment related to health and illness. Our results suggest that nursing care according to nursing models could become the basis for a change in patients' quality of life. The ultimate goal was to achieve implementing a conceptual model in clinical practice in Slovakia and at the same time bring more effective way of assisting chronically ill individuals to adapt to living with their chronic health conditions. It is necessary needed to continue in exploring the impact of nursing care according to the RAM on QOL of patients.

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## ICF core set for assessment of the dependency level in the Czech social security system

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### **Souhrn**

Článek seznamuje s novými posudkově medicínskými kritérii pro posuzování stupně závislosti pro potřeby příspěvku na péči dle zákona o sociálních službách. Principem nového posudkového řešení účinného od 1. 1. 2012 se stalo zpřehlednění dosavadního systému posuzování stupně závislosti. Vlastní posudkový proces spojený s posuzováním stupně závislosti agregoval úkony péče o vlastní osobu a úkony soběstačnosti do deseti vyšších celků. Jedná se o základní životní potřeby, jimiž jsou mobilita, orientace, komunikace, stravování, oblékání a obouvání, tělesná hygiena, výkon fyziologické potřeby, péče o zdraví, osobní aktivity a péče o domácnost. Uvedené skutečnosti vycházejí z obecných principů Mezinárodní klasifikace funkčních schopností, disability a zdraví (MKF) a z mezinárodně používaného systému ADL (Activities of Daily Living). Uvedeným způsobem se zajišťuje ucelený pohled na každodenní a zcela nezbytné potřeby, které jsou nutné pro schopnost samostatného života každé fyzické osoby. Nový způsob posuzování stupně závislosti na základě hodnocení deseti základních životních potřeb je zaměřen na využití funkční diagnostiky a salutogenetickém přístupu ke zdraví. Byl tak vytvořen první core set MKF k hodnocení zdravotního postižení pro účely sociálního zabezpečení.

*Klíčová slova: lékařská posudková služba; stupeň závislosti, MKF*

### **Summary**

The article introduces new medical assessment criteria for consideration of the degree of dependence for the care benefit purposes pursuant to the Social Services Act. The principle of the new consideration method effective as of 1.1.2012 is an improvement of the existing system for consideration of degree of dependence. The assessment process associated with consideration of the degree of dependence aggregated the tasks of self-care and the tasks of self-sufficiency into ten higher units. They cover basic personal needs, such as mobility, orientation, communication, food intake, putting on clothes and shoes, body hygiene, using the toilet, health care, personal activities, and household cleaning. These facts are based on the general principles of the International Classification of Functioning, Disability and Health (ICF) and internationally used ADL (Activities of Daily Living) system. Through this method, a comprehensive overview of everyday and vital needs that are a prerequisite in every physical person to have the ability of a self-sufficient living is obtained. The new assessment according to the ten basic living needs aims at using the functional diagnosis and salutogenic approach to health. It is the first core set ICF for disability for social security system.

*Key words: Medical Assessment Service; degree of dependence; ICF.*

### **Introduction**

The conditions for an entitlement to the care allowance are specified in the Act on Social Services. A person who is - for the reason of long-term unfavourable state of health - in need of another person to take care of his/her basic living needs - in the scope defined by the dependency level - is entitled to receive the

allowance. Since 1st January 2012, the long-term unfavourable state of health is newly defined as the state of health which, according to medical science knowledge, persists or is to persist for longer than one year, and which limits the ability required for managing the basic needs. The assessment of the degree of dependence includes an evaluation of the functional impact of the long-term unfavourable state of health on the ability to manage the 10 basic needs: mobility, orientation, communication, self-feeding, putting on clothes and footwear, washing oneself, toileting, looking after one's health, personal activities, and household tasks (Decree no. 505/2006 Coll., Act no. 108/2006 Coll.)

## **Materials and methods**

The new consideration is based on the principles of the Activity of Daily Living (ADL) assessment, which has been used in disabled patients already since the middle of 1960's. It is not an improvement in a partial degree that is decisive in ADL assessment, but in the first place, it is a functional fitness in a sense of self-care and self-sufficiency, activity and participation. Basic ADL focuses on self-care. It assesses, for example, relocation, bathing. Instrumental ADL (IADL) focuses on more complex activities that enable an individual to live their life independently; they condition their self-sufficiency. Among such activities belong, for example, doing shopping, household cleaning or money management (Kalvach et al., 2008). A change in the medical assessment criteria for consideration of the degree of dependence thus follows up on the already used ADL assessment method. In principle, it anticipates a systematic use of the International Classification of Functioning, Disability and Health (hereinafter as ICF) by general practitioners through the use of the principles of the classification, since the ten basic needs take into account not only ADL, but also the ten activities from ICF (ICF 2008). Functional abilities are assessed with the use of the remaining potentials and competencies of a physical person and with the use of generally available aids, means, articles of daily use or household gadgets, public areas or with the use of a medical device. This assessment is obtained through ICF (International Classification of Functioning, Disability and Health – ICF). ICF classification can be used for a wide range of applications, including social security, epidemiological studies, and evaluation and management of health care. It implements a social model through the information about how the functional abilities of an individual are affected by their environment. It offers an information framework for improvement of participation through reducing social barriers, for the area of social support. (Celedova, Cevela, 2011a, b).

## **Results**

The method of consideration of the degree of dependence was tested before approval of amendments to the legal regulations, so that its functioning, reliability and impact on the assessed persons as well as on the activity of the Medical Assessment Service is verified. Model testing has been performed both at the Ministry of Labour and Social Affairs of CR and at the Czech Social Security Administration and was performed by qualified assessing physicians.

The view of health sector changes from pathology to the consequences of pathological processes. We must address the needs of the persons with disabilities; that is why the ten basic personal needs represent a compressed expression of the domain no. 3 Activity and participation from ICF. Through this, an effective interconnection of ICF principles with the new medical assessment criteria is ensured during consideration of the degree of dependence – as shown in table 1. (Celedova et al, 2013).

Table 1. Reflection of the ICF classification into the Basic living needs assessment

Basic living needs	ICF classification
	activation/participation
mobility	chap. 4 mobility, e.g. d 450 walking, d 460, d 410
orientation	chap. 1 learning and application of knowledge, e.g. codes d 110–129
communication	chap. 3 communication d 310–360
food intake	chap. 5 self-care, food and drink d 550–560
putting on clothes and shoes	chap. 5 self-care d 540
body hygiene	chap. 5 self-care d 510–520
using the toilet	chap. 5 self-care d 530
health care	chap. 5 self-care d 570, chap. 2 general tasks and requirements, e.g. d 230
personal activities	chap. 8 the main areas of life, e.g. d 810–820, chap. 9 community, social and civilian life, e.g. d 910–920
household cleaning	chap. 6 living in a household, e.g. d 630–640

## Discussion

With the change in consideration of dependence taking into account 10 comprehensive tasks in the area of everyday life, the process has been made more simple, clearer and the volume of administration has been reduced for all parties, while the four-degree model and age categories have stayed the same. One of the criteria of particular importance is the one determining adverse health condition in the period lasting over one year. The new consideration of the degree of dependence, i.e. assessing 10 basic personal needs – mobility; orientation; communication; food intake; putting on clothes and shoes; body hygiene; using the toilet; health care; personal activities; household cleaning – has significantly improved the process of consideration of the degree of dependence, reduced the amount of time and administration required for preparation of a report, while maintaining objectivity of assessment. As a consequence, the procedure towards the client has been made more flexible and a higher effectiveness of the Medical Assessment Service activity has been achieved. New medical assessment criteria are based on the system that has been used already for 40 years and on the assessment of activities of daily living (ADL) proven in practice, and at the same time, they represent a reduced form of ICF classification – core set for social security system. Activities of daily living (ADL) correspond to the ten activities from the International Classification of Functioning, Disability and Health that cover all components of human health and some components of welfare. Reflection of ADL and ICF into the new medical assessment criteria for consideration of the degree of disability has therefore contributed to the change in view of healthcare public of disabilities and will ensure a better interconnection between the area of health care, follow-up and long-term care and social area (Celedova et al, 2013).

## Conclusion

Basic principles of the assessment activity apply to consideration of the health condition and the degree of dependence. A physician of the Medical Assessment Service (MAS) takes into account the health

condition of a person documented in a medical report from the treating physician, the result of social surveying and identifying the person's needs, or the results of functional examinations and of the examinations they have carried out themselves. A long-term adverse health condition, specifically, its impacts on self-sufficiency and the ability of self-care, is a basic criterion for determination of the degree of dependence on the help of other person. Owing to the change in the consideration method, 10 comprehensive and related areas of everyday life, i.e. basic personal needs, are distinguished and considered. A comprehensive view of everyday personal activities that are necessary for social integration.

Implementation of the elements of ICF classification, which covers all components of human health and some components of welfare, into the new medical assessment criteria for consideration of the degree of dependence changes view of the professional public of disabilities. Assessment of fulfilment of basic personal needs in an acceptable standard takes into account what is expected in the specific socio-cultural environment in the given area. It addresses those situations, when a physical person's physical capabilities would allow them to fulfil the need, however, they would fulfil it "in a non-standard manner, in insufficient quality, and unsatisfactory" due to their disability in the mental or sensory area. The new consideration thus focuses also on the use of a functional diagnosis and salutogenetic attitude to health, i.e. on the monitoring of quality of life. The aim of making the method of consideration of the degree of dependence more modern was to build the medical assessment criteria upon a functional assessment of a functional condition. Through this method, a comprehensive overview of everyday and vital needs that are a prerequisite in every physical person to have the ability of a self-sufficient living is obtained. The new assessment according to the ten basic living needs aims at using the functional diagnosis and salutogenic approach to health. It is the first core set ICF for disability for social security system.

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## Public mental health

### Is economy crisis influencing our mental health?

### Ovplyvňuje finančná kríza naše duševné zdravie?

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#### Abstract

Background and aim: In mental health of an individual or a population, multiple levels of causation are considered. We have researched factors influencing mental health of population at macrolevels, choosing the groups of affective and neurotic disorders as these are the disorders that are to a large extent triggered and influenced by „external“ factors.

Methods: We have conducted ecological study to research treated prevalence of affective and neurotic disorders (diagnostic groups F30-39 and F40-48, ICD-10) in regions of Slovak Republic in the years 2001-2010. We have used Joinpoint regression to assess statistical significance of treated disease prevalence increase over time. Further, through linear regression we have assessed relations of demographic (gender, divorce rate) and socioeconomic (monthly netto average salary, unemployment rate, regional proportion of population with university education, proportion of urban population) factors to the regional and national trends of treated prevalence of both studied diagnostic groups.

Results: Both affective and neurotic disorders treated in ambulance setting in the studied period 2001-2010 have an increasing trend, with a high peak and steep increase in/after 2008. All selected demographic and socioeconomic parameters are predictors of trends of both neurotic and affective disorders, except unemployment. Strongest association was shown for neurotic disorders and average monthly netto salary. We have also calculated an estimated number of people who possibly have symptoms of the researched disorders but are not treated for it, in the Slovak Republic - it is over 300 thousand people for affective disorders and over 650 thousand people with neurotic disorders, in 2010.

Conclusions: Global financial crisis influences many factors in the society and negatively affects population's mental health. We attempted to prove the impact on the Slovak society through an ecological study. Based on its findings and limitations we propose to conduct a population survey of mental health in the Slovak Republic that will bring the accurate data on the prevalence of mental disorders and risk factors. This information will enable effective planning of mental health care services.

Keywords: Mental Health, Epidemiology, Ecological Study

#### Abstrakt

Úvod: V problematike duševného zdravia sa v príčinnosti zvažujú viaceré úrovne, od individuálnej po populačnú. V našej štúdií sme sledovali faktory, ktoré ovplyvňujú duševné zdravie na makro-úrovni, konkrétne v skupine afektívnych a neurotických porúch, nakoľko tieto poruchy sú do veľkej miery ovplyvňované vo svojom nástupe a priebehu práve „externými“ faktormi.

Metódy: Uskutočnili sme ekologickú štúdiu na sledovanie afektívnych a neurotických porúch (diagnostické skupiny F30-39 a F40-48 Medzinárodnej klasifikácie chorôb, 10.revízia) v krajoch Slovenskej republiky v rokoch 2001-2010. Použili sme Joinpointovu regresiu na zhodnotenie štatistickej významnosti rastu liečenej prevalence sledovaných porúch v čase. Ďalej sme pomocou lineárnej regresie

sledovali závislosť prevalence vybraných diagnostických skupín duševných porúch od vybraných demografických (pohlavie, rozvodovosť) a socioekonomických (priemerná čistá mesačná mzda, nezamestnanosť, proporcia ľudí žijúcich v mestách a proporcia ľudí s vysokoškolským vzdelaním) premenných.

Výsledky: Ambulantne liečená prevalence afektívnych aj neurotických porúch má v sledovanom období 2001-2010 rastúci trend, s výrazným nárastom po roku 2008. Zo sledovaných demografických a socioekonomických parametrov, všetky okrem nezamestnanosti boli potvrdenými prediktormi trendu afektívnych a neurotických porúch. Najsilnejšia závislosť bola medzi trendom neurotických porúch a premennou čistá priemerná mesačná mzda. Tiež sme vypočítali odhad počtu ľudí, ktorí v Slovenskej republike trpia príznakmi sledovaných duševných porúch, neliečia sa však – v roku 2010 to bolo vyše 300 000 ľudí na afektívne poruchy a vyše 650 000 ľudí na neurotické poruchy.

Záver: Finančná kríza ovplyvňuje mnohé faktory v spoločnosti a prispieva k narušenému duševnému zdraviu populácie. V našej štúdii sme sa pokúsili tento fakt dokázať pomocou ekologickej štúdie. Na základe jej zistení a limitácií odporúčame realizáciu populačného prieskumu duševného zdravia obyvateľov Slovenskej republiky, ktorý prinesie presné údaje o výskyte duševných porúch a rizikových faktorov v našej populácii. Tieto zistenia pomôžu efektívne plánovať služby starostlivosti o duševné zdravie.

Kľúčové slová: Duševné zdravie, Epidemiológia, Ekologická štúdia

## **Introduction**

Global society has already acknowledged 'there is no good health without mental health' (Prince M et al., 2007). It is important at the individual level, enables the individual to realize his or her own abilities, to cope with the normal stresses of life, to work productively and fruitfully and to contribute to his or her community (Herrman H et al., 2005). Mental health is influenced on the individual level by many factors, such as genetics, social and economic environment, education, employment, etc. Disturbance on individual's mental health may lead to unemployment, decrease of financial resources for the affected person and their families, breakdown of families. It is important to look at mental health also from a macro perspective – mental health of social groups, of populations. Mental health problems at population level have significant economic effect for a country. Main consequence of mental health problems is lost productivity and disability. One third of new disability benefits in European countries are due to mental health condition (Mental Health, Disability and Work, 2010). Good population mental health contributes to economic productivity and prosperity and that is crucial for economic growth (Weehuizen R, 2008). Conversely, poor mental health leads to economic decline of individuals as well as societies. Causality in mental health works the other way, too - stable employment, secure incomes and social capital are predictors of good mental health. Poverty, financial problems and social deprivation are major socioeconomic risk factors for mental health problems and disorders (Fryers T et al., 2005). Living in the time of economic crisis, one needs to ask how is the increasing poverty in Europe influencing mental health of people.

Despite the obvious importance of good mental health we still know little about its status in populations. Many American and European studies show that there is still too little accurate data about the prevalence of mental disorders, their risk factors and socioeconomic consequences. This applies also to the Slovak Republic. Therefore, we decided to investigate trend of prevalence of selected mental disorders treated in outpatient setting in the Slovak Republic (a group of affective disorders, a group of neurotic, stress-related and somatoform disorders) for years 2001-2010 and their possible demographic and socioeconomic predictors.

## Materials and Methods

We used ecological study design in our research, where the unit of observation were 8 regions of the Slovak republic in the period 2001-2010. We have studied numbers of outpatients visits (first time in year) to psychiatric outpatient offices due to diagnosis within the International Classification of Diseases, 10.revision - diagnostic groups F3: affective disorders and F4:neurotic, stress-related and somatoform disorders.

Data were obtained from the National Center for Health Information.

Morbidity data were aggregate – numbers of visits per diagnostic group, per year, per region. We have calculated treated prevalence in outpatient setting rates (treated prevalence).

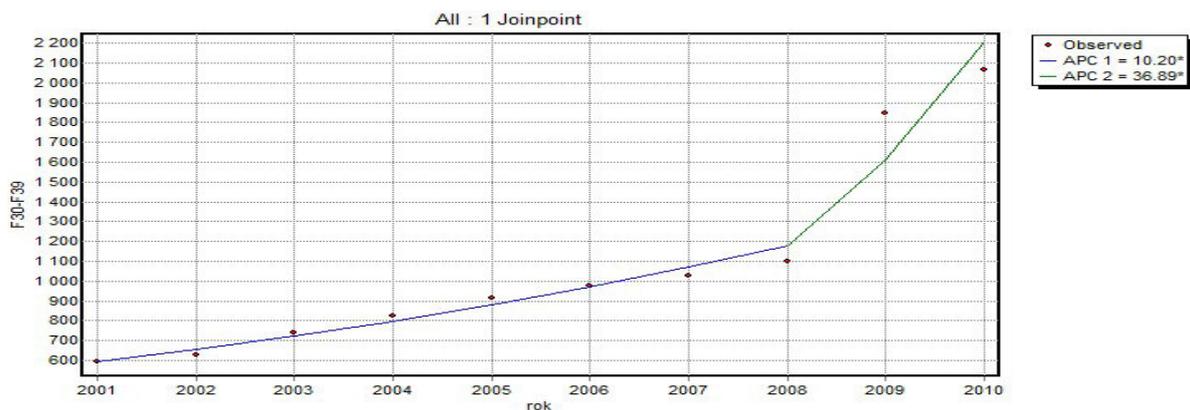
The studied determinants were: unemployment rate, average netto monthly salary, proportion of people living in towns, proportion of economically active people with university education, divorce rate. As a system factor we used number of outpatient psychiatric medical positions. These data were obtained from the Statistical Office of the Slovak Republic and processed at macro-level.

For data analysis we used standardization, Joinpoint regression and a mixed model regression to demonstrate the relationship of selected parameters. For a significance level we considered  $p < 0.05$ .

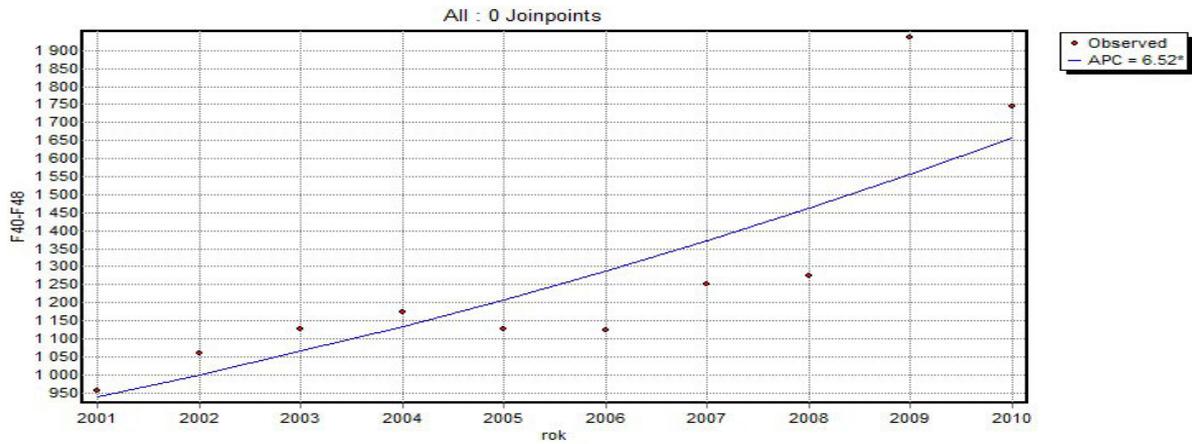
## Results

In both surveyed groups of mental disorders we found through Joinpoint regression that the treated prevalence for the period 2001-2010 increases (Graph 1 and 2). The highest treated prevalence was in 2009, and we attribute this to the start of economic crisis in our region. We found that the group of neurotic, stress-conditioned and somatoform disorders has the strongest association to the studied dependent factors, which are also possible predictors of these disorders. These predictors are: the proportion of urban population in the Slovak Republic, the divorce rate, the proportion of people with university education, the average netto salary and the number of outpatient psychiatric medical positions in Slovakia.

Graph 1. Affective disorders, 2001-2010 15.6 % increase, 2008-2010 36.9 % increase



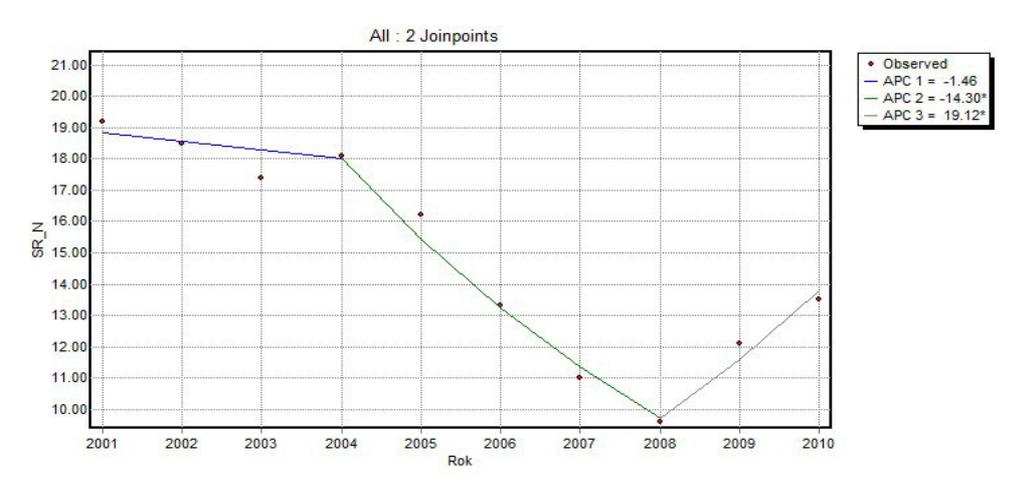
Graph 2. Neurotic disorders, 2001-2010 6.5 % increase



In the next part we looked at selected demographic and socioeconomic parameters that influence population's mental health at macro-levels.

In Graph 3. we present Joinpoint regression trend of unemployment rate in the Slovak Republic in 2001-2010

Graph 3. Unemployment rate in the Slovak Republic in 2001-2010



Mixed model of simple linear regression showed the unemployment rate is not a predictor for trend of neither affective nor neurotic disorders.

Graph 4 looks at the Joinpoint regression of the trend of average monthly netto salary in the Slovak Republic in 2001-2010. We see a stable rising trend in the period.

Graph 4. Average monthly netto salary in the Slovak Republic in 2001-2010 in EUR.

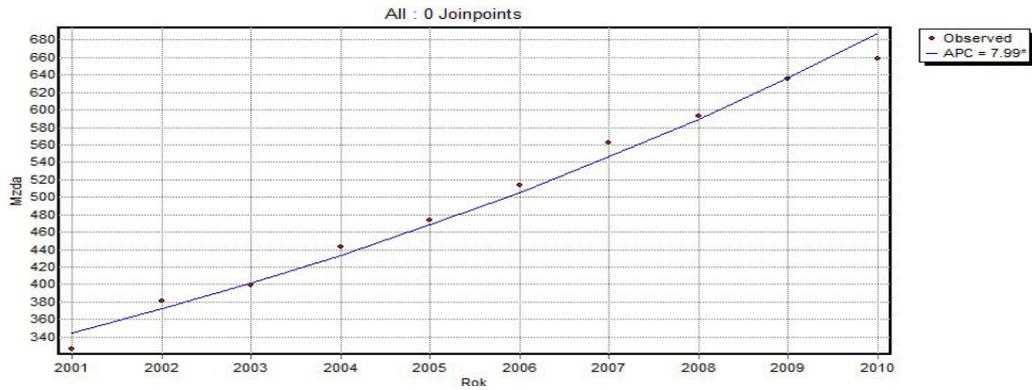


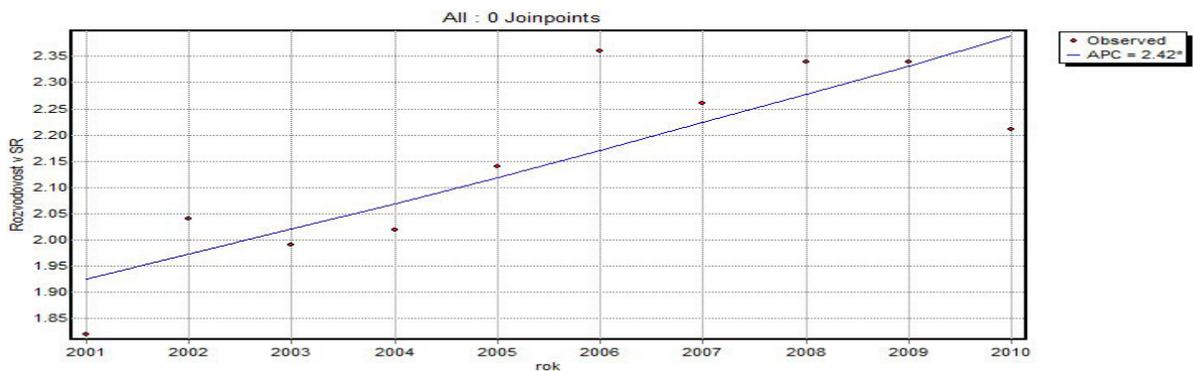
Table 1 shows results of mixed model of simple linear regression testing the correlation between average monthly netto salary and treated prevalence of group of affective disorders and group of neurotic disorders. This association showed the strongest correlation among all researched parameters.

Table 1. Simple linear regression of average monthly netto salary and treated prevalence of group of affective disorders (F30-F39) and group of neurotic disorders (F40-48)

SR	R <sup>2</sup>	A	B	p- value
F30-F39	0.87	124.98	1.39	p<0.001
F40-F48	0.90	-115.37	2.89	p<0.001

In Graph 5 we present continuously rising trend of divorce rate in the Slovak republic in the period 2001-2010.

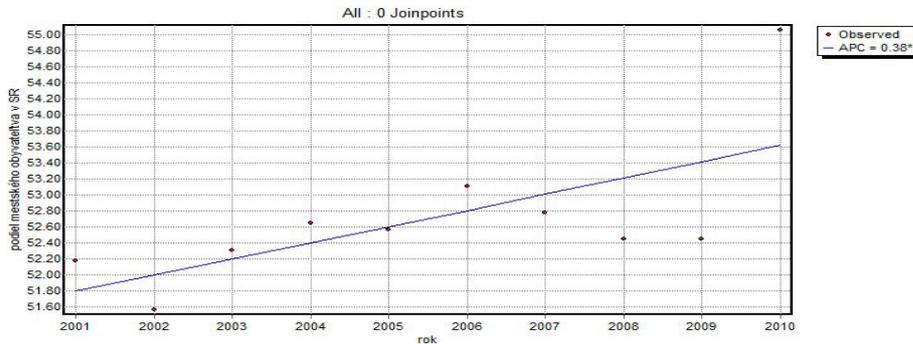
Graph 5. Divorce rate in the Slovak Republic in the period 2001-2010 per 1000 inhabitants.



Divorce rate is a predictor for neurotic disorder, if it increases, the treated prevalence of neurotic disorders increases in population as well.

In Graph 6 we looked at the trend of proportion of people living in towns in the ten year period. Joinpoint regression shows rising trend.

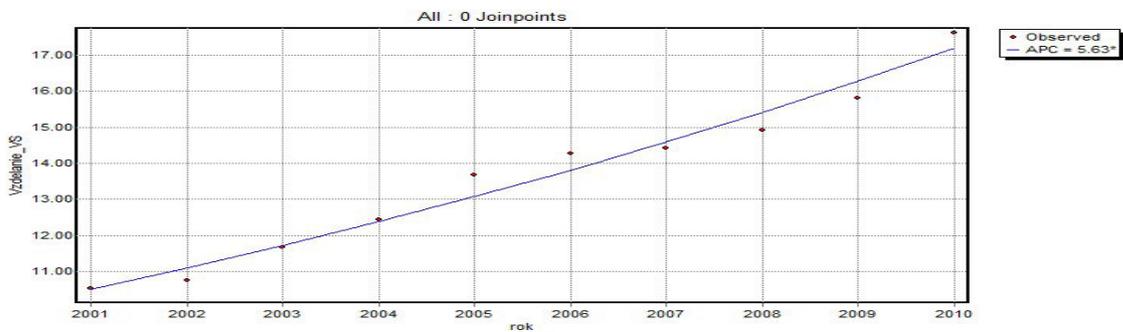
Graph 6. Proportion of urban population in the Slovak Republic in 2001-2010.



In mixed model of simple linear regression we proved proportion of urban population is a significant predictor for both groups of disorders, affective as well as neurotic. When number of people living in towns versus in the country increases, treated prevalence of both groups of disorders increases. This was true for the whole population. Looking at the individual genders, proportion of urban population was a significant predictor only for the group of affective disorders, for both men and women.

In Graph 7 we have examined the trend of proportion of economically active citizens with completed university education. The trend is continuously increasing.

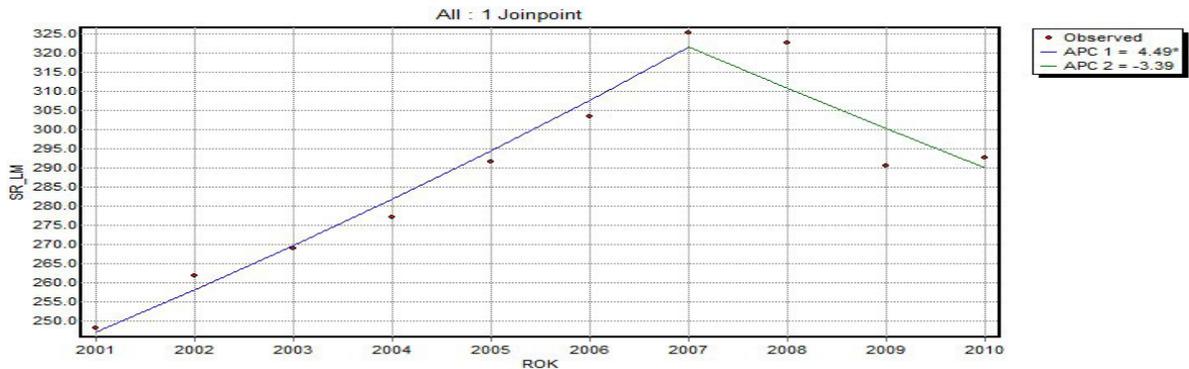
Graph 7. Proportion of economically active citizens with university education in the Slovak Republic in 2001-2010.



This parameter is a significant predictor for the whole population for both groups of disorders and when split by gender, it is a significant predictor for affective disorders for both women and men. The correlation is positive, when proportion of people with university education in population grows, the treated prevalence of the selected groups of disorders increases.

From the systemic parameters we have examined number of outpatient psychiatrists in the Slovak Republic in 2001-2010. The trend was increasing till 2007 and since then it decreases (Graph 8).

Graph 8. Number of outpatient psychiatrists in the Slovak Republic in 2001-2010.



This variable (number of outpatient psychiatrists) is a significant predictor for the whole population for both affective as well as neurotic disorders.

We have also estimated percentage of people that possibly had symptoms of affective and/or neurotic disorders in the society in 2010, but still were not treated. To calculate the estimate we have used estimated EU population prevalence (Wittchen HU et al., 2011) and compared it with our calculated treated prevalence. Estimated number of people that had any of the affective disorders in 2010 and where not treated was over 300 thousand (Table 2) and estimated number of people that had any of the neurotic disorders in 2010 and where not treated was over 650 thousand.

Table 2. Estimate of number of people with symptoms of affective disorders but not treated in the Slovak Republic in 2010

Affective	Treated prevalence in SR in 2010	Estimated prevalence EU 2010 (Wittchen)	Estimated % of untreated in SR	Estimated number of untreated 2010 in SR
Total	2.24 %	7.8 %	5.6 %	304 137

Table 3. Estimate of number of people with symptoms of neurotic disorders but not treated in the Slovak Republic in 2010

Neurotic	Treated prevalence in SR in 2010	Estimated prevalence EU 2010 (Wittchen)	Estimated % of untreated in SR	Estimated number of untreated 2010 in SR
Total	1.9 %	14 %	12.1 %	657154

## Discussion

In this ecological study we have researched association of treated prevalence of diagnostic group of affective disorders (ICD-10 group of F30-39) and group of neurotic disorder (ICD-10 group of F40-48)

with selected socioeconomic and demographic parameters that were shown by previous research to be correlated to mental illness (Waite LJ et al., 2010; Wang JL et al., 2004; Wang JL. Et al., 2010). We have also researched trend of the selected groups of disorders and that we found increasing in 2001-2010, with the steepest increase in 2009 after the global economic crisis reached the Slovak Republic.

The ecological studies are particularly suitable for generating hypotheses for further investigation and have limitations for the interpretations of their results. We have proved all selected socioeconomic and demographic factors except unemployment rate are possible predictors of trends of both affective and neurotic disorders. The strongest association was shown for neurotic disorders, especially its correlation to average monthly salary.

## **Conclusions**

Majority of followed socioeconomic and demographic factors are predictors of affective and neurotic disorders, except the unemployment. Due to the limitations of ecological study, we recommend to conduct population survey of prevalence of mental disorders in the Slovak Republic, which would be a continuation of our study. Thus the state of mental health in the Slovak Republic would be comprehensively mapped and it would allow for setting of appropriate preventive and intervention measures for protection and prevention of our population's mental health.

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## **Mental disorders and invalidism - disability in Slovakia**

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### **Abstract**

The number of people receiving disability pension, is growing. The article dealt with the situation in the world, while we discuss the situation regarding disability pensions due to mental disorders in Slovakia. We are discussed in more detail in part the increase in survey partial (41-70% rate of decrease of employment) and full (over 71%) disability pension during the last few years in relation to legislative amendment and we think the possible variables, which have not influence and how to improve the situation, as by clearer and more open communication for all involved.

Key words: disability, full and partial disability pension, social insurance, mental disorders

### **Background**

The number of people receiving disability pension, is growing. Disability - "onset of disability"? Disability - earning capacity > 40% (just now in Slovakia this number is 200 thousand the Slovak people, the incidence is 23 thousand the people). The law 461/2003 Z. z. is valid from 01. 01. 2004 (replaced the 100/1988 Z. z.) accurately determine the relevant chapters and headings for each disease percentage rate of decline in earning capacity of the patient. This contens about 40 novels, chapter XV (by type of disability organs and systems). When each item is given a specific rate of decline in earning ability in%. The rate of decline in earning capacity in% depends on the type of disability (without counting). The possibility of increasing the upper limit is more than 10%. If  $\geq 41\%$  - the recognition of disability in the range 41% -70% - degree of partial disability,  $\geq 71\%$  - corresponding to a full pension.

#### *Objective and hypothesis:*

Comparison of disability in Slovakia from 2005 to 2010 in relation to mental health problems, and we expect growth in the number of disability pensions granted either to 70% or above 71%.

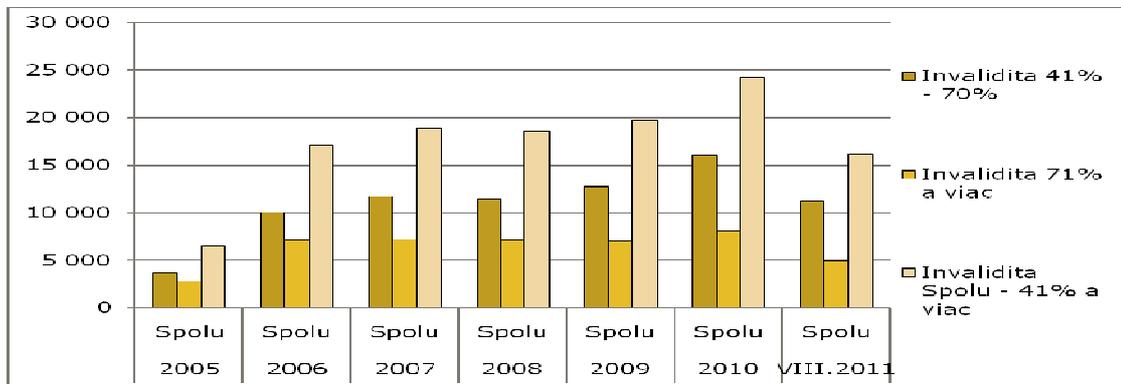
### **Methods:**

The data sources branches of social insurance institution, we compared the changes in the number of diseases and also in the years in terms of approved applications for disability pension, which we have specifically investigated the status of mental disorders among them. Interested in our incidence of disease is the number of recognized disabilities with 70% or over 70%. We used a simple accumulation of data available.

### **Results:**

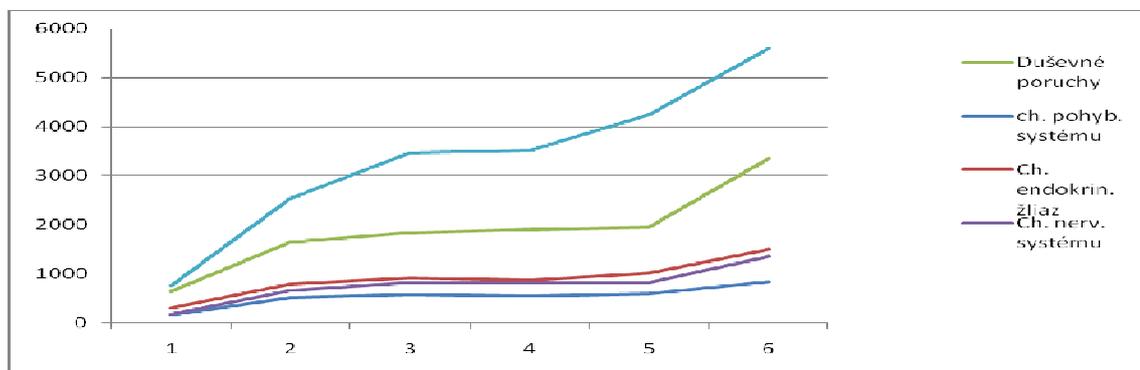
In 2010, 40 231 controls conducted medical examinations of which still recognized disability and partial disability rate of decline in earning capacity in excess of 40% - 70%: 20 777 still recognized disability and disability with the rate of decline in earning capacity over 70%: 14 977 still recognized disability with a change to a lower level of disability.

Fig. 1. Overview newly-disability (internal source of Social Insurance Institution, 2012)



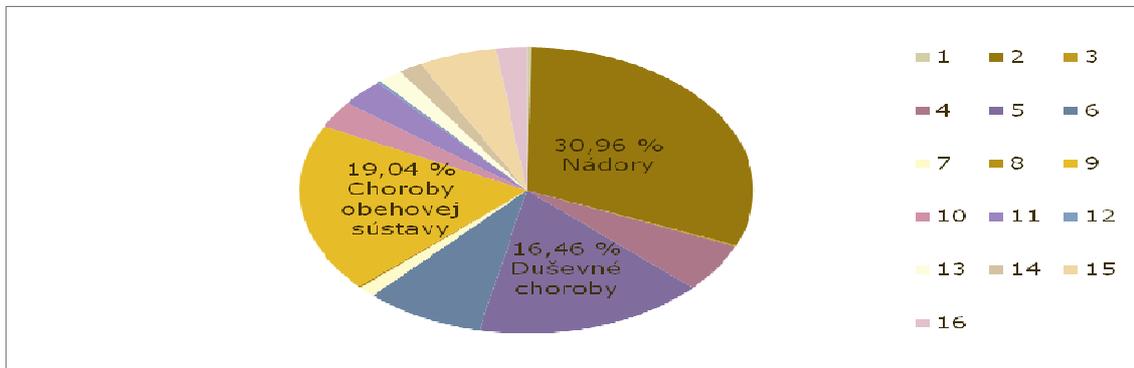
The first among illnesses that cause disability and a decreased rate of earning capacity of 40% together with men and women were disease muscle, skeletal system and connective tissue. The second were mental and behavioral disorders, third endocrinological diseases and finally neurological diseases in fourth place /Fig. 2/.

Fig. 2. Disability pensions from 41 to 70% - the absolute number (Internal source of Social Insurance Institution)



In the range of 71% and more are mental disorders in third place after oncological and cardiovascular diseases /Fig. 3/.

Fig. 3. Disability 71% or more in% (full pension) (Internal source of Social Insurance Institution)



### Discussion

Long wait for some special tests may result in a prolonged disease diagnosis - treatment, and the duration of temporary incapacity, which may lead to an increase in the number of applications for disability pension. The problem is also comorbid diagnosis - dual disorders, which may overestimate the medical findings of medical experts and this may influence the length of disability with potential options to ensure a certain financial security? Therefore, it is necessary to cooperate medical consultants, doctors and Social Insurance Institution, which will be reflected in the quality and relevance of expert medical findings, and mutual understanding (application for preferential examination or hospitalization citizen of consultative reasons). The absence of the temporary incapacity makes medical assessor has limited power to enter into the duration of temporary incapacity citizens.

### Conclusions

The newly-disability pensions are significantly contributes chapter on mental and behavioral disorders. The invalidity pensions in the range of 41% -70% are second in disability pensions in the range of 71% and more are in third place. Correct diagnosis allows correct classification into individual sections and items of the Act, and thus to determine the corresponding rate decrease earning capacity of the patient. Addressing the social consequences of illness affects not only social insurance but has a significant social impact, since the problems are not and can not be solely for medical consultants, social insurance. Disability pensions are a thing of the whole society, as can the social and economic impact of this issue deal with the complexity and perhaps more open and clearer communication between medical examiners and doctors - specialists could help the company better navigate this dilemma.

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## **Possibilities of neuropsychological diagnostic and rehabilitation of cognitive dysfunctions in psychiatry**

### **Možnosti neuropsychologickej diagnostiky a rehabilitácie kognitívnych deficitov v psychiatrii (prehľadový príspevok)**

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#### **Abstrakt**

Prehľadový príspevok poukazuje na význam neuropsychológie v manažmente liečby psychiatrických pacientov, poukazuje na to, ako práca neuropsychológa môže pomôcť pri zlepšovaní kognitívnych funkcií najmä pri schizofrénnych a depresívnych ochoreniach. Psychiatrické ochorenia prinášajú so sebou okrem behaviorálnych a emočných zmien aj zmeny kognitívne. Či samotná depresia, schizofrénia a zneužívanie psychoaktívnych vedú ku kognitívnym dysfunkciám mozgu alebo narušená plasticita mozgu vďaka dysbalancii neurotransmitterov vedie ku psychiatrickým poruchám, nie je dosiaľ známe. Napriek tomu, kognitívne deficity u psychiatrických pacientov sa vyskytujú predovšetkým v oblastiach ako percepcia, pamäť, pozornosť, reč a exekutívne funkcie. Neuropsychologická diagnostika zahŕňa pozorovanie pacienta, anamnestické interview a neuropsychologické testovanie. Po zhodnotení úrovne deficitu nasleduje konkrétna funkčná náprava pre účinnejšie zaradenie pacientov do bežného života. V rámci kognitívnych tréningov sa aplikujú úlohy šité na mieru pacientovi, najnovšie však počítačové programy pod vedením psychológa ako napr. CogniPlus, NEURO-2 alebo CogniFit. Neuropsychológia v psychiatrii je nápomocná pri diagnostickej a terapeutickej pomoci pacientom a ich rodinám pri odstraňovaní psychosociálnych dôsledkov kognitívnych deficitov.

**Kľúčové slová:** kognitívny deficit, schizofrénia, depresia, neuropsychologická diagnostika

This review attempts the importance of neuropsychology in the management of treatment of psychiatric patients, pointing out how the work of neuropsychologist can help to enhance cognitive functioning especially in schizophrenia and depressive disorders patients. Mental disorders include not only behavioral and emotional changes, but also cognitive ones. Whether present depression, schizophrenia or abuse of psychoactive drugs lead to cognitive dysfunction, or impaired brain plasticity due to neurotransmitters dysbalance leads to mental disorders, have not been known yet. Cognitive dysfunction among psychiatric patients were found primarily in areas such as perception, memory, attention, speech and executive functions. Neuropsychological diagnosis involves observing the patient, anamnestic interviewing and neuropsychological testing. Following the evaluation of the level of cognitive deficit, a specific remedy is needed for more effective inclusion of patients in the normal life functioning. The tasks tailored to the patient are applied in the framework of cognitive trainings, the latest ones include computer programs such as NEURO, CogniPlus-2 or CogniFit programs under the leadership of psychologist. Neuropsychology in psychiatry might be useful for diagnostic and therapeutic support of patients and their families in order to remove psychosocial consequences of cognitive deficits.

**Key words:** cognitive deficit, schizophrenia, depression, neuropsychological testing

## Úvod

Neuropsychológia je úzko prepojená s mnohými medicínskymi disciplínami, predovšetkým s neurológiou a psychiatriou. Jej cieľom, zjednodušene povedané, je skúmať vzťahy medzi fungovaním mozgu a správaním sa a prežívaním človeka. Kým jej klinická časť sa zaoberá neurofyziologickými procesmi v mozgu a správaním pacienta, kognitívna neuropsychológia vychádza z experimentálnej psychológie, ktorá skúma kognitívnu výkonnosť pri poškodení mozgu (Preiss et al., 2006).

Kognitívne funkcie zodpovedajú za to, ako narábame s informáciami. Možno ich zdeliť do troch oblastí podľa postihnutia, čiže receptívne funkcie, pamäť a učenie, myslenie a expresívne funkcie. U pacientov sa navonok môžu prejavovať ako agnózia, čiže porucha poznávania v niektorej zo zmyslových oblastí, apraxia ako neschopnosť vykonávať účelné pohyby bez zistenia primárnej poruchy motoriky, koordinácie, chápania, či pozornosti. Ďalej to môžu byť poruchy pozornosti a reči ako napr. afázia a dyzartria, ktoré je nutné detekovať pred každým neuropsychologickým, v podstate i každým klinicko-psychologickým vyšetrením. Súčasťou každého neuropsychologického vyšetrenia je posúdenie mnestických schopností, resp. amnézie (Pribišová, 2007).

Podľa MKCH-10, v psychiatrii kognitívne deficity sa zaraďujú do kategórie organické duševné poruchy označované ako F00-F09. Týkajú sa vekového obdobia dospelosti, s vylúčením detstva. U psychiatrických pacientov prevažujú kognitívne deficity najmä v oblastiach percepcia, pamäť, pozornosť, reč a exekutívne funkcie, ako aj sem priradené poruchy emócií následkom organického poškodenia CNS (MKCH10, 1992).

## Metódy a postupy

Úlohou neuropsychologickej dianostiky je objektívne posúdenie aktuálneho stavu, kognitívnych, exekutívnych a emočných funkcií pomocou neuropsychologickej batérie testov. Pri vyšetrení psychológ, okrem obševácie pacienta, získava anamnestické údaje z interview od pacienta a rodinných príslušníkov a zostavuje špeciálnu batériu testov so zameraním na stanovenie rozsahu kortikálneho poškodenia. Pri tom využíva výsledky moderných zobrazovacích techník, nakoniec stanovuje neuropsychologickú rehabilitačnú stratégiu. Jej úspech v komplexnej liečbe pacienta závisí od jeho veku a premorbídnej osobnosti, veľkosti, charakteru, lateralizácie a lokalizácie kortikálneho poškodenia, dĺžke kómy, či postraumatickej amnézie (Pribišová, 2007).

V psychiatrii majú kognitívne deficity najvyššiu prevalenciu pri depresívnych poruchách, schizofrénii, či poruchách spôsobených návykovými látkami. Samotní lekári využívajú na rýchly skrining pre vylúčenie demencie kognitívne úlohy (napr. ACE-R, MOCA, MMSE a i.) (Preiss et al., 2006). Neuropsychológia disponuje množstvom psychodiagnostických metód, z ktorých možno spomenúť nami najpoužívanejšie: Wechslerova skúška pamäti WMT, Kohsove kocky, Bender Gestalt Test, Test hodín, Číselný štvorec, Rey Osterriethova figúra, Test cesty, Test verbálnej fluencie a mnohé ďalšie popisované v prácach Preissa et al. (2002, 2006).

V časti o neuropsychologickej rehabilitácii možno spomenúť vytváranie neurokognitívnych tréningových plánov, v ktorých sa aplikujú úlohy „šité na mieru“ pacientovi. V ambulantnej praxi sa zdá byť najvhodnejší postup kognitívneho tréningu pomocou denných „domácich úloh“, napr. čítanie dennej tlače, hry s číslami, lúštenie krížoviek, orientácie na mapách, spoločenské hry typu dámy alebo šach, pexeso a iné. Úlohy sú potom kombinované s neuropsychologickým počítačovým tréningom pod vedením psychológa. V našich podmienkach neuropsychológovia využívajú na neuropsychologickú rehabilitáciu PC programy CogniPlus, NEURO-2 alebo CogniFit.

## Záver

Neuropsychológia v psychiatrii je nápomocná pri diagnostickej a terapeuticko-pomoci pacientom a ich rodinám pri odstraňovaní psychosociálnych ťažkostí ako následku kognitívnych deficitov. Pacienti sa

môžu zúčastňovať pravidelných neuropsychologických rehabilitačných cvičení so psychológom, či psychoterapeutom, čo má v rámci komplexnej liečby suptívny charakter v smere zlepšovania sociálneho fungovania.

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## Problems of Public Guardians in the Care of Incompetent Persons

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### Abstract

In the Czech Republic, there is an increasing number of persons with mental disorder who were deprived of in capacity to legal acts by court decisions (incompetent persons). These persons are a specific population group because for them the guardians are decision makers. The paper presents the results of survey that was conducted in two phases in the selected regions of the Czech Republic in 2009–2011. In the lines below there are the results of the second phase of the survey. The purpose of the survey was to determine the information about incompetent persons and their public guardians. The sample comprised 36 local authority workers of which 25 were appointed as public guardians and 11 were in charge of supervising guardianship. The data collection technique was a semi-structured interview. The data were processed using content analysis. The survey identified the current issues in the public guardian activity: (a) a valid law of guardianship is too general; (b) lack of a methodology for the guardian activity; (c) low public awareness about the guardianship institute, and (e), the lack of cooperation among physicians in health care for incompetent persons.

Keywords: Mental disorders. Persons deprived of capacity to legal acts. Public guardians. Guardianship system.

### Introduction

Issues related to adult guardianship have become a matter of interest in both the Czech Republic and abroad (Köller, Pilgram et al., 2009). The increased interest in guardianship results from (a) the rising number of adults with reduced ability to make decisions deprived of capacity to legal acts by court decisions due to mental illness (Juríčková, Ivanová, Kliment, 2011), (b) the changing demographic structure of the society (Ivanová et al. 2009), and (c) changing legal frames in the society (Köller, Pilgram et al., 2009). Adult persons (i.e. those aged 18 and more) suffering from mental disorders are restricted in or fully deprived of capacity to legal acts and, at the same time, are appointed guardians by legal order (hereinafter incompetent persons). Deprivation of or restriction in capacity to legal acts interferes with an individual's personal status, freedom and immunity (Marečková, Matiaško, 2010). Just because these persons are so vulnerable, care provided to them should be comprehensive (not only medical) and should stem from their needs (Juríčková, 2012).

Court statistics in the Czech Republic show that the numbers of incompetent persons and their guardians are increasing (Ministry of Justice, 2012). A task for the court-appointed guardian is an obligation to protect incompetent person's interests and to perform those legal acts which the incompetent person is not himself/herself capable of (Act No. 40/1964 Coll.).

A public guardian is a worker of a municipality who was assigned the function of the public guardian by a city mayor or by a mayor to act on his/her behalf in routine matters in a court and in other institutions in the interests of incompetent persons. Among the typical authorization of public guardian belong matters handling connected with everyday life of incompetent persons, e. g. ensuring food and living, ensuring

and management of financial means, property management etc, including the incompetent person health care.

In the Czech Republic there does not exist any statistics about the incompetent person or their guardians there is why a team of specialists from Palacký University decided to carry out a research. The research presented in this book follows a research carried out within the international project Advocacies for frail and incompetent elderly in Europe (ADEL). The research question was formulated as follows: "What are the current problems in performing a public guardian function?" The aim of the research was to find out, describe and analyze the current problems in performing the public guardian function in two regions of the Czech Republic (the Olomouc Region and the Moravian-Silesian Region). In the paper these problems are listed which the public guardian spontaneously labelled in an interview as a problem occurring in practice "very often" and which "very" complicates their performance of public guardian function.

## **Material and Methods**

The sample comprised 36 local authority workers of which 25 were appointed as public guardians and 11 were in charge of supervising guardianship. From the 25 public guardians, 23 were women and 2 men. The average respondents' age was 42,8 years. More than the half of public guardians (13 out of 25) stated that they are responsible only for the performance of public guardian function. Approximately the half of public guardians (11 out of 25) reached the high school education at the time of the research. The second phase of the survey was carried out in 13 local authorities in 11 municipalities in 2011. The data collection technique was a semi-structured interview. The respondents were asked 5 questions: 1. What kind of incompetent persons do you take care for? 2. How do you take care for them? 3. How do you evaluate cooperation with health care workers? 4. What does complicate your work? 5. What would you do for your work improvement? A participation in the research was voluntary. The data were processed using content analysis (Krippendorf, 2004). Every record was recorded separately and then the comparison of analysis results was made.

## **Results**

The survey identified the current issues in the public guardian activity: (1) a valid law of guardianship is too general; (2) lack of a methodology for the guardian activity; (3) low public awareness about the guardianship institute, and (4) the lack of cooperation among physicians in health care for incompetent persons.

The first current problem which very complicates public guardian work is the generality of current legislation on guardianship. If the public guardians (25 out of 25) do not have any clear power and responsibilities for their function performance they are not sure if they perform their work well. We chose from the respondents' answers: "We do not know if what we are doing we do well but we do it with a feeling; with common sense. we do it according to the best consciousness and conscience." (The interview no 1, lines 402-404).

The second current problem is the absence of methodology for the public guardian performance that stated all respondents (25 out of 25). We chose from the respondents' answers: "We miss such a methodology procedure to know what we can follow in case of this or that situation and he/she does not have any experience with it." (The interview no, lines 4403-4406) or: "there is not written anywhere how many incompetent persons should a guardian takes care for." (The interview no 8, line 4555).

The third current issue which very complicates the public guardian work is a low public awareness about institute of guardianship. The public guardians (25 out of 25) stated that the public consider them as nurses and concurrently they think that the public guardian is responsible for all acts of incompetent person. We chose from the answers: "even doctors do not know what does the public guardian function

entail, but it is impossible to go to the doctor's office with all of them if you have fifteen of them and all of them are in the field. And I do not talk about these public guardians who perform a cumulative function to it." (The interview no 7, lines 4326-4328).

The fourth current problem is an insufficient cooperation of doctors with public guardians in incompetent persons' health care. It followed from the data analysis that the public guardians (18 out of 25) have a problem to find the general practitioner or psychiatrist to the incompetent person. The public guardians (22 out of 25) meet while accompanying the incompetent person to a doctor in practice with these problematic situations: a) long waiting time for examination or unwillingness of the doctor to treat the incompetent person; b) the strict requiring of the public guardian presence while examining, treatment or control of incompetent person. The public guardians (23 out of 25) have also difficulties to gain for the incompetent persons, whose self-sufficiency has decreased significantly, care allowance. The public guardians (10 out of 25) think that medical examiners do not reflect all aspects of the health status of clients with mental disorder which can be a reason for denial of appropriate care allowance.

## **Discussion**

The Czech legislative on guardianship of adults is too general which places greater demands on the judge, but also the public guardians. The rights and obligations are not clearly defined in Act NO. 99/2963 Coll. Mental Disability Advocacy Center (MDAC, 2007) emphasizes the need of clearly define the right and obligations of public guardians, with the aim of the protection of persons deprived of or limited in their legal capacity. Other current problem in public guardian performance is the absence of the methodology for the public guardian performance and insufficient cooperation of doctors and public guardians in health care of incompetent persons. The authors of this paper guess when evaluation the cooperation it is necessary to take into account the objective characteristics which determine the differences between regions, e. g. access to health care, the number of general practitioners, their age etc. We can put a different professional status, culture of organization and stereotype among the barriers which complicate the interdisciplinary cooperation (Juríčková, Filka, Ivanová, 2012).

The public guardian (23 out of 25) stated in the interview that the low public awareness about the guardianship of adults is the problem in their function performance. This is also confirmed by research carried out in the Czech Republic within the project ADEL (Špaténková et al., 2011). One of the reasons which participates in the difficulty of the guardian function and which complicates the tasks filling is the insufficient cooperation with doctors in health care of incompetent persons. It is shown when evaluating the cooperation it is necessary to take into account the objective characteristics which determine the differences between both regions, e. g. access to health care, number of general practitioners, their age, occupancy, information etc.

Research results proved that the performance of public guardian function in the Czech Republic is influenced by various factors, in wider context especially social and health care state policy, or principles of distributive justice and legislation; in closer context specific decisions of courts or approaches of individual municipalities. Researchers abroad (Crampton, 2004; Quinn, 2005; Wright, 2010; Teaster et al., 2010; Uekert, 2010) warn about the problems of guardianship of adults, e. g. activities of courts and public guardians, a lack of private professional guardians, motivation of current guardian etc. The research of guardianship within the project ADEL (Köller et al., 2009) proved that in the Czech Republic there is not sufficient evidence for such a serious decision available, such as other aiming of guardianship of adults.

The research focused on the legislative modification of guardianship system which was carried out by MDAC in 2006 proved the necessity of reform of current guardianship system in the Czech Republic. This is confirmed by preliminary results within the project Health policy in relation to the care of patients with mental disorders which started by a team of professionals from Palacký University Olomouc in 2013. The aim of the project was to find out how doctors-psychiatrists selected from psychiatric hospitals evaluate the current system of mental health care in the Czech Republic (Juríčková et al., 2013).

Generally, the phenomenon of guardianship may be understood as acts on behalf of someone else with consent from the society (Juríčková, 2012). Differences in the institutions of guardianship in various countries are essentially influenced by particular welfare regimes and legal systems of guardianship in those countries (Köller, Pilgram et al., 2009). If the institution of guardianship is viewed from a system perspective, social and health aspects are closely connected. In the Czech Republic, however, the health care and social care systems are separated although the care in both is tightly interrelated.

## Conclusion

The research results proved that the public guardians in the two regions in the Czech Republic are not satisfied with conditions for the performance of public guardian function.

To ensure a high quality of care provided to incompetent persons, the following measures are necessary: (a) at the state level, adequate changes to legislation concerning the guardianship system; (b) at the regional level, methodological support of public guardianship; and (c) at the municipal level, systematic training provided to public guardians. At all the above levels, the awareness of both professionals and the general public of adult guardianship should be raised.

A change in the attitude to mentally challenged persons was to a great extent promoted by the Convention on the Rights of Persons with Disabilities (Act No. 10/2010, Collection of International Treaties). By adopting the convention, the Czech Republic is obliged to implement all the guaranteed rights and freedoms, including fundamental changes in the Czech system of guardianship. The new Civil Code (valid from 1 January 2014) reflects a change in the social paradigm – “supported decision-making”. Moreover, psychiatric care in the Czech Republic is to be reformed (Government office, 2013). In the Czech Republic, no studies on health and social aspects of the guardianship system have been carried out so far. Therefore, the research should be continued and extended to involve other municipalities and health care facilities in the Czech Republic, including psychiatric hospitals.

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## Public health epidemiology

### Association of mental health problems with weight status in adult urban population in Slovakia

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#### Summary

Obesity is an independent risk factor for mortality and morbidity. Conclusions of several studies indicate a possible existence of associations between mental health and weight. One of the easiest methods for objectifying is Body mass index (BMI). For the assessment of the mental status in the population was used the The General Health Questionnaire 12 (GHQ-12, Goldberg, 1978).

Represents a short, rapid, sensitive and reliable form suitable for detecting the existence of mental health problems (MHP). MHP were identified for achieving score 2 or higher. According to BMI individuals were assigned to either category with underweight, or with a normal weight (BMI < 25) or the category of overweight and obesity (BMI ≥ 25).

Collection was conducted in the two largest cities at random, within the European research project EURO-URHIS part 2. Administered were 3200 questionnaires. Respondents were divided by sex and age (48.3% men; mean age 59.7 ± 16.3 years). The aim of our study was to verify the hypothesis of significant impact of BMI on the incidence of MHP in Urban population in Slovakia and gender differences in the prevalence of MHP according to BMI. Statistically significant effect of BMI on the incidence of MHP was not demonstrated. Prevalence of MHP was 38.2%, significantly more often in women. Performed logistic regression confirmed to be a higher frequency of MHP in women, but the effect of weight was not confirmed by them. Conversely, men with higher BMI more frequently than women suffer MHP.

Key words: mental health problems, body mass index, overweight, gender, urban population

#### Background and aim

Obesity is a part of the metabolic syndrome and an independent risk factor for mortality in all age groups of the population. Among the simplest methods for objectifying obesity include calculation of body mass index (BMI)<sup>4</sup>. Above normal elevated BMI is associated with an increased risk of several diseases<sup>15,8, 28</sup> but the impact on mental health remains unclear and should be further explored. The prevalence of obesity is rapidly increasing worldwide in recent decades and now is a leader in the morbidity and mortality of the population of developed countries<sup>20</sup>. The term mental disorder according to ICD-10 6 is used in identifying the existence of a clinically detectable set of symptoms or behavior associated in most cases with distress and impaired interpersonal functions. 7. Several studies indicate a relationship between body weight and mental health, this relationship remains uncertain, but the findings are contradictory intensively studied 8

The aim of our study was to investigate whether in our group demonstrated significantly affect BMI on the incidence of MHP in the adult Urban population in Slovakia. The entire methodology of data collection

and database creation was coordinated by an international research team in Manchester within the project EURO-URHIS 2<sup>24</sup> (European Urban Health Indicators System part 2) which involved 12 European countries and Vietman.

## **Methodology**

Design- sectional data collection through an anonymous postal questionnaire survey, which was conducted from september 2010 to March 2011 in two major Slovak cities of Bratislava and Košice. Total 3200 people were interviewed.

Respondents were selected at random from the Registry of Citizens manner that ensures the uniform distribution by age and sex (19 to 64 years: 800 men and 800 women and 65 years and over: 800 men and 800 women). Each respondent received a questionnaire in addition to an introduction letter, which was explained by intention and use of data, self-addressed stamped envelope and the respondent was asked to reply to the questionnaire sent to that address. Return questionnaires reached 44.2% (N= 1266; 48.3% men; mean age 59.7±16.3years).

One of the question was also an indication of height and weight. These data were then calculated BMI under which the respondents were classified into two categories. When BMI values in the range  $<18.5 \leq 24.9$  in the category underweight and a normal weight and BMI values when reaching 25 or higher in the overweight category respectively obesity.

Mental state was considering the question of the General Health Questionnaire (GHQ-12 further, Goldberg, 1978)<sup>10</sup>. It is fast, reliability (Cronbach's alpha= 0.87) and sensitive screening tool used to worldwide to identify MHP in the population and the community, with the exception of clinical psychiatry. It is focused on the inability to detect normal functioning and non-psychotic Phenomenon causing distress<sup>11</sup>. Second item non 12 version is one of several (there are still 60, 30 and 28 item versions).

Respondent's answers were evaluated in accordance with the author of the questionnaire. Achievable score ranged from 0 to 12 and the incidence of MHP was identified in achieving score 2 or more.

Data were analyzed by logistic regression statistical software SPSS. Confidence interval was 95%. Reference category represented the men of normal weight respectively underweight.

## **Results**

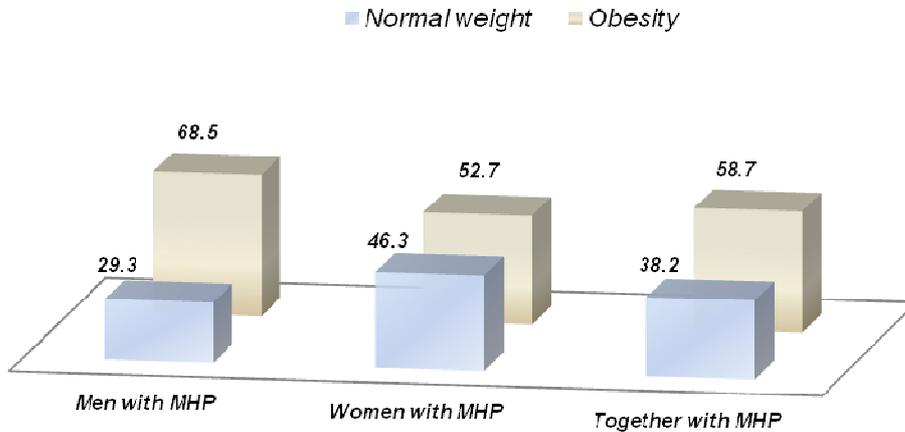
In our group of females slightly predominated (51.7%) and people aged over 65 (50.9%). The age group 65-79 accounted for 44.8% yearly. Significantly overweight respondents with overweight and obesity (60.66%), mainly in the age group 65 and over, and especially the group of men.

Prevalence MHP achieved in our study 38.2%. The incidence of MHP was significantly higher in women than in men. Moreover, women showed greater the chance that they occur MHP (OR 1.38, 95% CI 1.09-1.75,  $p < 0.01$ ) compared with men.

However, statistically significant effect on the incidence of MHP with weight in our study was not found. Between weight categories in women was not observed in the incidence of MHP significant difference, but the MHP significantly frequent in the group of obese men (68.46%).

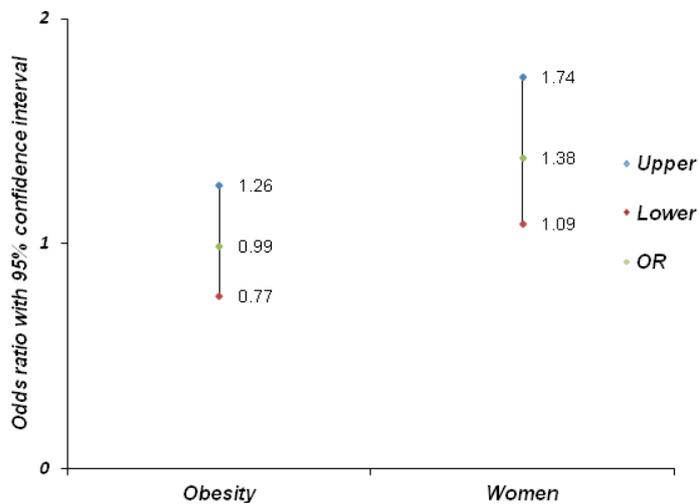
The effect of age on the incidence of MHP in our group has not a significant impact.

Figure 1. The prevalence MHP in mass groups by gender



Missing data for calculation of MHP were 1.59% and 1.35% for BMI

Figure 2. Association of MHP weighing the adult urban population (adjusted for age and sex)



Reference category were a men of normal weight, respectively with underweight.

## Discussion

In general very few studies have been concerned with how gender combined with age affects the association between BMI and mental health, particularly in total population<sup>5</sup>

The results of the studies conducted so far are mixed. Are found positive correlations between BMI and distress particularly in individuals with a BMI of 35 or above<sup>19,21</sup>. According to Huang et al., 2006<sup>14</sup> who examined these relationships in a large population study (N= 14.221) was described association between

BMI, poorer mental health and diversity of psychological distress symptoms such as low self-esteem, poor self-image and depression, particularly among people with a BMI greater than 40.

On the other hand, there are also similar to our findings in which significant mass effect on mental state has expressed and where not found an association between distress and BMI<sup>2</sup>. Relationships between BMI and mental state are ambivalent but not least we must not forget other potentially factors that may affect a number of ways whether BMI value, or the occurrence of MHP. According to some studies, there are other factors that may influence the relationship between BMI and distress, for example. Lund et al., given that unemployment affects the quality of life of morbidly obese people more than weight<sup>18</sup>.

In contrast, in some studies (Bacon, Aphramor, 2011) acknowledge the influence of factors such as rare activity, physical health, diet, changes in weight, or socioeconomic status and the relationship between BMI and distress<sup>3</sup>. In our series, we found a significantly increased prevalence MHP in women. Such a conclusion has already been described. The study, which looked hypothesis classification of obesity among mental disorders according to common diagnostic criteria ICD-10<sup>27</sup> and DSM-IV-TR<sup>1</sup> which describe (D.Marcus, E.Wildes, 2009)<sup>19</sup> a stronger correlation between BMI and distress in women than in men. Some findings also point to a possible interaction between gender and age as such (DD Carroll et al., 2010)<sup>7</sup> indicate a significant correlation between the BMI and distress in against middle age 19. But there are scores of studies whose findings have shown the effect of gender on the relationship between BMI and distress<sup>23,16</sup>.

If it is accepted that age may influence the relationship between BMI and mental health range is unclear<sup>5</sup>. In our case the effect of age have not a significant impact. In earlier studies have found correlations between older people<sup>10,11</sup> but these studies were not taken into account the overall health status, presence of chronic diseases and health restrictions.

According to the findings of other studies (Chang HH, Yen ST, 2012) among elder people a greater negative impact on mental health, respectively presence distress was caused a undedweight symptoms of disease such as overweight<sup>6,9</sup>. But the studies that were controlled by the overall health of the association between BMI and distress did not appear<sup>9</sup>. One of the conclusions of a major study involving 68.000 adult population in Sweden was found that with increasing age the incidence of distress decreasing, irrespective of the value of BMI.

Pronounced in women than in men. It is completely elucidated the role of interpersonal relationships in which people considered themselves to the perception of others and the impact of stigma on their subjective sensibility of his value<sup>5</sup>.

## Conclusion

By now there is no doubt that the mental condition significantly affects the occurrence of somatic diseases and vice versa. For a more detailed explanation but further analysis<sup>14,13,25</sup>.

Although in our study have been demonstrated to significantly affect weight on the mental state must not omit certain limitations and therefore a number of reasons our results can not be generalized to the whole Urban population in Slovak republic. Ad 1) return questionnaires was indeed relatively low (44.2%) but nevertheless achieved negligible bounty. Ad 2) to 44.8% of respondents were aged 65-79 years and ad 3) finally to take into account the advantages and shortcomings of the questionnaire data collection. It is now available is sufficient evidence of the negative impact of the worsening obesity and mental health respectively distress to the individual, but a few researches dealing with the issue of cooperation of these two risk factors and their impact on public health of selected population buys up companies.

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## **Area-level and individual-level socioeconomic factors are associated with self-rated health in adult urban citizens. Evidence from Slovak and Dutch cities**

### **Socioekonomické indikátory prostredia a jednotlivcov súvisia so sebaodsudzovaným zdravím u dospelej mestskej populácie. Dôkaz zo slovenských a holandských miest**

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#### **Abstract**

**Background:** Studies on urban neighbourhood differences have shown that living in disadvantaged areas is associated with poor health. This may be due to the socioeconomic (SE) characteristics of both these residents and of the areas where they live.

**Methods:** We examined the association of area-level and individual-level SE factors with the prevalence of poor self-rated health (SRH) among urban citizens in Slovakia and the Netherlands. We obtained data from the EU-FP7 EURO-URHIS 2.

**Results:** Multilevel logistic regression showed that poor SRH was associated with area deprivation in both countries. Regarding age by country, poorer SRH occurred more frequently in the more deprived areas for the younger age group ( $\leq 64$ ) in the Netherlands but for the older age group ( $\geq 65$ ) in Slovakia. Moreover, Slovak citizens reported poor SRH significantly more often than Dutch residents. Individual SES was significantly associated with poor SRH in both age groups and both countries for most area-level SE measures.

**Conclusion:** The effect of urban-area deprivation seems to differ between Central-European and Western European countries. These findings might be used by local policy makers in both countries, particularly in preparation of policies with focus on social determinants of health.

**Key words:** urban health, self-rated health, area deprivation, socioeconomic indicators

#### **Abstrakt**

**Úvod:** Štúdie zaoberajúce sa rozdielmi medzi mestskými časťami preukázali že bývanie v znevýhodnených oblastiach súvisí s horším zdravím. Daný jav môže byť spôsobený jednak socioekonomickými (SE) charakteristikami samotných obyvateľov, ale aj samotným prostredím, v ktorom žijú.

**Metódy:** Zisťovali sme súvislosť medzi SE faktormi na úrovni mestských častí a jednotlivcov s prevalenciou neuspokojivého sebaodsudzovaného zdravia (SPZ) medzi obyvateľmi miest na Slovensku a v Holandsku. Údaje sme získali v rámci EU-FP7 projektu EURO-URHIS 2.

Výsledky: Viacúrovňová logistická regresia ukázala že SPZ súviselo s depriváciou prostredia v oboch krajinách. Neuspokojivé SPZ sa vyskytovalo častejšie vo viac deprivovaných oblastiach v mladšej vekovej kategórii ( $\leq 64$ ) v Holandsku, ale v staršej vekovej kategórii ( $\geq 65$ ) na Slovensku. Obyvatelia slovenských miest hodnotili svoje zdravie ako neuspokojivé signifikantne častejšie ako obyvatelia holandských miest. SE indikátory na úrovni jednotlivcov signifikantne súviseli s neuspokojivým SPZ v oboch vekových kategóriách a v oboch krajinách pre väčšinu SE indikátorov prostredia.

Záver: Naše výsledky ukazujú, že SE indikátory na úrovni jednotlivcov súvisia so SPZ viac než s depriváciou prostredia. Efekt deprivácie sa líši medzi krajinami strednej a západnej Európy. Naše zistenia môžu byť využité pri tvorbe politiky na lokálnej úrovni v oboch krajinách; obzvlášť pri tvorbe politik zameraných na sociálne determinanty zdravia.

**Kľúčové slová:** mestské zdravie, sebaopisované zdravie, deprivované prostredie, socioekonomické indikátory

## **Introduction**

With an ever-increasing number of urban citizens, the context of cities has become of a particular importance. Studies on urban neighbourhood differences have shown that living in disadvantaged areas is associated with poor health (Hou and Myles, 2005; Reijneveld, 2002, Reijneveld, 1998; Collins et al., 2009; Browning et al., 2003; Stafford et al., 2001). This may be due to the socioeconomic (SE) characteristics of both these residents (Reijneveld and Schene, 1998) and of the areas where they live (Reijneveld, 2002; Gray et al., 2012; Giatti et al., 2010; Agyemang et al., 2007).

A comparison on urban-level SE health differences between Central European and Western European countries is lacking. Slovakia and the Netherlands are typical examples of a Central European and a Western European country, respectively. Regarding Slovakia, to our knowledge the only available study is that of Rosicova et al., who found in a series of ecological studies that SE and ethnic indicators predicted the standardised mortality rate and alcohol-related mortality rate among districts in Slovakia in men aged 20 - 64 years, as well as perinatal and infant mortality (Rosicova et al., 2011a; Rosicova et al., 2011b, Rosicova et al., 2009). Regarding the Netherlands, the effect of areas on health have been studied much more intensively (Reijneveld, 2002, Reijneveld, 1998; Reijneveld and Schene, 1998; Agyemang et al., 2007; Kamphuis et al., 2010; van Hooijdonk et al., 2007).

Our study examined the impact of area-level and individual-level SE factors on the prevalence of poor SRH among urban citizens in Slovakia and in the Netherlands. Our aim was to assess whether the prevalence in poor SRH was higher in deprived areas and whether this differed between Slovakia and the Netherlands per age group.

## **Methods**

### *Sample and procedure*

The data was collected within the European Urban Health Indicators project (EURO-URHIS 2) in the two largest cities in Slovakia, Bratislava and Kosice and in two comparable Dutch cities, Amsterdam and Utrecht.

A representative sample regarding age and gender comprised of 1600 persons from each city was equally stratified by age groups (19-64,  $\geq 65$ ) and gender. In both countries all respondents received identical self-administered postal questionnaires along with a stamped return envelope. Questionnaires were accompanied by a cover letter informing about the project and a confidentiality statement on each returned questionnaire.

Regarding the Slovak cities, a representative sample was randomly selected by the Population Registry Office of the Slovak Republic. Data collection lasted from September 2010 to March 2011.

Regarding Dutch cities a representative sample was obtained from the municipal population registry in each city. Data collection lasted from September 2010 to January 2011.

Invalid addresses (n=215), deaths (n=9) and incapacities to complete the questionnaire with living/working abroad (n=46) were deducted from the original sample size. Thus, the overall response rate in Slovakia was 44.2% (n=1296), with refusals accounting for 26.0% (n=761) and non-respondents for 29.8% (n=873). Respondents did not differ from non-respondents regarding age ( $F=134.7$ ,  $t=-0.77$ ,  $p=0.44$ ) and gender ( $\chi^2=1.92$ ,  $p=0.17$ ). The overall response rate in the Netherlands was 46.9% (n=1484), after invalid addresses (n=26), deaths and the incapacity to complete the questionnaire (n=9) were subtracted. Refusals represented 16.3% (n=517) and non-respondents 36.8% (n=1164). Differences between respondents and non-respondents regarding two age groups (Cohen's  $W=0.07$ ) and gender (Cohen's  $W=0.06$ ) were trivial.

## Measures

The original questionnaire of EURO-URHIS 2 was translated from English into Slovak/Dutch and back translated.

### *Individual-level data*

*Self-rated health* (SRH) was measured by a single question: How is your health in general? (The European health interview survey, 2006). The answers were dichotomised as poor ((very) bad, fair) and (very) good health.

The socioeconomic status (SES) of individuals was measured by educational level, household income and financial strain. *Education* was assessed by a question on the highest educational level attained (The European health interview survey, 2006). *Household income* was measured by self-reported annual household income (The European health interview survey, 2006). *Financial strain* (EURO-URHIS 2, 2011) was assessed by asking respondents "Do you have enough money for daily expenses, e.g. accommodation, travel, clothing, food?" with answer options of yes or no.

### *Neighbourhood-level data*

Unemployment rates and the proportion of primary and university educated residents were used to describe the SES of neighbourhoods.

Slovak neighbourhoods concerned local administrative units on the lower level (the LAU 2 level) as defined by Eurostat (Eurostat, 2010). Dutch neighbourhoods concerned areas based on postcode sectors. We used Census data for Slovak (Statistical Office of the Slovak Republic, 2001) and municipality data for Dutch neighbourhoods (UWV WERKbedrijf, 2010) for the total proportion of unemployed people (*Unemployed  $\geq 16$  years looking for their first job or having worked before*). Area-level indicators on primary and university educated residents were constructed from the EURO-URHIS2 survey. Data regarding neighbourhoods were split into tertiles of deprivation: least favourable, medium and most favourable.

### *Statistical analyses*

First, we assessed differences in poor SRH by area deprivation using chi-square tests. Second, we employed multilevel analyses to assess differences in SRH by area deprivation. We computed the odds ratio for tertiles of neighbourhood deprivation measures, crude and adjusted for age, sex, and their interactions. We then added country to the model, and assessed the interaction of country with area deprivation. Third, we added the measures of individual SES to the model and assessed whether they explained differences in SRH. Next to the crude model (with one of the area measures included), we

adjusted for the various measures of individual-level SES separately and jointly. Finally, median odds ratios (MOR) were calculated as interpretable measures of neighbourhood-level variance (Merlo et al., 2006). Poor SRH was modelled as a binary outcome variable in logistic regression models of citizens (level 1) nested within neighbourhoods (level 2). Multilevel regression analyses were performed in MLwiN 2.02 (Rasbash et al., 2005). We also used SPSS 18.

## Results

### *Characteristics of the sample*

The distribution of respondents' background characteristics and area characteristics are described in Table 1.

Respondents from the least favourable neighbourhoods for each type of area deprivation reported poor health more often than other respondents (Table 2 and Table 3, prevalence in brackets). The prevalence of poor health was significantly higher for both age groups in the least favourable neighbourhood regarding university education and further in the age group of 65 and above with the area indicator for primary education.

### *Differences in SRH, 19-64 years old (Table 2)*

In 19-64-year-olds poor SRH occurred more frequently in the least favourable areas regarding university education, after adjustment for age and gender and after additional adjustment for individual SES characteristics (OR 1.96, 95% CI 1.02-3.74) (Model 7). The occurrence of poor SRH did not differ for the area indicator unemployment. The risk of reporting poor health in areas characterised by a high proportion of primary educated and unemployed residents was in general higher for Slovak residents than for the Dutch. Individual SES characteristics were significant predictors of poor SRH in all models.

### *Differences in SRH, 65 years old and over (Table 3)*

Poor health was reported significantly more often in the least deprived areas regarding primary education by Slovak residents (OR 2.69, 95% CI 1.72-4.20) (Model 7). The greatest risk for poor SRH occurred in areas with a high proportion of unemployed residents. Area clustering of poor SRH was observed in all three types of area deprivation until the interaction term regarding area deprivation by country was included in the model.

## Discussion

This study explored the impact of area-level and individual-level socioeconomic factors on the prevalence of poor SRH among urban citizens in Slovakia and in the Netherlands in two age groups (19-64 old and 65 and over). We had four main findings. First, in both countries, poor SRH was associated with area deprivation, but the results differed by type of area indicator and by age group. Second, Slovak citizens reported poor SRH significantly more often than Dutch residents. Third, the pattern differed by country and age group regarding the association between poor SRH and area deprivation. In the younger age group a strong association between poor SRH and area deprivation was found for all three area-level indicators in the Netherlands but not as much in Slovakia. The reverse was observed for the elderly. For Slovakia we found a strong association among the elderly, but this was weak for the Netherlands. Fourth, individual SE factors were significantly associated with poor SRH in both age groups and both countries.

In line with previous studies (Hou and Myles, 2005; Reijneveld, 2002; Reijneveld, 1998; Collins et al., 2009; Browning et al., 2003; Stafford et al., 2001) our results confirmed the association of poor health with area deprivation. The risk of reporting poor health was higher for Slovak residents than for the Dutch. This supports the conclusions of Bobak et al. (2000) that the high frequency of poor SRH in Central and Eastern Europe is unlikely to be an artefact. Overall, in both countries a part of the poor SRH was

explained by inclusion of demographic and individual-level SE characteristics. This indicates that these individual factors account for a part of the area characteristics, i.e., that an aggregation effect occurs, and this holds similarly for Western and Central European countries.

Our observation of a steeper gradient regarding area deprivation in the younger age group in the Netherlands may suggest that socioeconomic residential segregation is more advanced in the Netherlands than in Slovakia. This explanation may be supported by the study of Dragano et al. (2007) who found relatively weak effects of urban neighbourhoods on health behaviours in Czech Republic than in Germany. We hypothesise, similarly as Dragano et al. that this may be due to the communist past of the Slovak Republic as post-communist cities have particular features, similarly as in Czech Republic. We assume that although residential segregation was not found in Slovakia it may yet be visible in the future as economic transformations proceed.

On the other hand, the gradient in reporting poor health for the elderly was much steeper in Slovakia than in the Netherlands. In line with this, Vignoli and De Santis (2010) presented two ideas. The first is that those who have spent their adolescent and adult years in environments of relative economic deprivation are economically worse off also in their old age. Second, if economically developed areas are also more expensive, then those who are relatively worse off tend to leave them and to move towards cheaper, but also more depressed areas, where they also reside in their old age. These findings open several questions for discussion regarding differences between and within Western and Central European countries in social security and healthcare systems.

#### *Strengths and limitations*

Strengths of this study are that we used a standardised sampling, recruitment and data collection protocols, which allowed us to make a proper and international comparison and assessment of health characteristics of the urban population. Limitations of this study are the cross sectional design, relatively low response rate and the use of area-level indicators constructed from the individual-level variables for the primary and university area indicator

#### *Implications*

Our data might be used by local policy makers in both countries in preparing policy documents with a focus on social determinants of health in local/urban settings. Further research is needed particularly in Slovakia in order to assess more precisely area-level influence on health of the residents.

### **Conclusion**

We explored whether individual SES is associated with SRH more strongly than area deprivation. Slovak citizens reported poor SRH significantly more often than Dutch residents. While the association between poor SRH and area deprivation in younger age groups for Slovakia was rather flat, for the Netherlands it was steeper, with a higher prevalence of poor SRH in deprived areas. In contrast, for the elderly the association of SRH and area deprivation was steeper in Slovakia, but flat for the Netherlands. Individual SES was significantly associated with poor SRH in both age groups and both countries for most area-level measures. These findings open several questions for future studies in urban-level differences between and within Western and Central European countries.

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Table 1. Background characteristics and area characteristics with the main study variables for two age groups per country

	19-64 (N=1268)			65+ (N=1384)		
	Netherlands (N=655)	Slovakia (N=613)	p <sup>a</sup>	Netherlands (N=749)	Slovakia (N=635)	p <sup>a</sup>
<b>Individual characteristics</b>						
Age Mean age (±SD)	40.1(±12.3)	46.1 (±11.8)	<0.001	74.4(±6.9)	72.9(±6.1)	<0.001
Sex - Men (N, %)	280 (42.7)	257 (41.9)	n.s.	381 (50.9)	346 (54.5)	n.s.
Self-rated health (N, %)			<0.001			<0.001
poor	139 (21.2)	205 (33.4)		360 (48.1)	440 (69.3)	
Household income (N, %)			<0.001			0.007
low	132 (20.2)	86 (14.0)		211 (28.2)	279 (43.9)	
medium	139 (21.2)	162 (26.4)		205 (27.4)	202 (31.8)	
high	244 (37.3)	286 (46.7)		94 (12.6)	74 (11.7)	
Adjusted household income (€) Mean (±SD)	49 752 (±38 037)	11 936 (±9977)	<0.001	24 707 (±19 335)	6501 (±3314)	<0.001
Education (N, %)			<0.001			<0.001
no formal or primary	42 (6.4)	30 (4.9)		183 (24.4)	91 (14.3)	
secondary	226 (34.5)	292 (47.6)		381 (50.9)	320 (50.4)	
university	382 (58.3)	290 (47.3)		162 (21.6)	223 (35.1)	
Financial strain (N, %)			<0.001			<0.001
yes	74 (11.3)	134 (21.9)		64 (8.5)	182 (28.7)	
<b>Area characteristics</b>						
Number of respondents per neighbourhood (Mean)			Number of neighbourhoods			
		Netherlands (N=201)		Slovakia (N=61)		
1_4 (2)		66		20		
5_14 (9)		122		14		
15_39 (20)		13		16		
Over 40 (80)		0		11		

Note: The missing cases for variables are as follows: adjusted household income (Slovakia 12.7%, Netherlands 27.0%), education (Slovakia 0.2%, Netherlands 2.0%); financial strain (Slovakia 1.0%, Netherlands 1.5%)<sup>a</sup> - chi-square test for categorical and t- test for continuous variables

Table 2. Odds ratios with 95% confidence intervals and chi-square prevalences (in brackets) of poor self-rated health in deprivation tertiles of urban neighbourhoods in Slovakia (Bratislava, Kosice) and in the Netherlands (Amsterdam, Utrecht) for respondents aged 19-64

Measure of area deprivation	Model 1 Adjusted for age, gender <sup>a</sup>	Model 2 Adjusted M1+country	Model 3 M2+country *area deprivation	Model 4 M3+income status	Model 5 M3+education	Model 6 M3+financial strain	Model 7 M3+income, education, financ.strain
University education							
Most favourable (20.1)	1	1	1	1	1	1	1
Medium (24.7)	1.27 (0.90-1.80)	1.27 (0.90-1.80)	1.56 (0.94-2.60)	1.46 (0.78-2.70)	1.06 (0.62-1.81)	1.41 (0.83-2.40)	1.15 (0.60-2.21)
Least favourable (35.2)	<b>2.04 (1.48-2.82)</b>	<b>1.96 (1.41-2.71)</b>	<b>2.95 (1.79-4.84)</b>	<b>2.72 (1.49-4.97)</b>	1.65 (0.97-2.81)	<b>2.32 (1.38-3.90)</b>	<b>1.96 (1.02-3.74)</b>
Country							
The Netherlands		1	1	1	1	1	1
Slovakia		<b>1.34 (1.02-1.76)</b>	<b>2.05 (1.22-3.44)</b>	<b>2.46 (1.35-4.50)</b>	<b>1.76 (1.03-2.99)</b>	1.66 (0.96-2.85)	1.83 (0.98-3.42)
Interaction area deprivation x country							
Slovakia*most favourable			1	1	1	1	1
Slovakia*medium favourable			0.67 (0.33-1.36)	0.73 (0.32-1.66)	0.83 (0.40-1.71)	0.72 (0.34-1.51)	0.86 (0.36-2.02)
Slovakia*least favourable			<b>0.48 (0.25-0.93)</b>	0.53 (0.25-1.14)	0.64 (0.33-1.28)	0.56 (0.28-1.12)	0.61 (0.27-1.37)
Measures of individual SES							
Medium income status (vs high)				<b>1.51 (1.05-2.16)</b>			1.06 (0.72-1.55)
Low income status (vs high)				<b>3.42 (2.31-5.05)</b>			<b>1.64 (1.04-2.60)</b>
Secondary education (vs university)					<b>2.73 (2.03-3.69)</b>		<b>1.94 (1.37-2.76)</b>
Primary education (vs university)					<b>7.02 (3.99-12.34)</b>		<b>2.85 (1.39-5.87)</b>
Financial strain (vs no strain)						5.47 (3.91-7.66)	<b>2.96 (1.96-4.54)</b>
QIC	1368.9	1365.6	1362.7	1056.7	1049.4	1024.6	1003.3
Random area effect (median odds ratio)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary education							
Most favourable (23.8)	1	1	1	1	1	1	1
Medium (28.3)	1.29 (0.94-1.76)	1.29 (0.94-1.80)	<b>1.93 (1.16-3.22)</b>	1.59 (0.87-2.90)	<b>1.72 (1.01-2.91)</b>	<b>1.82 (1.07-3.09)</b>	1.50 (0.81-2.78)
Least favourable (30.5)	<b>1.61 (1.16-2.22)</b>	<b>1.69 (1.22-2.34)</b>	<b>2.83 (1.74-4.61)</b>	<b>1.85 (1.04-3.31)</b>	<b>2.00 (1.18-3.56)</b>	<b>2.15 (1.29-3.60)</b>	1.57 (0.85-2.92)

Country							
The Netherlands	1	1	1	1	1	1	1
Slovakia	<b>1.51 (1.15-1.98)</b>	<b>2.53 (1.59-4.03)</b>	<b>2.61 (1.55-4.41)</b>	<b>2.32 (1.44-3.73)</b>	<b>2.05 (1.26-3.33)</b>	<b>2.06 (1.20-3.53)</b>	
Interaction area deprivation x country							
Slovakia*most favourable		1	1	1	1	1	1
Slovakia*medium favourable		<b>0.52 (0.27-1.00)</b>	0.61 (0.29-1.30)	<b>0.51 (0.26-0.99)</b>	0.53 (0.27-1.04)	0.60 (0.27-1.33)	
Slovakia*least favourable		<b>0.38 (0.20-0.75)</b>	0.59 (0.28-1.27)	<b>0.46 (0.23-0.92)</b>	<b>0.42 (0.20-0.85)</b>	0.61 (0.28-1.32)	
Measures of individual SES							
Medium income status (vs high)			<b>1.59 (1.12-2.27)</b>				1.06 (0.73-1.56)
Low income status (vs high)			<b>3.56 (2.41-5.25)</b>				<b>1.65 (1.05-2.60)</b>
Secondary education (vs university)					<b>2.89 (2.16-3.85)</b>		<b>2.12 (1.50-2.97)</b>
Primary education (vs university)					<b>6.62 (3.75-11.7)</b>		<b>3.06 (1.50-6.27)</b>
Financial strain (vs no strain)						<b>5.54 (3.96-7.77)</b>	<b>2.95 (1.95-4.45)</b>
QIC	1382.0	1374.0	1366.7	1066.7	1050.8	1034.7	1006.3
Random area effect (median odds ratio)	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 2 – cont.

Unemployment							
Most favourable (25.6)	1	1	1	1	1	1	1
Medium (26.6)	1.02 (0.73-1.41)	1.07 (0.77-1.48)	1.30 (0.81-2.10)	1.55 (0.86-2.80)	1.16 (0.71-1.90)	1.24 (0.75-2.03)	1.34 (0.72-2.46)
Least favourable (29.8)	1.27 (0.94-1.72)	1.27 (0.94-1.72)	<b>1.81 (1.13-2.91)</b>	<b>2.01 (1.11-3.62)</b>	1.31 (0.80-2.17)	1.44 (0.87-2.38)	1.72 (0.93-3.20)
Country							
The Netherlands		1	1	1	1	1	1
Slovakia		<b>1.44 (1.10-1.89)</b>	<b>1.94 (1.26-2.96)</b>	<b>2.95 (1.75-4.97)</b>	<b>1.76 (1.14-2.73)</b>	1.48 (0.94-2.32)	<b>2.09 (1.22-3.60)</b>
Interaction area deprivation x country							
Slovakia*most favourable			1	1	1	1	1
Slovakia*medium favourable			0.71 (0.36-1.39)	<b>0.47 (0.22-0.98)</b>	0.76 (0.38-1.53)	0.81 (0.40-1.63)	0.62 (0.27-1.40)
Slovakia*least favourable			0.54 (0.29-1.01)	0.46 (0.21-1.02)	0.66 (0.34-1.26)	0.71 (0.37-1.38)	0.54 (0.25-1.17)
Measures of individual SES							
Medium income status (vs high)				<b>1.58 (1.11-2.25)</b>			1.06 (0.72-1.55)

Low income status (vs high)				<b>3.58 (2.43-5.28)</b>			<b>1.65 (1.04-2.60)</b>
Secondary education (vs university)					<b>2.89 (2.17-3.86)</b>		<b>2.09 (1.49-2.95)</b>
Primary education (vs university)					<b>7.55 (4.32-13.20)</b>		<b>3.23 (1.59-6.57)</b>
Financial strain (vs no strain)						<b>5.68 (4.06-7.95)</b>	<b>2.89 (1.91-4.35)</b>
QIC	1388.6	1382.2	1381.7	1065.5	1049.3	1035.4	1006.2
Random area effect (median odds ratio)	1.14	1.00	1.00	1.00	1.00	1.00	1.00

a adjusted for age, sex and their interactions; statistical significance at p<0.05 is indicated in **bold**

QIC (Quasi Likelihood under Independence Model Criterion)

Table 3. Odds ratios with 95% confidence intervals and chi-square prevalences (in brackets) of poor self-rated health in deprivation tertiles of urban neighbourhoods in Slovakia (Bratislava, Kosice) and in the Netherlands (Amsterdam, Utrecht) for respondents aged 65 and above

Measure of area deprivation	Model 1 Adjusted for age and gender <sup>a</sup>	Model 2 Adjusted M1+country	Model 3 M2+country *area deprivation	Model 4 M3+income status	Model 5 M3+education	Model 6 M3+financial strain	Model 7 M3+income, education, financial strain
University education							
Most favourable (52.3)	1	1	1	1	1	1	1
Medium (52.9)	1.23 (0.92-1.63)	1.26 (0.94-1.68)	<b>1.02 (0.71-1.48)</b>	0.82 (0.52-1.30)	0.83 (0.56-1.22)	1.05 (0.72-1.54)	0.79 (0.49-1.28)
Least favourable (61.4)	<b>1.45 (1.12-1.88)</b>	<b>1.36 (1.04-1.77)</b>	1.11 (0.78-1.58)	0.93 (0.60-1.45)	0.75 (0.52-1.10)	1.15 (0.80-1.66)	0.84 (0.53-1.34)
Country							
The Netherlands		1	1	1	1	1	1
Slovakia		<b>2.57 (2.05-3.23)</b>	<b>1.83 (1.22-2.75)</b>	<b>1.67 (1.05-2.67)</b>	<b>1.88 (1.23-2.86)</b>	<b>1.54 (1.01-2.35)</b>	1.52 (0.93-2.48)
Interaction area deprivation x country							
Slovakia*most favourable			1	1	1	1	1
Slovakia*medium favourable			1.68 (0.93-3.06)	<b>2.02 (1.02-4.00)</b>	<b>2.05 (1.11-3.81)</b>	1.53 (0.82-2.83)	<b>2.06 (1.02-4.20)</b>
Slovakia*least favourable			1.60 (0.94-2.72)	<b>1.86 (1.00-3.47)</b>	<b>2.18 (1.25-3.79)</b>	1.52 (0.88-2.64)	<b>2.00 (1.05-3.82)</b>

Measures of individual SES							
Medium income status (vs high)					<b>1.94 (1.31-2.88)</b>		<b>1.59 (1.05-2.39)</b>
Low income status (vs high)					<b>3.43 (2.31-5.13)</b>		<b>2.00 (1.28-3.12)</b>
Secondary education (vs university)						<b>2.11 (1.61-2.78)</b>	<b>1.51 (1.09-2.08)</b>
Primary education (vs university)						<b>3.67 (2.55-5.27)</b>	<b>2.38 (1.50-3.78)</b>
Financial strain (vs no strain)							<b>3.84 (2.66-5.54)</b> <b>3.10 (2.01-4.78)</b>
QIC	1892.0	1813.5	1813.1	1329.5	1333.1	1315.7	1289.0
Random area effect (median odds ratio)	1.63	1.17	1.15	1.00	1.10	1.00	1.00
Primary education							
Most favourable (52.5)	1	1	1	1	1	1	1
Medium (58.6)	1.26 (0.97-1.62)	1.25 (0.96-1.63)	<b>1.59 (1.11-2.28)</b>	1.23 (0.79-1.93)	1.38 (0.94-2.01)	<b>1.47 (1.02-2.13)</b>	1.09 (0.69-1.73)
Least favourable (62.9)	<b>1.53 (1.17-2.00)</b>	<b>1.69 (1.28-2.23)</b>	<b>1.99 (1.39-2.85)</b>	1.42 (0.91-2.21)	<b>1.58 (1.08-2.31)</b>	<b>1.83 (1.27-2.64)</b>	1.21 (0.76-1.91)
Country							
The Netherlands		1	1	1	1	1	1
Slovakia		<b>2.70 (2.15-3.39)</b>	<b>3.61 (2.47-5.29)</b>	<b>3.04 (1.98-4.68)</b>	<b>4.05 (2.73-6.01)</b>	<b>2.83 (1.91-4.18)</b>	<b>2.69 (1.72-4.20)</b>
Interaction area deprivation x country							
Slovakia*most favourable			1	1	1	1	1
Slovakia*medium favourable			0.59 (0.35-1.01)	0.77 (0.42-1.42)	0.64 (0.37-1.10)	0.62 (0.36-1.08)	0.84 (0.45-1.58)
Slovakia*least favourable			0.69 (0.39-1.22)	0.95 (0.49-1.83)	0.77 (0.43-1.39)	0.71 (0.39-1.27)	1.02 (0.52-2.00)
Measures of individual SES							
Medium income status (vs high)					<b>1.91 (1.30-2.82)</b>		<b>1.57 (1.04-2.36)</b>
Low income status (vs high)					<b>3.27 (2.20-4.86)</b>		<b>1.94 (1.25-3.02)</b>

Secondary education (vs university)						<b>2.00 (1.53-2.64)</b>	<b>1.47 (1.07-2.02)</b>
Primary education (vs university)						<b>3.20 (2.22-4.59)</b>	<b>2.27 (1.43-3.59)</b>
Financial strain (vs no strain)						<b>3.65 (2.53-5.28)</b>	<b>3.11 (2.02-4.78)</b>
QIC	1891.7	1804.9	1803.8	1352.5	1350.4	1317.9	1293.5
Random area effect (median odds ratio)	1.63	1.15	1.00	1.00	1.00	1.00	1.00

Table 3 – cont.

Unemployment							
Most favourable (57.0)	1	1	1	1	1	1	1
Medium (58.0)	1.04 (0.81-1.35)	1.13 (0.87-1.48)	1.39 (0.97-1.99)	1.40 (0.89-2.19)	1.14 (0.85-1.81)	1.32 (0.92-1.91)	1.32 (0.83-2.08)
Least favourable (58.7)	1.05 (0.81-1.36)	1.22 (0.93-1.59)	<b>1.93 (1.36-2.75)</b>	<b>1.69 (1.08-2.63)</b>	<b>1.55 (1.08-2.25)</b>	<b>1.81 (1.26-2.60)</b>	1.48 (0.93-2.34)
Country							
The Netherlands		1	1	1	1	1	1
Slovakia		<b>2.66 (2.11-3.34)</b>	<b>4.17 (2.92-5.95)</b>	<b>4.18 (2.77-6.33)</b>	<b>4.67 (3.23-6.77)</b>	<b>3.21 (2.22-4.63)</b>	<b>3.65 (2.38-5.61)</b>
Interaction area deprivation x country							
Slovakia*most favourable			1	1	1	1	1
Slovakia*medium favourable			0.66 (0.39-1.15)	0.65 (0.34-1.22)	0.70 (0.40-1.22)	0.71 (0.41-1.25)	0.69 (0.36-1.31)
Slovakia*least favourable			<b>0.32 (0.18-0.55)</b>	<b>0.33 (0.18-0.63)</b>	<b>0.37 (0.21-0.65)</b>	<b>0.34 (0.19-0.59)</b>	<b>0.39 (0.20-0.75)</b>
Measures of individual SES							
Medium income status (vs high)				<b>1.83 (1.24-2.71)</b>			<b>1.51 (1.00-2.28)</b>
Low income status (vs high)				<b>3.19 (2.14-4.75)</b>			<b>1.89 (1.22-2.95)</b>
Secondary education (vs university)					<b>2.05 (1.56-2.69)</b>		<b>1.47 (1.07-2.02)</b>
Primary education (vs university)					<b>3.35 (2.34-4.08)</b>		<b>2.26 (1.43-3.57)</b>
Financial strain (vs no strain)						<b>3.70 (2.56-5.34)</b>	<b>3.07 (1.99-4.73)</b>
QIC	1444.0	1370.6	1355.9	1324.6	1328.3	1311.0	1287.4
Random area effect (median odds ratio)	1.65	1.26	1.00	1.00	1.00	1.00	1.00

a adjusted for age, sex and their interactions; statistical significance at p<0.05 is indicated in **bold**

QIC (Quasi Likelihood under Independence Model Criterion)

## Traumatic brain injury mortality in Slovakia (2010-2011)

### Mortalita v dôsledku traumatických úrazov mozgu na Slovensku (2010-2011)

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#### Abstract

Background: Traumatic brain injury (TBI) is a major public health problem worldwide. The purpose of this paper was to describe the epidemiological situation of TBI mortality in Slovakia.

Method: ICD-10 was used to TBI epidemiology description. Data was obtained from Statistical Office of the Slovak Republic.

Result The SMR in Slovakia for the years 2010 and 2011 was 11.4 and 10.8/100 000 per year, respectively. The highest TBI mortality due to TBI was in the Banská Bystrica region in 2010 and in the Žilina region in 2011. Fall-related TBIs were the leading causes of TBI-related death in both years (2010- 37.3 %; 2011- 39.3 %). Motor vehicle accidents, assaults and exposure to mechanical forces are the other major etiologies of TBI in Slovakia. Suicide caused 7.5 % and 8.2 % of all TBI deaths in 2010 and 2011. The risk of dying increased with increased age.

Conclusion: Preventive activities focused on TBI deaths prevention should be implemented in the Žilina region, where SMR for TBI was the highest. Activities should include prevention of falls and accidents, because they are the most frequently causes of deaths after TBI in Slovakia. Our attention should be focused on risk groups (for example, older people, and men).

Keywords: Traumatic brain injury, mortality, Slovakia, gender, age, external causes

#### Abstrakt

Úvod: Traumatické úrazy mozgu patria k významným problémom verejného zdravotníctva. Cieľom výskumu bolo popísať epidemiologickú situáciu mortality v dôsledku traumatických úrazov mozgu na Slovensku v rokoch 2010 a 2011.

Metodika Na popis mortality bola využitá klasifikácia MKCH-10. Údaje sme získali zo Štatistického úradu SR.

Výsledky Štandardizovaná mortalita v dôsledku traumatických úrazov mozgu bola v roku 2010 11,4 úmrtí na 100 000 obyvateľov, v roku 2011 poklesla na 10,8 úmrtí na 100 000 obyvateľov. Najvyššia štandardizovaná mortalita v dôsledku TBI bola zistená v roku 2010 v Banskobystrickom kraji a v roku 2011 v Žilinskom kraji. Pády boli najčastejšou externou príčinou úmrtia v dôsledku traumatických úrazov mozgu v obidvoch sledovaných rokoch (2010- 37.3 %; 2011- 39.3 %). Významnou externou príčinou úrazov mozgu boli aj dopravné nehody, násilie a vystavenie účinku mechanických síl. Samovraždy spôsobili v roku 2010 7,5 % úmrtí a v roku 2011 8,2 % úmrtí v dôsledku traumatického úrazu mozgu. Riziko úmrtia sa zvyšovalo s rastúcim vekom.

Záver Aktivity zamerané na prevenciu traumatických úrazov mozgu by sa mali implementovať najmä v Žilinskom kraji, kde bola zistená najvyššia štandardizovaná mortalita. Aktivity by mali zahŕňať prevenciu pádov a dopravných nehôd. Tiež by sme sa mali zamerať na rizikové osoby (starší ľudia, muži).

**Kľúčové slová :** traumatické úrazy mozgu, mortalita, Slovensko, pohlavie, vek, externé príčiny

## **Introduction**

Traumatic brain injury (TBI) can be defined as “a traumatically induced structural injury and/or physiological disruption of brain function as a result of an external force that is indicated by new onset or worsening of at least one of the following clinical signs, immediately following the event: any period of loss of or a decreased level of consciousness, post-traumatic amnesia, alteration of consciousness/mental state, neurological deficits that may or may not be transient, and intracranial lesion” (Cifu, 2009, p. 16). Main events that can cause TBIs are a blow to the head, a fall, a bullet, a high-speed crash, or an explosion (WHO, 2004).

It is estimated that 10 million people are disabled by TBIs worldwide (Hyder, 2007). In Europe the estimated incidence of TBIs is 235 per 100 000 population per year. This incidence includes TBI inpatients and TBI dead patients before hospital admissions (Tagliaferri, 2006). In west European countries incidence of TBIs with necessary hospitalization is 115 per 100 000 population per year (Center of Excellence Neurotrauma, 2008). TBIs are the main causes of disability of people younger than 40 years of age (WHO, 2006). The probability of death for people after TBI is 1.5 times higher than for people with similar age, gender, and race in general population (Harrison-Felix, 2009).

It is important to focus our attention on TBIs because of its economic burden on individual people, their families (Hollingworth, 2009), and society (Caro, 2010). Advances in critical care, imaging, and the reorganization of trauma systems led to a reduction in deaths and disability resulting from TBIs (Ghajar, 2000). Despite TBI outcomes improvement, patients after TBIs have often difficulties with movement, memory, thinking, communication and behavior (WHO, 2004). It is estimated that from all moderate or severely brain injured European patients one third of patients die, 3 % of patients are in vegetative states, 6 % of patients have serious disabilities, 20 % patients have moderate disabilities and only 31 % of patients are well-recovered (Murray, 1999). The cost for a health care system for TBI patients and financial losses because of PYLLs after TBI are in Europe 60 billion \$ per year (Caro, 2010).

This shows that TBIs are important public health issues. Information about TBI epidemiology (causes of TBI, geographical distribution, risk factors, cost, social impact, and so on) are necessary for designing effective interventions and for the evaluation of these interventions. The purpose of this paper is to describe epidemiological situation of TBI mortality in Slovakia and (a) to determine TBI mortality in Slovakia in 2010 and 2011; (b) to compare TBI mortality due to selected factors (age, gender, and region), and (c) to describe external causes of death after TBI in Slovakia.

## **Materials and Methods**

ICD-10 was used to TBI epidemiology description. Data was obtained from Statistical Office of Slovak Republic. Deaths were classified as TBI-related deaths when primary causes of deaths from death certificates were some of the categories from table 1 (CDC, 2010). If primary causes of death were reported onto death certificates only by simple code (S01, S02), then the death certificates were excluded from research.

Table 1. ICD-10 codes for traumatic brain injury-related deaths

Description	ICD-10 (deaths) by CDC
Open wound of the head	S01.0-S01.9
Fracture of the skull and facial bones	S02.0, S02.1, S02.3, S02.7- S02.9
Injury to optic nerve and pathways	S04.0
Intracranial injury	S06.0-S06.9
Crushing injury of head	S07.0, S07.1, S07.8, S07.9
Other unspecified injuries of head	S09.7-S09.9
Open wounds involving head with neck	T01.0
Fractures involving head with neck	T02.0
Crushing injuries involving head with neck	T04.0
Injuries of brain and cranial nerves with injuries of nerves and spinal cord at neck level	T06.0
Sequelae of injuries of head	T90.1, T90.2, T90.4, T90.4, T90.5, T90.8, T90.9

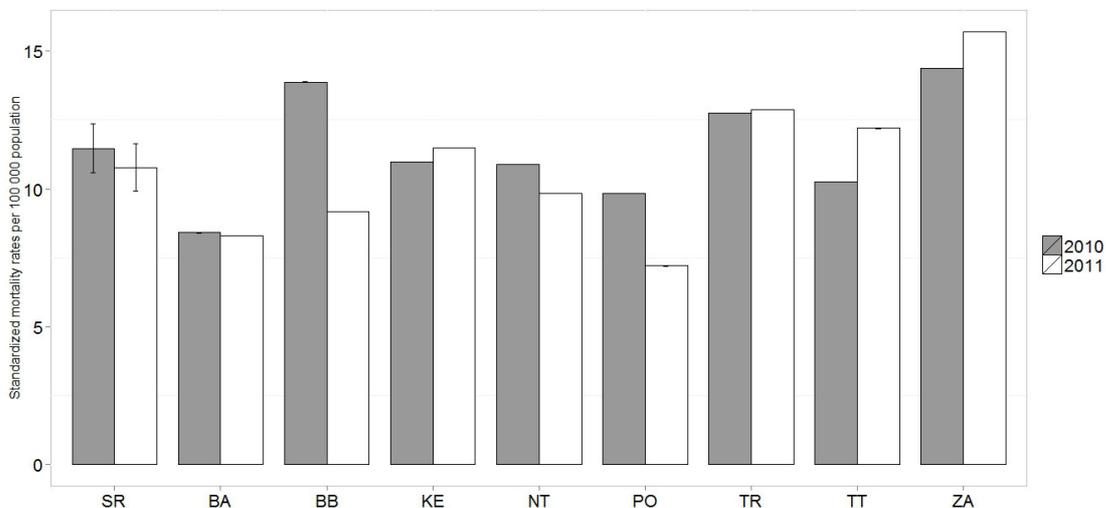
CDC, 2010

Mortality rates were calculated per 100 000 population. Mortality was standardized to the European standard population (WHO, 2002). Data were analyzed by Mann-Whitney U test. Differences were considered statistically significant when  $p \leq 0.05$ .

## Results

In Slovakia the standardized mortality ratio (SMR) due to TBI was 11.4 per 100 000 population in 2010, it declines to 10.8 per 100 000 population in 2011. The highest SMR due to TBI was in the Banská Bystrica region and in the Žilina region in 2010, and in the Žilina region and Trenčín region in 2011 (Graph 1).

Graph 1. Standardized mortality rates for TBI in Slovakia by regions in 2010 and 2011



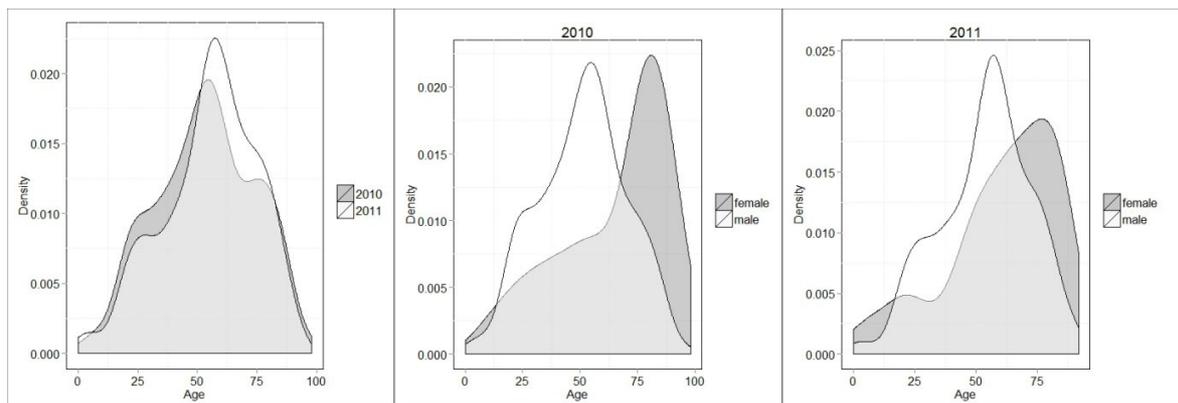
Mean age of death due to TBI were  $53.3 \pm 20.6$  years and  $55.1 \pm 19.67$  in 2010 and in 2011 respectively. Men died younger than women in both years (Graph 2). Differences between mean ages of death of men and women were statistically significant (Table 2).

Table 2. Mean age of death due to TBI in Slovakia in 2010-2011 by gender

	2010		2011	
	$\pm$ SD	p	$\pm$ SD	p
male	$50,9 \pm 19,1$	< 0,01	$53,7 \pm 18,6$	< 0,01
female	$64,6 \pm 23,4$		$60,6 \pm 22,5$	
Total	$53,3 \pm 20,6$		$55,1 \pm 19,67$	

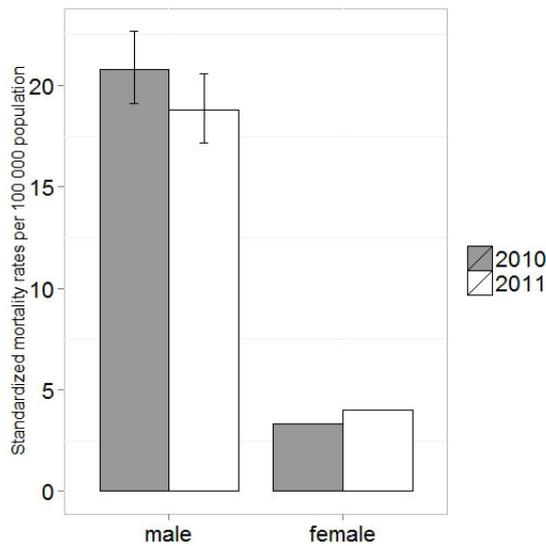
The data distributions about age of death due to TBI in Slovakia are in histograms (Graph 2).

Graph 2. Data distributions of death age due to TBI by year and by gender in Slovakia in 2010 and 2011



The SMR due to TBI of men was significantly higher than standardized mortality ratio of women. The SMR of men was decreased in 2011 compared with 2010; but the SMR of women was increased in the same time period (Graph 3).

Graph 3. Standardized mortality rates for TBI in Slovakia by gender in 2010 and 2011



In Slovakia, the most frequent external causes of death due to TBI were falls, accidents and undefined events.

The proportion of death after accidents decreased in 2011 compared with 2010, but proportion of TBI deaths after undefined events increased in the same time period (Table 3).

Table 3. TBI deaths proportion by external causes in Slovakia in 2010 and 2011

	2010		2011	
	n	%	n	%
falls	246	36	241	38
accidents*	175	26	122	19
undefined events*	145	21	175	27
suicide	51	8	53	8
exposure to mechanical forces	35	5	24	4
assault	17	3	23	4
other	9	1	3	0

\* Statistically significant; individual cause was compared with all the others causes

## Discussion

In European countries mean mortality ratio due to TBI is 15 deaths per 100 000 population per year (Tagliaferri, 2006). In Slovakia SMRs due to TBI were 11.4 and 10.8 deaths per 100 000 population in 2010, and in 2011 respectively. Similar SMR was in Germany in 1996 (11.5 deaths per 100 000 population), and it decreased to 9 deaths per 100 000 population to 2000 (Firsching, Woischneck, 2001, Steudel, Cortbus, Schwerdtfeger, 2005). SMR due to TBI is lower than the European mean. It can be due to underestimated results because we defined TBI by full ICD-10 code (i.e. S02.1, S02.3) so it was

necessary to exclude death certificates where deaths were reported only by simple code ICD-10 (i.e. S02, S04). Another explanation can be that TBIs are often together with multiple traumas so the primary cause of deaths can be reported as multiple traumas not as brain injuries (Ribbers, 2010).

The primary risk factors of TBI are age, gender and socioeconomic status (Harrison-Felix, 2009).

In Slovakia, with the increased age of the population, the number of deaths due to TBI increases too. It is similar like a result of Steudels' research (2005). It is an 8 % increased risk of death for each additional year of age at injury (Harrison-Felix, 2009). People in the age group above 75 years have the highest probability of dying in the US (CDC, 2010). A similar situation is in our country, but we find differences between men and women; women die older than men in Slovakia.

Men have a higher risk of TBI than women (IOM, 2008, CDC, 2010) and they have 3 times higher probability to die due to TBI in compare with women (Harrison-Felix, 2009).

In Slovakia we found significant differences in SMR due to TBI between regions. Explanations for this include differences in regions' economy (average monthly wage, unemployment), differences in age and gender structure, and alcohol consumption in the regions. The highest SMR due to TBI was in the Banská Bystrica region, Žilina region, and in the Trenčín region.

The lowest average monthly wage in Slovakia were in regions Prešov, Banská Bystrica and Nitra in 2010 and 2011 (ŠÚSR, 2011; ŠÚSR, 2012). The highest unemployment rates were in regions Banská Bystrica, Prešov and Košice. The highest proportion of people in the age group above 65 was in regions Nitra, Trenčín and Banská Bystrica in 2010 and 2011. The highest proportion of men was in regions Prešov, Žilina and Trenčín (ŠÚSR, 2013).

Low socioeconomic status is an evidenced risk factor for TBI. People with low socioeconomic status usually work in physically demanding jobs and in unsafe environments, they are more exposed to assault risks, their houses are not often repaired, and they usually use older cars without new safety functions (IOM, 2008). The mortality due to TBI can be also influenced by economic status of individual regions. The possible explanation of this is that the economic status of regions influences to management of patients with TBI (adequate prehospital care, fast transport to specialized facilities, comprehensive hospital care and rehabilitation) (Mauritz, 2008).

The main causes of TBI worldwide are accidents, assaults and falls (Dias, 2004). In Slovakia the most frequent causes of TBI were falls, accidents and undefined events.

Transport is considered to be the most frequent causes of TBI in the world (WHO, 2006), because transport includes passengers of cars and lorries, bikers and motorbikers, pedestrians injured by cars, planes, and boats (IOM, 2008). WHO (2006) assumes, that transport will shift in the order from ninth to third position of causes of health damage burden to 2020.

The legislative duty to wear helmets for bikers in Slovakia is in place since 1.2.2009. Adults have to wear helmets outside the towns, children younger than 15 still have to wear helmets. The deaths of bikers are in 60 % due to TBI, but wearing helmets reduce the risk of TBI of 80 % for adults (CDC, 2000), and for children of 63 % (Thomas, 1994). In California, after the enactment of a law which determines the duty to wear helmets for children fewer than 17, there were 18.2 % reductions of children biker TBI (Lee, Schofer, Koppelman, 2004). The probability of TBI for motorbikers is reduced 10-times after wearing of helmets (Yu, 2011).

Worldwide the second frequent causes of TBI are falls. The risk group for falls includes especially the people under 70 years. The risk of falls is increased for older people with gait impairment, dizziness, previous stroke, cognitive impairment, postural hypotension, poor visual acuity and multiple medications (WHO, 2006).

The assaults and the abuses are important causes of children TBI (Parks, 2012) instance shaken baby syndrome (SBS), shaken impact syndrome (SIS), whiplash shaken infant syndrome, inflicted neurotrauma,

inflicted traumatic brain injury (iTBI), non-accidental head trauma (NAHT) a abusive head trauma (AHT). The incidence of AHT for children younger than one year is 24.6 – 29.7 per 100 000 children. After AHT 25% of children die and about 50% of AHT lead to neurodevelopmental disorders (Fraiser, 2008).

## Conclusions

SMR due to TBI was lower than European mean in Slovakia in 2010 and 2011, but we expect that real mortality is higher.

Preventive activities focus on TBI deaths prevention should be implemented in the Žilina region, where SMR for TBI was the highest. Activities should include prevention of falls and accidents, because they are the most frequently causes of deaths after TBI in Slovakia. Our attention should be focused on risk groups (older people, men).

We would like to recommend further description of the epidemiology of TBI in Slovakia.

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## Health-related risk factors

### Occupational factors associated with burnout among nurses

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#### Abstract

**Objectives:** The aim of this study was to quantify the frequency of burnout among Slovak nurses, to shed more light on the associations between selected job characteristics and burnout syndrome in nurses.

**Methods:** A survey was conducted in hospitals in Slovakia in 2009-2010. A total of 770 nurses participated in the study. Data were collected the Maslach Burnout Inventory to measure burnout and the questionnaire comprising questions on socio-demographic variables and job characteristics.

**Results:** The investigated sample showed a higher degree of burnout syndrome under EE dimension in 56.8% of respondents and in the DP dimensions in 29.4% of nurses. Nurses with the length of work experience between 1-3 years and more than 5 years had a significant level of occurrence of burnout syndrome. Length of work experience and type of department are factors related to increased occurrence of burnout syndrome in the investigated sample.

**Conclusions:** Research results suggest that the profession of nurses should be supported by management aimed at preventing work-related stress and highlight the importance of application of intervention programs to prevent burnout syndrome in clinical practice.

**Keywords:** burnout, nurses, the length of work experience, the type of department

#### Abstrakt

**Cieľ:** Cieľom štúdie bolo stanovenie miery syndromu vyhorenia u sestier na Slovensku. Taktiež sme sa u sestier zamerali na vybrané faktory pracovného prostredia vo vzťahu k syndromu vyhorenia.

**Metódy:** Výskum prebiehal v období 2009-2010. Súbor tvorilo 770 sestier. Použitý bol dotazník Maslach Burnout Inventory, ktorý bol doplnený o socio-demografické údaje a informácie z oblasti pracovného prostredia.

**Výsledky:** Výsledky výskumu potvrdili vyššiu mieru syndrómu vyhorenia v dimenzii EE (56.8%) sestier a v dimenzii DP (29.4%). Sestry s dĺžkou praxe medzi 1-3 rokom a viac ako 5 rokov mali vyššiu mieru syndrómu vyhorenia. Dĺžka praxe a typ oddelenia sú faktory, ktoré ovplyvnili zvýšenú mieru syndrómu vyhorenia v sledovanom súbore.

**Záver:** Výsledky výskumu poukazujú na potrebu zlepšenia manažmentu prevencie stresu a aplikáciu intervenčných programov zameraných na prevenciu syndrómu vyhorenia v klinickej praxi.

**Kľúčové slová:** syndróm vyhorenia, sestry, dĺžka praxe, typ oddelenia

## **Introduction**

Burnout has been defined as a specific kind of occupational stress among human service professionals, as a result of the demanding and emotionally charged relationships between caregivers and their recipients (Maslach et al, 1986). It is a problem that is specific to the work context, in contrast to depression, which tends to pervade every domain of a persons life (Maslach et al, 2001). Clinical symptoms of burnout syndrome are nonspecific and include tiredness, headaches, eating problems, insomnia, irritability, emotional instability and rigidity in relationships with other people (Poncet et al., 2007).

The nursing profession is one of the most demanding and stressful occupations, due to the quantity and diversity of risk factors associated with the work environment (Jaworek et al, 2010). The most frequent risk factors of the burnout syndrome are excessive workload such as lack of time, shift work, type of department, organization culture (e.g. relationships among colleagues, role conflicts, etc.), not enough materials and technical equipment (Tummers et al, 2002). Leiter & Maslach (2004) identified work life-workload as a predictor of burnout syndrome.

The nursing profession is also further complicated by specific of type department. In the departments of internal medicine, surgery, oncology and others, nurses must be competent specific nursing interventions according to the type of disease. Working in intensive care units (ICU) can originate stress in nurses as well (Bakker et al, 2005; Chen et al, 2001). The presence of burnout syndrome in critical care nurses has been examined in several research studies (Davies, 2008; Embriaco et al, 2007; Solano et al, 2002). Critical care nurses have heavy workloads, extensive responsibilities, and only limited authority. They must care for unstable patients, carry out procedures accurately and react to extremely urgent matters.

Prevention of burnout syndrome in the individuals includes applying the principles of mental hygiene (a balanced relationship between stressors and salutors, increased self confidence, leisure time), with regard to external factors, good interpersonal relationships, social support, satisfactory working conditions, which are the most frequently factors (Iglesias et al, 2010; Simockova et al, 2009; Raggio et al, 2007; Piko, 2007). Preventing burnout can be accomplished by a focus on building engagement and utilizing organizational assessment that include tools for early detection (Maslach, 2011).

The aim of this study was to quantify the frequency of burnout among Slovak nurses and to shed more light on the associations between selected job characteristic and burnout syndrome in nurses.

## **Material and Methods**

### *Sample and procedure*

Nurses working in medical facilities in Slovakia the period of April 2009 and April 2010 participated in the research. 770 persons completed the questionnaire. The questionnaire comprised questions on socio-demographic variables, selected job characteristic and burnout.

The respondents answered the questions on-line. The questionnaires was published on the web page of the Slovak Chamber of Nurses and Midwives (SKSaPA), <http://www.sksapa.sk/DOTAZNÍK.html>, and the web page of World Health Organization, Country Office in Slovakia, <http://www.who.sk>.

The code for access to the web page (<http://www.sksapa.sk/DOTAZNÍK.html>) and completion of the on-line questionnaires was the registration number, by which we ensured that the questionnaire could only be completed by nurses. The registration number was not a part of the questionnaire; as a result, we could not find out who completed the questionnaire, which ensured the anonymity of respondents. The nurses were regularly informed of the possibilities and the necessity of being involved in the research aimed at selected health factors and burnout syndrome at the Congresses of the Slovak Chamber of Nurses and Midwives and through an article in the magazine *Sestra a lekár v praxi* (Dimunova, 2009) which is one of the most popular magazines among nurses.

## Measures

### *Burnout syndrome*

Maslach Burnout Inventory (MBI) was used to measure burnout syndrome (Maslach et al, 1981). The MBI has 22 items and three subscales (dimensions): emotional exhaustion (EE), depersonalization (DP) and personal accomplishment (PA). The first subscale EE describes feelings of being exhausted by the job. The second one DP deals with self-esteem and behaviour towards recipients of care which lacks emotion for the individual. The last subscale PA addresses feelings about ability to cope with the problems of working directly with people in the work environment. Higher scores on emotional exhaustion and depersonalization, recode on personal accomplishment, indicate more burnout. As proven by a meta-analysis (Lourel et al, 2007) the MBI questionnaire can be used both universally and transculturally. The testimonial value of the MBI questionnaire was also verified in a multi-centre, which included 54 738 nurses from eight countries (Poghosyan et al, 2009) Cronbach's  $\alpha$  in this study sample yielded EE-0.91; DP-0.76; PA-0.87; MBI 0.89.

### *Type of department characteristics*

The types of departments were coded as follows: 1 = Internal medicine 2 = Surgery 3 = Paediatrics 4 = Psychiatry 5 = Oncology.

### *Statistical analyses*

For statistical analyses, *t-tests*, Pearson corrections and ANOVA with Post Hoc Tests (LSD and Scheffe) were used. All analyses were performed with the SPSS.16.

## Results

The demographic and job characteristics of the sample are shown in Table 1. The sample (n=770) consisted of 754 women (97.9%) and 16 men (2.1%). The mean age of respondents was 40.9 SD  $\pm$  8.9 years; the minimum age was 20 years and the maximum age 61 years. The average length of work experience was 21.8 SD  $\pm$  9.4 years, the shortest duration of practice was 1 year and the longest one was 44 years.

### *Length of work experience and burnout syndrome*

In the overall evaluation, no significant correlation (Pearson's correlation coefficient) between the length of work experience of respondents in a medical facility and burnout syndrome was confirmed. For more detailed analysis of correlation between the length of work experience and burnout syndrome among nurses, the length of work experience in the observed sample was divided into 7 categories: 1 = from 1 to 3 years, 2 = from 4 to 5 years, 3 = from 6 to 10 years, 4 = from 11 to 15 years, 5 = from 16 to 20 years, 6 = from 21 to 30 years, 7 = 31 years or more. For this variable, an important finding was that nurses with the length of work experience between 3 – 5 years have more statistically significant scores of burnout syndrome as compared with other categories of the length of work experience. Respondents with the lengths of work experience between 1 - 3 years and more than 5 years have significant occurrence of burnout syndrome (Table 2). The results show that the correlation between the length of work experience and burnout syndrome is not linear.

Table 1. Descriptive characteristics of the sample: means, standard deviations (SD), frequencies (n) and percentages (%)

	n / M	% / $\pm$ SD
<b>Gender</b>		
Male	16	2.1
Female	754	97.9
<b>Age (in years)</b>	40.96	$\pm$ 8.97
<b>Length of work experience (in years)</b>	21.8	$\pm$ 9.4
<b>Department</b>		
Internal medicine	332	43.1
Surgery	297	36.2
Paediatrics	66	8.6
Psychiatric	24	3.1
Oncology	36	4.7
<b>Type of unit</b>		
Intensive Care Units	143	25.1
Standard Departments	427	74.9
<b>Burnout syndrome</b>		
EE		
low	139	18.1
middle	183	23.8
high	437	56.8
DP		
low	298	38.7
middle	236	30.6
high	226	29.4
PA		
low	680	88.3
middle	56	7.3
high	27	0.9

Note: In the table only valid percentages are presented.

Abbreviations: EE-emotional exhaustion, DP–depersonalisation, PA–personal accomplishment, MBI–Maslach Burnout Inventory

Table 2. Correlation between the length of work experience and burnout syndrome

Length of work experience/years	Dimensions of burnout syndrome											
	EE			DP			PA			MBI total scale		
	M±SD	F	Post Hoc Tests	M±SD	F	Post Hoc Tests	M±SD	F	Post Hoc Tests	M±SD	F	Post Hoc Tests
1 to 3 (1)	22.33 ± 12.66	<b>2.647</b>	1-4 **	8.00 ± 3.00	1.671	n.s.	24.66 ± 13.05	0.952	n.s.	55.00 ± 26.45	<b>2.432*</b>	2-3*
4 to 5 (2)	28.04 ± 10.39	<b>***</b>	1-6 **	9.60 ± 6.69			18.42 ± 11.43			56.15 ± 20.47		3-4**
6 to 10 (3)	21.25 ± 12.95		3-4*	6.48 ± 6.09			16.12 ± 10.15			42.95 ± 18.22		3-5**
11 to 15 (4)	31.50 ± 13.18		3-5*	10.01 ± 7.26			18.26 ± 9.53			59.78 ± 24.35		3-7*
16 to 20 (5)	29.26 ± 12.68		3-6*	9.03 ± 6.39			18.36 ± 9.44			56.15 ± 20.40		
21 to 30 (6)	30.34 ± 12.51		3-7*	10.01 ± 6.86			17.15 ± 10.17			57.77 ± 22.40		
31 or more (7)	28.06 ± 13.07			8.74 ± 6.31			16.64 ± 10.55			53.35 ± 22.05		

Abbreviations: EE - emotional exhaustion, DP – depersonalisation, PA - personal accomplishment, MBI -Maslach Burnout Inventory

Significant differences between the groups are displayed in bold; \*  $p \leq 0.05$ , n.s. non-significant

Table 3. Burnout syndrome in relation to type of department

	EE			DP			PA			MBI total scale		
	M±SD	F	Post Hoc Tests	M±SD	F	Post Hoc Tests	M±SD	F	Post Hoc Tests	M±SD	F	Post Hoc Tests
<b>Type of department</b>												
Surgery (1)	28.04 ± 13.54	<b>5.005***</b>	1-5	9.10 ± 6.84	1.114	n.s.	16.79 ± 10.16	1.676	n.s.	53.88 ± 22.34	<b>3.528**</b>	1-5
Internal medicine (2)	29.16 ± 11.97		2-5 3-5	9.13 ± 6.27			17.71 ± 9.83			55.91 ± 21.35		2-5
Paediatrics (3)	29.81 ± 12.34			9.70 ± 6.87			19.65 ± 10.31			59.12 ± 22.21		
Psychiatric (4)	31.37 ± 12.60			9.29 ± 6.39			14.95 ± 8.33			55.62 ± 20.95		
Oncology (5)	37.75 ± 9.57			11.45 ± 6.09			18.52 ± 9.23			67.48 ± 20.95		

Abbreviations: EE - emotional exhaustion, DP – depersonalisation, PA - personal accomplishment, MBI -Maslach Burnout Inventory

Significant differences between the groups are displayed in bold; \*  $p \leq 0.05$ , n.s. non-significant

### *Type of department and burnout syndrome*

Nurses working at internal departments had a significantly higher score of total burnout syndrome (MBI) as compared with surgery departments ( $p \leq 0.05$ ). Similarly, internal and psychiatric departments yielded a significantly higher score of burnout syndrome in the EE dimension in comparison with surgery departments ( $p \leq 0.05$ ). Finally, internal departments had a significantly higher score of burnout syndrome in the PA dimension as compared with psychiatric departments ( $p \leq 0.05$ ). Intensive Care Units had a significantly higher score of burnout syndrome in the DP dimension as compared with standard departments ( $p \leq 0.05$ )

A highly statistically significant correlation was confirmed in the EE dimension and the total burnout syndrome (MBI). Nurses working at oncology departments have a higher degree of occurrence of burnout syndrome in the EE dimension than nurses working at internal, surgery and paediatric departments ( $p \leq 0.001$ ). Finally, oncology departments had a significantly higher score of the total burnout syndrome (MBI) as compared with internal and surgery departments ( $p \leq 0.01$ ). There was no significant correlation between nurses working at psychiatric departments and oncology departments (Table 3).

There was no statistically significant correlation between intensive care units and standard departments.

### **Discussion**

The aim of this study was to explore the associations between selected job characteristic and the extent of burnout among nurses. The results show that there are significant differences in the extent of burnout depending on the length of work experience and type of department.

As regards the correlation between the length of work experience and burnout syndrome, authors report different findings. Blanchard et al. (2010) did not confirm any correlation, similarly as Palfi et al. (2008), whose study included 805 nurses. On the other hand found out that the degree of burnout syndrome increased with the length of work experience for nurses working at intensive care units (Meltzer et al, 2004). In the overall evaluation of occurrence of burnout syndrome in our sample, no statistical significance was confirmed. More detailed analysis of the categories of the years of work experience confirmed a statistically significant correlation with the EE dimension and the DP dimension and in the total MBI. Nurses with the length of work experience between 1-3 years and more than 5 years had a significant level of occurrence of burnout syndrome. The results show that the correlation between the length of work experience and burnout syndrome is not linear. The influence of the length of work experience was also investigated in more detail by Iglesias et al. (2010), who divided the sample of observed nurses into three categories: 1-10 years, 11-20 years, and above 20 years of work experience. A significant correlation was confirmed in the EE and DP dimensions for 11-20 years of work experience, and for over 20 years of work experience (EE, DP).

According to studies by various authors (Fazelzadeh et al, 2008; Gillespie et al, 2003) individual types of departments (surgery, paediatrics, psychiatry, oncology) and specificities of work at intensive care units are significant factors influencing the occurrence of burnout syndrome. The oncology department had significantly higher scores of burnout syndrome in the EE dimension as compared with the internal, surgery and paediatric departments, and a higher total score MBI as compared with internal and surgery departments. Blanchard et al. (2010) confirmed the presence of a high score of burnout syndrome in the EE, DP dimensions in 340 medical workers working at oncology departments, which is in line with the results of our research. A high score of burnout syndrome in nurses working at the oncology department was found out by Lyckholm (2001). No significant correlation between the groups working at the psychiatric department and at the oncology department was confirmed. The results of our study are in line with the results of Kilfedder et al. (2001), who identified a high degree of burnout syndrome occurrence in the EE dimension, covering as much as 42% nurses working in the psychiatric department. Similar to our

findings are the results of a Turkish study (Ilhan et al, 2008), who found no burnout syndrome in any dimension involving nurses working at surgery departments.

Our study provides evidence for the suggestion that nurses working in intensive care units no have statistically higher scores of burnout syndrome as compared with standard departments. Differently, Mealer et al. (2007) examined if there had been a difference in burnout syndrome occurrence between 351 nurses working at intensive health care units and 140 nurses working at general departments (in our case considered as standard departments). Their results show higher occurrence of burnout syndrome among the nurses working in intensive care units. A higher score of burnout syndrome occurrence among nurses working in intensive care units was also confirmed by Poncet et al. (2007), who found burnout syndrome occurrence among 33% of nurses. Double higher burnout syndrome occurrence within the group of nurses working intensive care units was also confirmed by a Hungarian study (Palfi, 2008).

## Conclusions

The primary objective of the work was to define the personal and workplace factors that seem to be responsible for the formation of burnout. Nurses showed a high degree of burnout syndrome in the emotional exhaustion dimension and in the depersonalization dimension. Risk factors related to increased occurrence of burnout syndrome included the length of work experience and type of department (oncologic department).

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## The importance of environmental burdens in the epidemiology of orofecal infections

### Význam environmentálnych záťaží v epidemiológii orofekálnych inkekcíí

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#### Abstract

Background: Environmental burden of orofecal pathogens is associated with serious health risks. In their transfer is necessary to pay special attention to wastewater and sludge. The aim of this work is to summarize the knowledge about the possible risks of environmental burdens and their impact on the epidemiology of orofecal infections.

Methods: In raw wastewater, treated wastewater and sludge, we examined the incidence of developmental stages of parasites, their circulation in the population and the current state of the environmental burden. Total 195 samples were examined. The laboratory analysis, we used the flotation method according Cherepanov.

Results: In the samples we recorded the presence of parasites at 55, 89 % of samples. Most often, in raw wastewater were observed helminths eggs of *Ascaris sp.*, *Strongylus sp.* The presence of parasites in treated wastewater can not be found. In sludges were detected eggs of *Ascaris sp.*, *Trichuris sp.*, *Strongylus sp.*, protozoa (*Cryptosporidium sp.*, *Isospora sp.*, *Giardia sp.*). Examination results confirmed, that untreated wastewater and sludge containing developmental stages of parasites. Therefore, it is necessary to build effective wastewater treatment.

Conclusions: Due to the risks involved with orofecal infection occurrence is essential monitoring and examination of environmental samples in high-risk areas.

Keywords: pathogens, wastewater, environment

#### Abstrakt

Úvod: Environmentálna záťaž orofekálnymi patogénmi je spojená s vážnymi zdravotnými rizikami. V ich prenose je potrebné venovať osobitnú pozornosť odpadovým vodám a kalom. Cieľom práce je zhrnúť poznatky o možných rizikách environmentálnych záťaží a ich vplyv na epidemiológiu orofekálnych infekcií.

Metodika: V surovej odpadovej vode, čistených odpadových vodách a kaloch sme skúmali výskyt vývojových štádií parazitov, ich cirkuláciu v populácii a súčasný stav záťaže životného prostredia. Spolu bolo vyšetrených 195 vzoriek. Na laboratórnu analýzu sme použili flotačnú metódu podľa Čerepanova.

Výsledky: Vo vzorkách sme zaznamenali prítomnosť parazitov v 55, 89 % vzoriek. Najčastejšie boli v surových odpadových vodách pozorované vajčička helmintov *Ascaris sp.*, *Strongylus sp.* Prítomnosť parazitov v čistených odpadových vodách sme nezaznamenali. V kaloch boli zistené vajčička *Ascaris sp.*, *Trichuris sp.*, *Strongylus sp.*, protozoá (*Cryptosporidium sp.*, *Isospora sp.*, *Giardia sp.*). Výsledky vyšetrení potvrdzujú, že nečistená odpadová voda a kal obsahujú vývojové štádia parazitov. Preto je nutné budovať efektívne čistiarne odpadových vôd.

Záver: Vzhľadom na riziká súvisiace s výskytom orofekálnych infekcií je potrebné monitorovanie a vyšetrovanie vzoriek životného prostredia vo vysoko rizikových oblastiach.

Kľúčové slová: patogény, odpadová voda, životné prostredie

## Úvod

Zdravie obyvateľstva je ovplyvňované komplexom vlastností životného prostredia a spôsobom života populácie i jednotlivca. Orofekálne patogény zahŕňajúce patogénne vírusy, baktérie a parazity sa fekálno - orálnym spôsobom prenosu dostávajú z výkalov jedného hostiteľa a ich požitím do organizmu nového hostiteľa. Sú častou príčinou enteritíd s prejavom hnačky (ale i iných zdravotných ťažkostí), čo umožňuje, aby sa ochorenie rozšírilo vo veľkom množstve do životného prostredia. Infekcia nového hostiteľa môže nastať prostredníctvom kontaminovaného životného prostredia, pitnej vody alebo potravín. Zlá hygiena je jednou zo základných príčin prenosu orofekálnych ochorení (Stoeckel et al, 2006).

Patogénne mikroorganizmy v odpadových vodách a kaloch predstavujú závažné zdravotné riziko šírenia orofekálnych infekcií. Ich zastúpenie odráža výskyt patogénov bežných ochorení v populácii (Gerardi et al, 2005). Prítomnosť patogénov v neupravenej odpadovej vode naznačuje, že môže byť zdrojom patogénov v prostredí a ohrozovať zdravie, pretože čistenie odpadových vôd neodstráni všetky mikroorganizmy (Gilbride et al, 2006). Čistiarenský kal obsahuje až  $10^6$  mikroorganizmov v 1 ml, z ktorých asi 10% sú patogénne pre ľudí a zvieratá. Uvádza sa, že 1% populácie zdravých ľudí, respektíve zvieratá vylučujú choroboplodné zárodky, ktoré prichádzajú prostredníctvom odpadových vôd do čistiarní odpadových vôd (Juriš et al, 2000).

Environmentálna záťaž spôsobená ľudskými výkalmi je spojená s vážnym zdravotným rizikom. Komunálne odpadové vody sú teda jedným z možných zdrojov patogénov z hľadiska počtu aj druhového zastúpenia. V nečistenej surovej odpadovej vode sa z vírusov najčastejšie vyskytujú enterovírusy (*Coxsackie* vírusy A a B, echovírusy, poliovírusy), adenovírusy, norovírusy, astrovírusy, rotavírusy, vírusy hepatitíd (najmä vírus hepatitídy A a E), z baktérií najmä enterobaktérie z čeľade *Enterobacteriaceae* (*Salmonella* sp., *Shigella* sp., patogénne *E. coli*, *Yersinia* sp.), baktérie *Campylobacter* sp., z parazitov protozoa (*Giardia* sp., *Microsporidium* sp., *Cryptosporidium* sp.) a helminty (*Ascaris* sp., *Trichuris* sp.).

Zdroje vody sú náchylné ku kontaminácii rôzneho pôvodu. Zdrojmi fekálneho znečistenia sú ľudia, hospodárske zvieratá a voľne žijúce zvieratá. Bolo preukázané, že mnoho riek v Európe sú významne kontaminované patogénmi, ktoré pochádzajú z komunálnych odpadových vôd a / alebo zvierat. Povrchové vody sú často používané na účely, ako je zavlažovanie, rekreácia, doprava a môžu predstavovať potenciálne riziko v prenose patogénnych mikroorganizmov.

Ku kontaminácii životného prostredia dochádza tiež pri povodniach. Zrážková činnosť môže viesť k vyššiemu zaťaženiu zdrojov vody a environmentu patogénnymi mikroorganizmami. Počas obdobia vysokých zrážok alebo zlyhania zariadení, sa môže z čistiarní odpadových vôd uvoľniť značné množstvo zle čistenej odpadovej vody.

Kontaminácia podzemných vôd môže byť vyvolaná rôznymi spôsobmi, napr. aj pri technických poruchách kanalizačných systémov, prenikaním výkalov zo žump, pri manipulácii s domovými odpadovými vodami a hnojom. Okrem toho môžu byť patogény rozptýlené do prostredia využitím odpadových vôd ako umelého hnojiva (Dechesne et al, 2006).

Významnú skupinu mikroorganizmov tvoria endoparazity, ktoré sú vylučované do životného prostredia stolicou. Záťaž životného prostredia vývojovými štádiami parazitov môže potenciálne ohroziť ľudské zdravie a predstavuje hlavný epidemiologický problém (Caccio et al, 2003).

## Materiál a metodika

V súčasnosti sa na bakteriálne vyšetrenie vzoriek odpadových vôd využívajú kultivačné metódy, mikroskopia, na parazitologické vyšetrenie sedimentačné, koncentračné a flotačné metódy. Možné je využitie molekulárnych metód (napr. PCR). Výskyt orofekálnych patogénov (baktérií, vývojových štádií parazitov), ich cirkulácia v populácii a súčasný stav záťaže životného prostredia, boli sledované v surových odpadových vodách, biologicky čistených odpadových vodách a kaloch odobratých zo šiestich čistiarní odpadových vôd (tab.), nachádzajúcich sa v povodí rieky Torysa na Východnom Slovensku. Celkovo bolo vyšetrených 195 vzoriek (90 vzoriek odpadových vôd a 105 vzoriek kalov). Na laboratórnu analýzu vzoriek bola použitá metóda podľa Čerepanova (1982) s použitím nasýteného roztoku sacharózy o mernej hmotnosti 1,30, ktorá je modifikáciou metódy podľa Romanenka (1968). Súčasťou metódy je sedimentácia, centrifugácia a flotácia. Následne sme vzorky vyšetrili mikroskopicky.

## Výsledky

Vo vzorkách odpadových vôd a kalov z čistiarní odpadových vôd sme zaznamenali prítomnosť vývinových štádií parazitov v 55, 89 % vzorkách z celkového počtu odobratých vzoriek (195). Počet pozitívnych vzoriek bol 109 (surové odpadové vody- 36 pozitívnych vzoriek, čo predstavuje 40 % z 90 odobratých vzoriek odpadových vôd, kaly- 73 pozitívnych vzoriek, čo predstavuje 69,52 % zo 105 odobratých vzoriek kalu). Najväčšie množstvo pozitívnych vzoriek pochádzalo z ČOV Lemešany (výsledky sú zobrazené v tab.1, a tab. 2).

Tabuľka 1. Počet a celkové percento pozitívnych vzoriek odpadových vôd

ČOV	odpadová voda			
	surová odpadová voda		čistená odpadová voda	
	počet vzoriek	pozitívne vzorky	počet vzoriek	pozitívne vzorky
Lipany	8	8	5	0
Torysa	8	0	5	0
Sabinov	12	4	5	0
Prešov	12	4	5	0
Ličartovce	14	8	-	-
Lemešany	16	12	-	-
Spolu	70	36 (40% z 90)	20	0 (0% z 90)

ČOV- čistiareň odpadových vôd

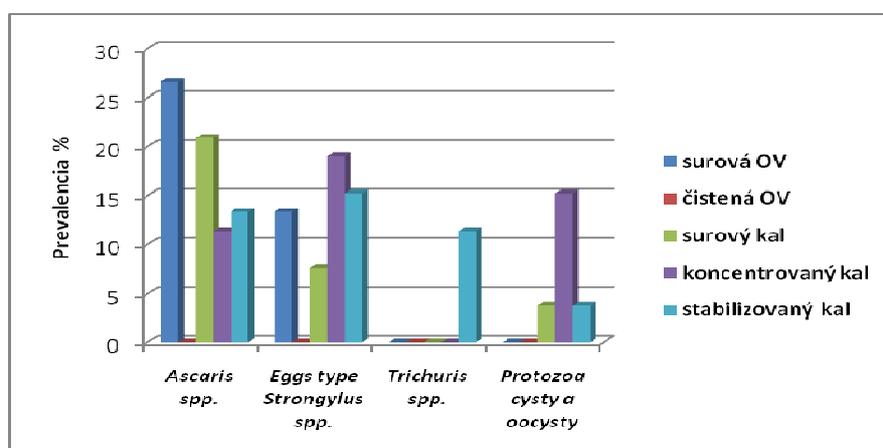
Tabuľka 2. Počet a celkové percento pozitívnych vzoriek kalov

ČOV	kal					
	surový kal		koncentrovaný kal		stabilizovaný kal (z kalových polí)	
	počet vzoriek	pozitívne vzorky	počet vzoriek	pozitívne vzorky	počet vzoriek	pozitívne vzorky
Lipany	-	-	16	8	-	-
Torysa	-	-	16	16	-	-
Sabinov	4	4	12	8	4	3
Prešov	16	4	8	-	4	4
Ličartovce	-	-	-	-	8	6
Lemešany	-	-	-	-	24	20
Spolu	20	8 (7,62 % zo 105)	47	32 (30,48 % zo 105)	38	33 (31,43 % zo 105)

ČOV- čistiareň odpadových vôd

Najčastejšie sa v surovej odpadovej vode (prítok) vyskytovali vajíčka helmintov *Ascaris sp.* (26,66 %), vajíčka strongyloidného typu (13,33 %) z celkovo 90 vyšetrených vzoriek odpadových vôd, s najvyšším výskytom v ČOV Lemešany a ČOV Ličartovce. V čistenej odpadovej vode sa prítomnosť parazitov nenašla. V kaloch boli detekované vajíčka helmintov *Ascaris sp.* (s najvyšším zastúpením 20,95 % v surovom kale, z celkovo 105 vyšetrených vzoriek kalov, s najväčším výskytom v ČOV Lemešany), vajíčka strongyloidného typu (s najvyšším zastúpením 19,05 % v koncentrovanom kale, z celkovo 105 vyšetrených vzoriek kalov, s najväčším výskytom v ČOV Torysa), *Trichuris sp.* (s najvyšším zastúpením 11,43 % v stabilizovanom kale, z celkovo 105 vyšetrených vzoriek kalov, s výskytom v ČOV Lemešany, ČOV Ličartovce, ČOV Sabinov), cysty a oocysty protozoí (s najvyšším zastúpením 15,24 % z celkovo 105 vyšetrených vzoriek kalov). Z protozoí boli detekované druhy *Cryptosporidium sp.*, *Isospora sp.*, *Giardia sp.* s najvyšším výskytom v kale (ČOV Torysa a ČOV Prešov). Výsledky analýz sú uvedené v tabuľke 3 a grafe 1.

Graf 1. Druhové zastúpenie endoparazitov najčastejšie sa vyskytujúcich v odpadovej vode a kaloch z vybraných ČOV



OV- odpadová voda

Tabuľka 3. Zhrnutie výsledkov analýz odpadových vôd a kalov vykonaných na prítomnosť parazitov v sledovaných ČOV

patogén	surová OV		čistená OV		surový kal		koncentrovaný kal		stabilizovaný kal	
<i>Ascaris sp.</i>	64 s.*	Lemešany 12 +	24 s.*	-	24 s.*	Lemešany 14 +	52 s.*	Torysa 4 +	36 s.*	Lemešany 10 +
		Sabinov 4 +		-		Sabinov 4 +		Sabinov 4 +		
		Lipany 8 +		-		Ličartovce 4 +		Lipany 4 +		Ličartovce 4 +
Spolu	24 +			-	22 +		12 +		14 +	
<i>Eggs type Strongyillus sp.</i>	64 s.*		24 s.*	-	24 s.*	Sabinov 4 +	52 s.*	Sabinov 4 +	36 s.*	Sabinov 4 +
		Prešov 4 +		-		Prešov 4 +		Torysa 12 +		Lemešany 8 +
		Ličartovce 8 +		-				Lipany 4 +		Ličartovce 4 +
Spolu	12 +			-	8 +		20 +		16 +	
<i>Trichuris sp.</i>	64 s.*	-	24 s.*	-	24 s.*	-	52 s.*	-	36 s.*	Lemešany 4 +
		-		-		-		-		Ličartovce 4 +
		-		-		-		-		Sabinov 4 +
Spolu	-			-	-		-		12 +	
<i>Protozoa cysty a oocysty</i>	64 s.*	-	24 s.*	-	24 s.*	Prešov 4+ ( <i>Giardia sp.</i> )	52 s.*	Torysa 8 + ( <i>Cryptosporidium sp.</i> )	36 s.*	Prešov 4 + ( <i>Isospora sp.</i> )
		-		-				Torysa 4 + ( <i>Isospora sp.</i> )		
		-		-				Sabinov 4 + ( <i>Isospora sp.</i> )		
		-		-						
Spolu	-			-	4 +		16 +		4 +	

OV- odpadová voda, + (pozitívne vzorky), - (negatívne vzorky), \* celkový počet odobratých vzoriek

## Diskusia

Základným zdrojom znečistenia povrchových vôd a environmentu sú odpadové vody. V regióne východného Slovenska je každoročne vypúšťaných 100 – 120 miliónov m<sup>3</sup> odpadových vôd, z čoho 80-90% prechádza čistiarňami odpadových vôd. Počet čistiarňí odpadových vôd sa zvyšuje, čo možno hodnotiť priaznivo. Hoci odpadová voda a čistiaci proces odpadových vôd sú nepriateľským prostredím pre patogény, mnoho vírusov a patogénnych mikroorganizmov prežíva v týchto podmienkach. Prežívajúce patogény sú zvyčajne odolnejšie voči tomuto prostrediu ako mnoho iných mikroorganizmov. V odpadových vodách a kaloch sa vyskytuje množstvo rôznorodých mikroorganizmov. Zastúpenie

mikroorganizmov je totožné s ich výskytom v populácii a môžu byť prítomné v množstve až  $10^8$ -  $10^{10}$ /mililiter (Gerardi et al, 2005).

Patogénne protozoa sa vyskytujú v odpadových vodách častejšie ako ktorýkoľvek iný pôvodca ochorení (Toze, S., 1997). Medzi patogénne protozoa súvisiace s odpadovými vodami patrí *Entamoeba histolytica*, *Giardia intestinalis* a *Cryptosporidium parvum*. Tieto mikroorganizmy sú často izolované z odpadových vôd a predstavujú pôvodcov fekálneho znečistenia (Caccio et al, 2003).

Zimmerman, M. (2005) uvádza, že cysty a vajíčka parazitov sú často odolné voči nepriaznivým podmienkam a môžu sa vyskytovať v odpadových vodách alebo kale. Odpadová voda môže obsahovať parazitárne protozoa *Balantidium coli*, *Dietamoeba fragilis*, *Entamoeba histolytica*, *Giardia intestinalis*, *Isoospora belli*, *Isoospora hominis*, *Toxoplasma gondii* a iné. Komunálne odpadové vody sú významným zdrojom *Giardia intestinalis*. Voľne žijúce a domáce zvieratá predstavujú dôležité rezervoáre cyst. Stupeň záťaže odpadových vôd cystami *Giardia sp.* môže byť vysoký až 1000000/liter.

Podľa našich výsledkov, protozoárne cysty a oocysty *Cryptosporidium sp.*, *Isoospora sp.*, *Giardia sp.* boli prítomné v koncentrovanom kale v počte 16 pozitívnych vzoriek z 52 vyšetrených vzoriek. V stabilizovanom kale boli prítomné *Isoospora sp.* v počte 4 pozitívnych vzoriek, teda počet pozitívnych vzoriek bol nižší.

Čistenie odpadových vôd procesom aktivovania kalov a stabilizácia odpadov je významnou prekážkou v prenose patogénov do environmentu. Oba procesy odstraňujú 90-99,7% cyst a oocyst *Cryptosporidium* a *Giardia* (Fricker, C., R., 1995, Fricker, C., R. et al, 1997).

Väčšina prieskumov určuje prítomnosť alebo neprítomnosť vývojových štádií parazitov v odpadových vodách, ale tieto prieskumy nepoukazujú, či sú tieto štádiá parazitov infekčné. Štúdia vykonaná v Spojených štátoch uvádza, že odpadové vody a kaly môžu obsahovať druhy helmintov *Ascaris sp.*, *Toxocara sp.*, *Trichuris sp.*, *Capillaria sp.*, *Taenia sp.* *Ascaris lumbricoides* a *Trichuris trichiura* sa stávajú infekčné po embryonizácii vo vhodných podmienkach (napr. v pôde) za 2 - 3 týždne. Za vyhovujúcich podmienok životného prostredia môžu vajíčka *Ascaris sp.*, *Trichuris sp.* a *Toxocara sp.* prežívať v pôde niekoľko rokov. Vajíčka *Ascaris sp.* môžu ostať infekčné až sedem rokov. Hrubé obaly vajíčok *Ascaris sp.* im poskytujú odolnosť voči mnohým nepriaznivým podmienkam prostredia, vrátane zmien teplôt. Z tohto dôvodu sa často využívajú ako ukazovateľ pre meranie účinnosti čistenia odpadových vôd a procesov na odstránenie patogénov. Kal zvyčajne nie je ideálne prostredie pre vajíčka *Ascaris* aby sa z nich vyvinuli infekčné embryonované vajíčka, ale aj naďalej je potrebné vykonávať stanovenie prítomnosti embryonovaných vajíčok *Ascaris sp.* v kale (Gerardi, M. H. et al, 2005).

Konate a kol. (2010) uvádzajú vo svojej štúdiu, v ktorej sa venovali prežívaniu parazitov (protozoi a helmintov) v čistiarenskom kale po procese jeho stabilizácie, že po anaeróbnej stabilizácii bola preukázaná prítomnosť protozoi *Entamoeba coli*, *Entamoeba histolytica*, *Giardia spp.*. Vo fakultatívnom kale sa potvrdila prítomnosť *Giardia spp.*, *Entamoeba coli*, *E. histolytica* a helmintov *A. lumbricoides* a *Ancylostoma spp.* s najvyššou koncentráciou vajíčok pri vstupe kalu do nádrže (16 % vajíčok bolo životaschopných).

Sasáková, N. a kol. (2005) svojimi výsledkami tiež potvrdzujú, že vývojové štádiá parazitov môžu prežívať čistiaci proces odpadových vôd a zostať životaschopné. Vo svojej štúdiu uvádzajú, že s ohľadom na vysokú špecifickú hmotnosť vývojových štádií parazitov majú tendenciu sedimentovať a sústrediť sa v pevnej frakcii spolu s nerozpustenými látkami, a týmto spôsobom môžu byť vrátené späť do prostredia. V porovnaní, naše výsledky analýz vykonaných na detekciu vývojových štádií parazitov v pevnej frakcii (vo vzorkách kalu) tento fakt potvrdzujú. Najviac pozitívnych vzoriek, čo sa týka čistiarenských kalov predstavovali vzorky koncentrovaného a stabilizovaného kalu.

Keďže značný počet vajíčok parazitov prešlo do pevnej frakcie, je preto nevyhnutné tento substrát podrobiť ďalšiemu spracovaniu pred aplikáciou na poľnohospodársku pôdu. Kompostovanie je možné odporučiť ako veľmi vhodný spôsob ošetrenia. Deaktivuje väčšinu mikroorganizmov za predpokladu, že

teplota je nad 55 ° C a udržuje sa po dostatočnú dobu. Podľa Day a Shaw (2000), teplota 55 ° C je dostatočná pre devitalizáciu *Ascaris lumbricoides* za 60 min. a cýst *Entamoeba histolytica* za 1 sek. Avšak niektorí autori uvádzajú že cysty protozoí a vajíčka helmintov môžu prežívať (Sasáková, N. a kol., 2005).

## Záver

Zo zdravotného hľadiska predstavuje fekálne znečistenie a kontaminácia vody, pôdy a environmentu patogénnymi mikorganizmami dôležitý zdroj ľudských infekčných ochorení na celom svete. Požitie vody, potravín kontaminovaných výkalmi má za následok rad významných ochorení človeka prenosných fekálno-orálnou cestou prenosu (Santo Domingo et al, 2010).

V surovej nečistenej odpadovej vode a kaloch môžu byť prítomné vývojové štádiá endoparazitov, čo potvrdili aj naše výsledky analýz. Z tohto dôvodu, je potrebné manipulovať a nakladať s odpadovými vodami a kalmi tak, aby sa minimalizovali nepriaznivé vplyvy na životné prostredie. Tento problém prevláda najmä v oblastiach, kde nie je vybudovaná verejná kanalizácia alebo bezpečné odvádzanie a manipulácia s odpadovými vodami. V tomto prípade je nutné zachytenie odpadových vôd v nádržiach a následne vývoz do čistiarne odpadových vôd.

Vzhľadom k tomu, že sa ľudská populácia na svete zvyšuje, voda sa stáva jedným z najcennejších životných potrieb v 21. storočí, a to aj cez veľké pokroky v čistení vody a čistenie odpadových vôd. Komunálne odpadové vody vypúšťané do povrchových vôd musia pred ich vypúšťaním prejsť sekundárnym čistením, prípadne primárnym čistením, ktoré zaručí limitné hodnoty znečistenia za bežných klimatických podmienok.

Na zabezpečenie prevencie znečistenia a znehodnotenia vodných zdrojov, pôdy a ohrozenia ľudského zdravia je nevyhnutné budovať účinné čistiarne odpadových vôd. Čistené odpadové vody predstavujú nízke riziko kontaminácie životného prostredia.

Zariadenia na čistenie odpadových vôd sa stali dôležitým z hľadiska zabezpečenia vysokej kvality vypúšťaných odpadových vôd do recipientu, čoho výsledkom je zdravšie životné prostredie. Zabezpečenie primeranej kvality života obyvateľov, udržanie požadovaných hygienických a zdravotných podmienok a zachovanie ekologicky akceptovaného stavu vodného ekosystému je úzko previazané s odkanalizovaním a čistením odpadových vôd vznikajúcich rozmanitou ľudskou činnosťou. Nakladanie s odpadovými vodami a ich vplyv na kvalitu životného prostredia je v súčasnosti podrobne sledované, vyhodnocované, sú prijímané nápravné opatrenia na dosiahnutie požadovaného stavu, vyvodzované sankcie za nedodržanie predpísaných podmienok s ich nakladaním.

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## **Study of Noise Pollution Perception and Its Impact on Health of Kosice City Inhabitants**

### **Štúdia vnímania hluku obyvateľmi Košíc a jeho dôsledky na ich zdravie**

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#### **Abstract**

The study was realized in year 2012. The citizens in Kosice city were asked to fill in questionnaire about their perception of noise pollution in their environment, they were asked to describe their lifestyle and health. They were also asked to fill in the street name they live on. The questionnaire contained 71 question. We had asked 751 citizens - 227 (30%) men and 524 (70%) women of Kosice to fill in our questionnaire.

We applied mathematical statistic methods to obtain interpretable results. We monitored 479 streets in Kosice city to obtain noise pollution data samples using certified and calibrated Sound level meter Peaktech 8005. We used notebook to collect noise pollution data for further processing. The sound pressure level in dBA was digitally recorded each 0.2 sec for a period of one hour. We evaluated noise pollution levels according to Announcement of Ministry of Health of The Slovak Republic MZ SR 549/2007 Z. z. The sound pressure level was measured in  $1.5 \pm 0.5$  meter distance in front of the building wall and in  $1.5 \pm 0.2$  meter height from the ground under most convenient weather conditions. We can use this art of measurement sound pressure level that can be further processed to determine the noise pollution level by transportation.

We concluded that together with higher sound pressure level also annoyance from noise pollution is getting higher. We evaluated data for relative risk where we obtained significant relationship between eyes color and annoyance from noise pollution (RR = 0,542/0,310 =1,75). We can interpret this result as blue-eyed people are 1.75 times more sensitive to noise pollution as people with dark color of eyes.

Our study also proofed increasing sound pressure level with increasing floor number in the apartment building with 12 floors.

We inspected the noise pollution impact on the immune system of human. We observed that with increasing noise from transportation there were more people responding "yes" to a question about weak immune system. We observed among streets up to 47 dBA sound pressure level (SPL) 16% weak immune system responses, among streets up to 57 dBA SPL 17% weak immune system responses and among streets up to 67 dBA 24% weak immune system responses. We were also able to observe increased number of pre-hypertension in relationship with noise pollution among streets up to 57 dBA and 67dBA.

Keywords: noise, health, Kosice

#### **Abstrakt**

V štúdiu realizovanej v roku 2012 sme zisťovali formou dotazníkového prieskumu u obyvateľov Košíc subjektívne vnímanie hluku v životnom prostredí, životný štýl, zdravotný stav respondentov a na akej ulici v Košiciach bývajú. Dotazník obsahoval 71 otázok. Bolo oslovených 751 obyvateľov Košíc – 227 (30 %) mužov a 524 (70 %) žien.

Výsledky boli spracované a na vyhodnotenie dát sa použili základné matematické štatistiky. Monitoring hluku sa vykonával na 479 uliciach v Košiciach certifikovaným prístrojom PeakTech 8005, ktorý bol USB káblom pripojený na počítač. Hladiny akustického tlaku (dB A) sa zaznamenávali digitálne s intervalom 0,2 sekundy vo forme čiarového grafu a číselných hodnôt do tabuľky. Náš monitoring hluku spočíval v hodinovom meraní dopravného hluku v Košiciach. Podľa vyhlášky MZ SR 549/2007 Z. z. sa hodnotil hluk vo vonkajšom prostredí pred obvodovou stenou budov vo vzdialenosti  $1,5 \text{ m} \pm 0,5 \text{ m}$  od steny a vo výške  $1,5 \text{ m} \pm 0,2 \text{ m}$  nad podlahou príslušného podlažia za priaznivých poveternostných podmienok. Postupom merania uvedeným v tejto vyhláške je možné realizovať na posudzovanie hluku z dopravy z hľadiska vplyvu na ľudí.

Rušenie hlukom sa zvyšuje so zvyšujúcou sa intenzitou hluku v životnom prostredí. Pri výpočte relatívneho rizika vyšla významná pozitívna súvislosť medzi farbou očí a rušením hlukom ( $RR = 0,542/0,310 = 1,75$ ). Z toho vyplýva že „svetlookí“ ľudia sú 1,75 krát častejšie senzitívni na hluk ako ľudia „tmavookí“.

Štúdia preukázala, že intenzita hluku v závislosti s narastajúcim poschodím sa zvyšuje. Monitoring hluku sa vykonával v Košiciach pred obytnou budovou na každom z 12 poschodí.

Pri skúmaní vplyvu hluku na imunitný systém človeka sme zistili, že so zvyšujúcou sa dopravným hlukom sa zvýšil aj počet respondentov so zníženou imunitou. V uliciach s intenzitou hluku do 47 dB uviedlo zníženu imunitu 16 % respondentov, v uliciach do 57 dB 17 % respondentov a uliciach do 67 dB 24 % respondentov. Pri sledovaní prehypertenzie v súvislosti s intenzitou hluku je viditeľný mierny nárast počtu respondentov v uliciach do 57 dB a do 67 dB.

Kľúčové slová hluk, zdravie, Košice

## Úvod

Sluch je prvý zmysel u človeka, ktorý je plne funkčný už pred narodením. Vnímame ním najrôznejšie zvuky z okolia – príjemné aj nepríjemné. To, že hluk pôsobí pozitívne aj negatívne na organizmus človeka potvrdzujú mnohé štúdie. S narastajúcou intenzitou hluku v životnom prostredí narastá aj počet ľudí, ktorí trpia rôznymi poruchami zdravia v dôsledku expozície hlukom. Dlhotrvalé pôsobenie hluku môže mať za následok zvýšenie krvného tlaku, pulzu, zvýšenie svalového tonusu, zvýšenie hormonálnej sekrécie, zmeny v metabolizme (Martonová, 1998). Dôsledky pôsobenia hluku na psychiku sa môžu prejavovať v príznakoch ako je podráždenie, nervozita, nesústredenosť a pod. (Havránek, 1990).

## Materiál a metodika

V štúdiu realizovanej v roku 2012 sme zisťovali formou dotazníkového prieskumu u obyvateľov Košíc subjektívne vnímanie hluku v životnom prostredí, životný štýl, zdravotný stav respondentov a na akej ulici v Košiciach bývajú. Dotazník obsahoval 71 otázok. Bolo oslovených 751 obyvateľov Košíc – 227 (30 %) mužov a 524 (70 %) žien.

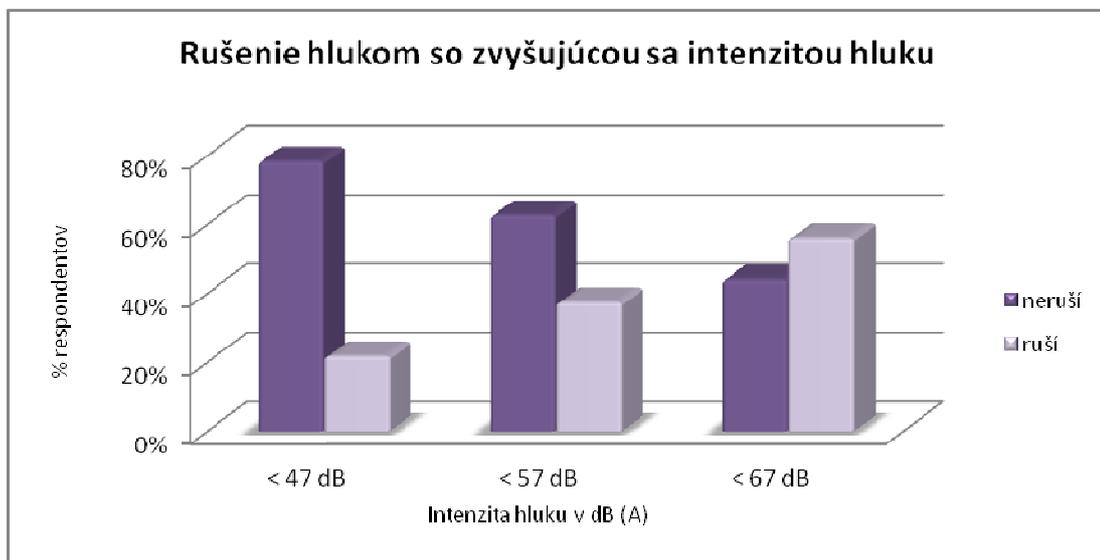
Výsledky boli spracované a na vyhodnotenie dát sa použili základné matematické štatistiky. Monitoring hluku sa vykonával na 479 uliciach v Košiciach certifikovaným prístrojom PeakTech 8005, ktorý bol USB káblom pripojený na počítač. Hladiny akustického tlaku (dB A) sa zaznamenávali digitálne s intervalom 0,2 sekundy vo forme čiarového grafu a číselných hodnôt do tabuľky. Náš monitoring hluku spočíval v hodinovom meraní dopravného hluku v Košiciach. Podľa vyhlášky MZ SR 549/2007 Z. z. sa hodnotil hluk vo vonkajšom prostredí pred obvodovou stenou budov vo vzdialenosti  $1,5 \text{ m} \pm 0,5 \text{ m}$  od steny a vo výške  $1,5 \text{ m} \pm 0,2 \text{ m}$  nad podlahou príslušného podlažia za priaznivých poveternostných podmienok.

Postupom merania uvedeným v tejto vyhláške je možné realizovať na posudzovanie hluku z dopravy z hľadiska vplyvu na ľudí.

## Výsledky

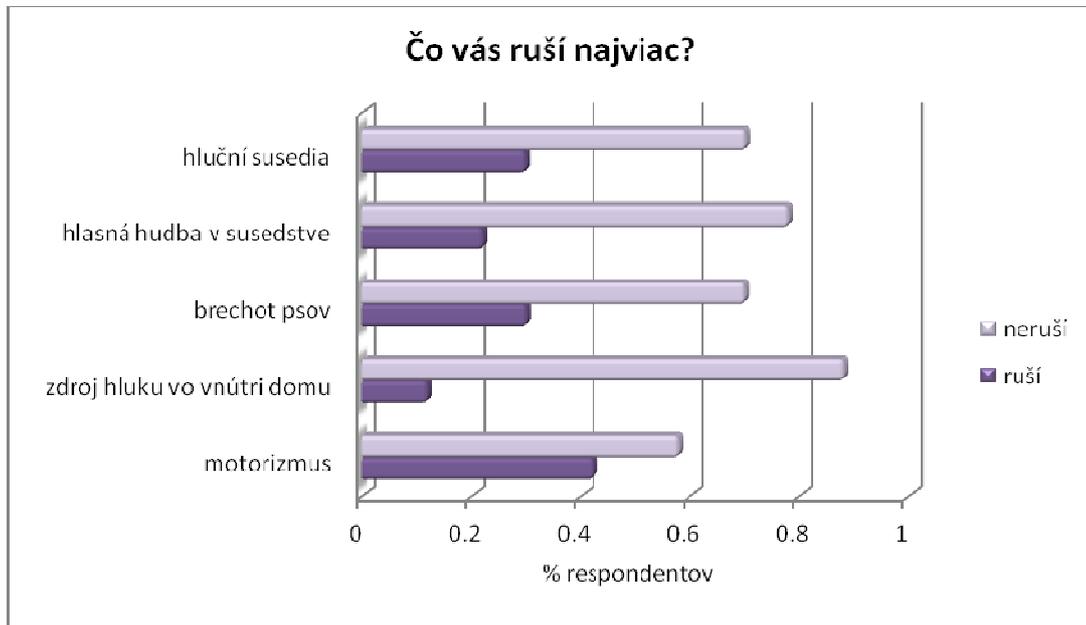
Obťažovanie hlukom je najvšeobecnejšia reakcia ľudí na hlukovú záťaž. Je daná fyzikálnymi vlastnosťami zvuku (intenzita, frekvencia a dĺžka expozície) a tiež je veľmi ovplyvnená tzv. osobnostnými charakteristikami príjemcu. V populácii je cca 10% veľmi senzitívnych ľudí voči hluku a naopak 10% nadmerne tolerantných ľudí a pre 80% populácie platí, že zo zvyšujúcou sa hlučnosťou rastie adekvátne aj kvantita odpovedí (pocity rozmrzelosti a obťažovania). Pri pôsobení hluku sú veľmi dôležité aj vplyvy neakustické: sociálne, psychologické faktory a faktory ekonomickej povahy, čo potvrdzujú rôzne výsledky štúdií, ktoré preukazujú u rovnakých hladín hluku rozdielny efekt u exponovanej populácii (Státní zdravotní ústav, 2013).

Obrázok 1. Rušenie hlukom pri zvyšujúcej sa intenzite hluku



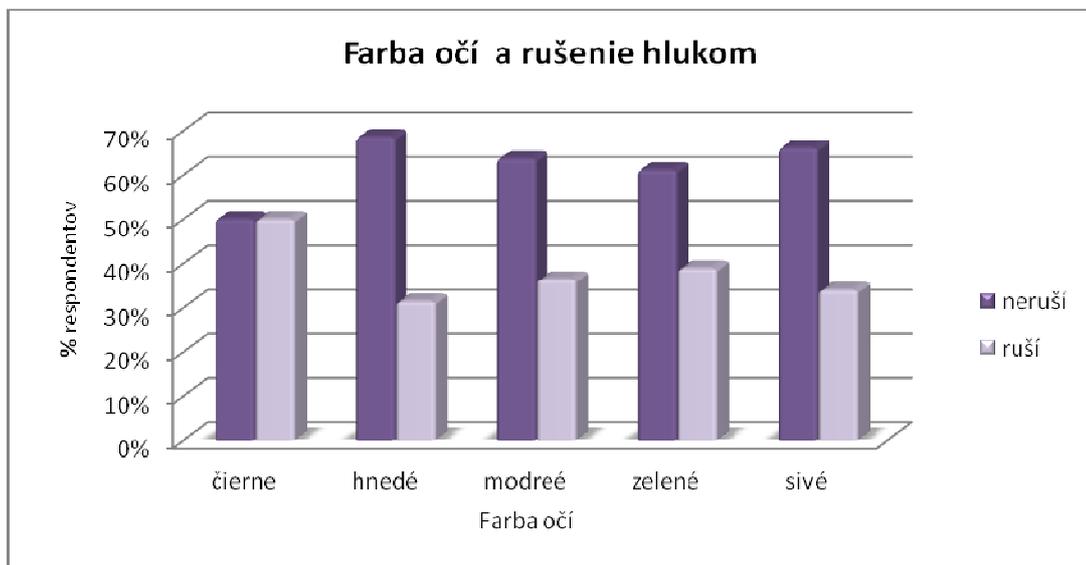
Došli sme k záveru, že spolu s vyššou intenzitou akustického tlaku sa zvyšuje aj obťažovanie hlukom. Rušenie spánku hlukom môže zvýšiť riziko srdcového infarktu, arytmie, spôsobiť tráviace problémy, bolesti hlavy, závraty, vysoký krvný tlak, alebo predčasný pôrod v tehotenstve (Kuzmová, 2010). Ako naznačujú výsledky, najčastejšou príčinou rušenia hlukom u respondentov z Košíc je doprava (42%), hluční susedia (30%) a štekajúce psy (30%). Následne hlasná hudba v susedstve (22%) a zdroj hluku vnútri budovy (12%).

Obrázok 2. Príčiny rušenia hlukom



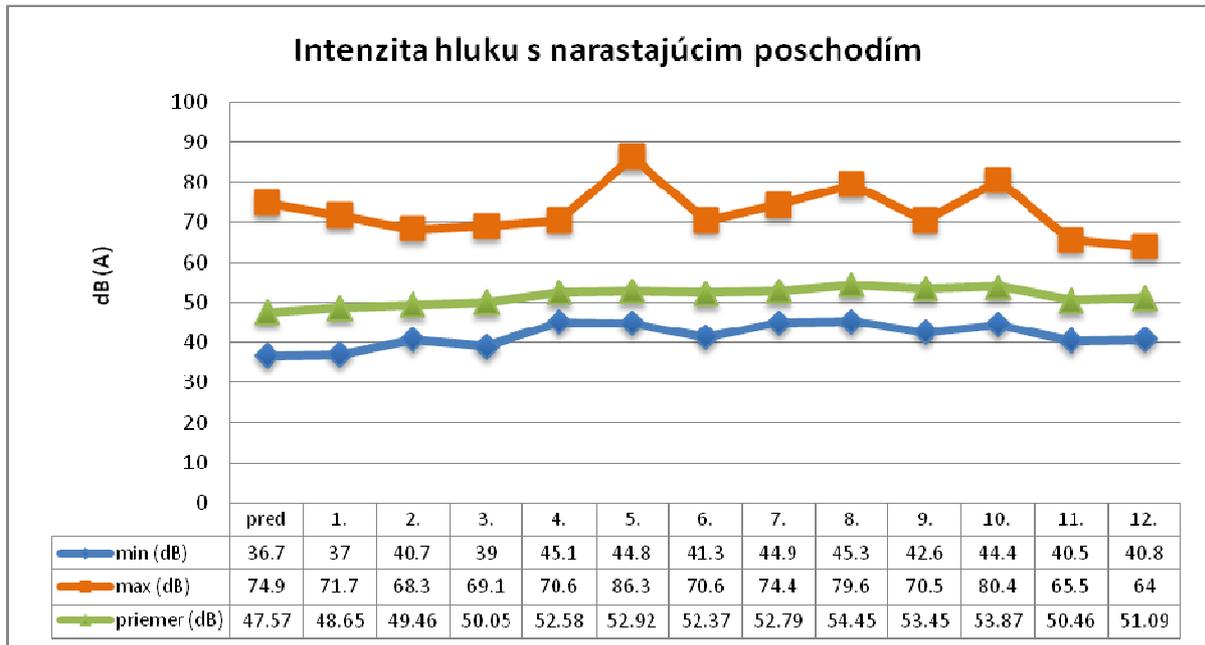
Pri výpočte relatívneho rizika vyšla významná pozitívna súvislosť medzi farbou očí a rušením hlukom ( $RR = 0,542/0,310 = 1,75$ ). Z toho vyplýva že „svetlookí“ ľudia sú 1,75 krát častejšie senzitívni na hluk ako ľudia „tmavookí“.

Obrázok 3. Rušenie hlukom v závislosti na farbe očí



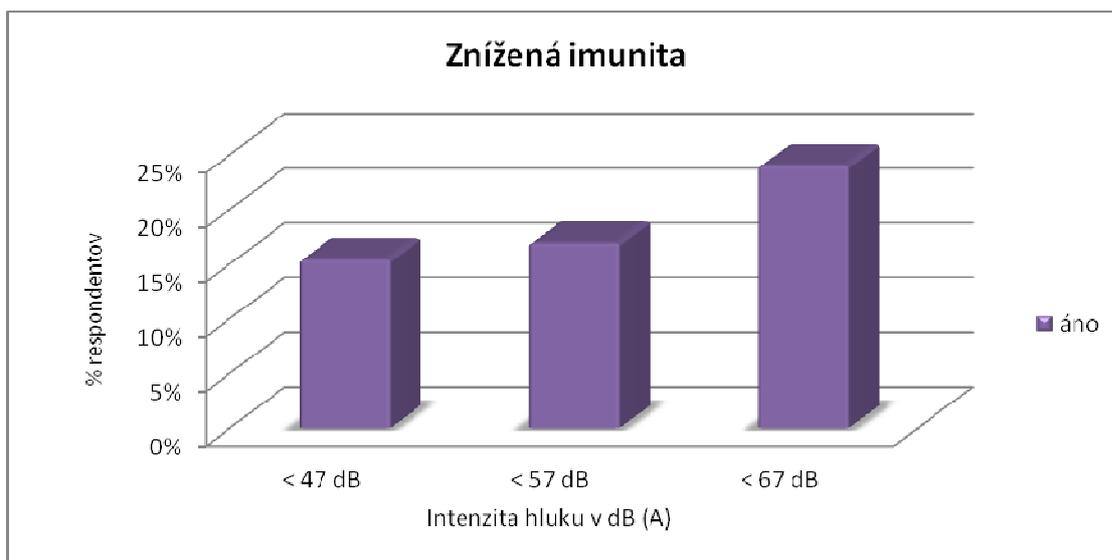
Štúdia preukázala, že intenzita hluku v závislosti s narastajúcim poschodím sa zvyšuje. Monitoring hluku sa vykonával v Košiciach pred obytnou budovou na každom z 12 poschodí.

Obrázok 4. Nárast intenzity hluku so zvyšujúcim sa poschodím



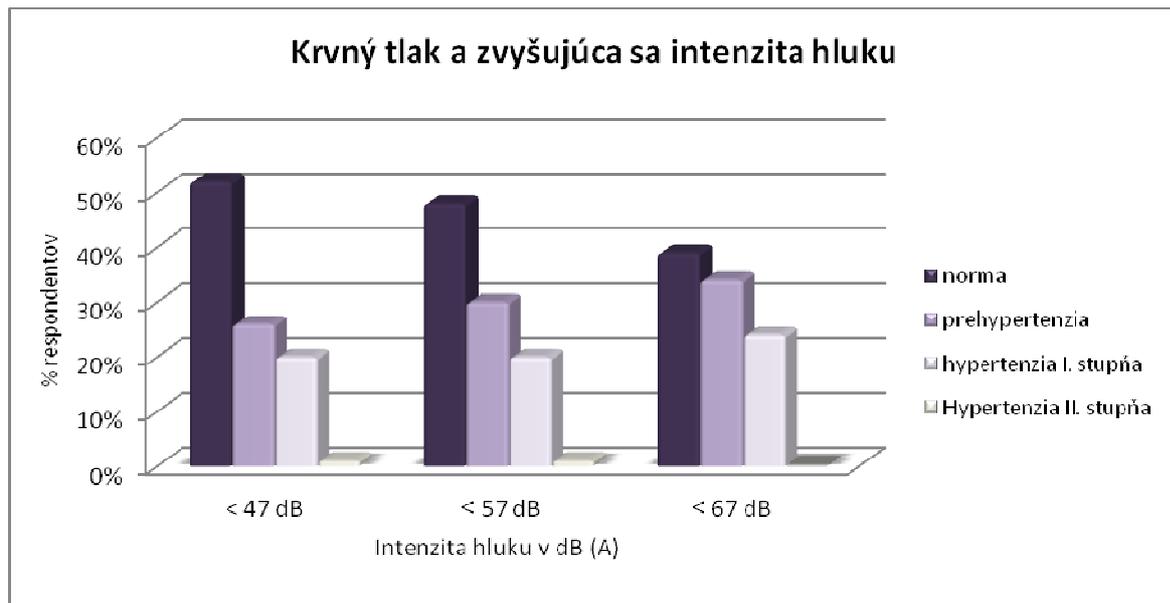
Pri skúmaní vplyvu hluku na imunitný systém človeka sme zistili, že so zvyšujúcim sa dopravným hlukom sa zvýšil aj počet respondentov so zníženou imunitou. V uliciach s intenzitou hluku do 47 dB uviedlo zníženú imunitu 16 % respondentov, v uliciach do 57 dB 17 % respondentov a uliciach do 67 dB 24 % respondentov.

Obrázok 5. Znížená imunita v závislosti s narastajúcou intenzitou hluku



Jedným z najnebezpečnejších aspektov hypertenzie je, že človek nemusí vedieť, že ju má. Takmer tretina ľudí, ktorí majú vysoký krvný tlak o tom nevie. S narastajúcim záujmom o krvný tlak a jeho hranice sa objavuje aj nový pojem – prehypertenzia. Ide o opakované nameranie systolického TK 120 – 139 alebo diastolického TK 80-89 mmHg, ktoré môže vyústiť do hypertenzie ak sa nedodržiava správna životospráva - redukcia hmotnosti, príjmu soli, vylúčenie stresu a fajčenia, zvýšená pohybová aktivita (American Heart Assotiation, 2013). Pri sledovaní prehypertenzie v súvislosti s intenzitou hluku je viditeľný mierny nárast počtu respondentov v uliciach do 57 dB a do 67 dB.

Obrázok 6. Krvný tlak v závislosti s narastajúcou intenzitou hluku



## Diskusia

Hluk má vplyv na predčasné starnutie a skrátenie života obyvateľov veľkých miest o cca 8 - 12 rokov. Organizmus človeka sa len ťažko adaptuje na hlučné prostredie. Ak niekto tvrdí, že si na hluk zvykol, je to len subjektívny dojem. V skutočnosti, nebezpečný účinok hluku pokračuje. V dnešnej dobe sme vystavení oveľa vyššej intenzite hluku ako v minulosti. Hluk je rovnako nebezpečný ako znečistenie výfukovými plynmi. Nemal by sa podceňovať ani v životnom prostredí. Psychologický aspekt, ako je postoj k hlučnému prostrediu má významný vplyv na správanie jednotlivca, jeho nálady a pocity. Zmeny nálady a správania sa človeka, ako aj vplyv na poslucháčov môžu pôsobiť ako stresový faktor.

Aj my sami môžeme prispieť k zníženiu hluku v životnom prostredí – znížiť hlasitosť reprodukovanej hudby, televízie, včas oznámiť hlučné práce susedom, vypínať si mobilný telefón počas verejných podujatí, dodržiavať rýchlostný limit pri jazdení autom, relaxovať v prírode a tým si zregenerovať svoj sluch (Kuzmová, 2010).

## Záver

Prípustné hodnoty ekvivalentných hladín A akustického tlaku pre referenčné časové intervaly (deň, večer a noc) v chránenom vonkajšom prostredí pre dopravu by mali vychádzať z prijateľného percenta obťažovaných resp. rušených obyvateľov Košíc. Špecifická situácia nastáva pri posudzovaní oprávnenosti sťažností jednotlivcov alebo skupiny občanov na rušenie hlukom z iných zdrojov (stacionárnych

zariadení, výrobných a nevýrobných prevádzok a pod.) alebo rušenie hlukom, ktorý je spôsobený aktivitami ľudí. Subjektívne vnímanie špecifického (identifikovaného) hluku súvisí s jeho časovým charakterom, frekvenčným spektrom, trvaním a výrazne ho ovplyvňuje aj zdravotný stav sťažovateľov a emočný vzťah k zdroju hluku.

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## **Risk perception & environmental risks management in environment & health protection context**

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### **Abstract**

When evaluating perception of environmental risks, psychosocial and psychosomatic factors may be of fundamental importance. This is the case in particular where our knowledge of the true health consequences of exposure to given factor is incomplete or its action is within the range of values where we do not anticipate the measurable biological effect. This applies not only in the case of the indoor environment related complains but also to that of non-ionizing electromagnetic radiation and electro-ionic microclimate. A serious consequence found in the syndrome of mass hysteria is the fact that due to differently motivated disinformation, part of the population can suffer from some psychosomatic symptoms. Those imply objective suffering and deterioration quality of life for those affected.

Keywords: Risk perception, environmental risks assessment, psychosomatic aspects, psychosocial aspects of risk, health an illness, scientific and social models, public health.

### **Introduction**

*Scientific and social models of health and illness*

When contemplating the problem of a healthy environment in relation to a sick one, it is necessary to define the relationship of *health* and *illness* in general. Currently, health is conceived as a condition of physical, psychic, and socioeconomic wellbeing. Contrarily, illness involves an extensive set of different experiences or behaviours of the affected person. Different experience in the negative sense against the generally accepted standard is implying the deteriorated or endangered subjective condition or social function, feeling of undesirability, of being unwelcome and/or unexpected. The illness induces some activities which aim is an improvement of the condition (Bencko and Honzák, 1997).

Every society responds to such impaired function by charging a number of individuals or institutions with duties to evaluate and interpret the actual condition and provide the necessary measures. Public health key stakeholders (owing to public health being both an institution and scientific discipline) whose representatives include physicians are expected to react to these social requirements and provide best practices and outcomes. Medicine tries to build up a scientific model of illness, its diagnostics, treatment and prevention, yet this model often is neither identical nor congruent with the social one. There is a difference between *illness* and *disease*; the same as the difference of views concerning the therapeutic and preventive approach (Bencko, 2011).

The priority of the scientific approach is the attempted objectivity and criticism in collecting data and interpreting it. On the contrary, the social model is mostly based on subjective and strongly emotional attitudes. Both, the expert and lay community are not immune against the harmful influence of myths. Science, however, is closer to truth, but not exceptionally, the science-based, as well as lay models, tend to misinterpret the situation, and provide altered or skewed approaches (Burns and Slovic, 2012). Using objective methods rooted in the scientific process, it becomes clear to be able to reflect upon failures, where the subjective approach often resists logical argumentation and organized methodology.

Nevertheless, even the scientific process operates with some traditional elements. Max Planck has lamented, “the new scientific truth would not win by convincing the opponents, but rather by letting the

opponents die, and the new generation then adopts a new, and own truth.” If rationally removing harmful effects and providing for a healthy living environment we have to consider both the scientific and social aspects, i.e. the views and needs of people living in particular environment.

#### *Assessment of ecological and health risk factors and settings*

The assessment of potential ecological and health risk rising from the planned industrial transport and waste treatment facilities and other construction activities becomes indispensable (Drew et al, 2003). Of course, the public health aspects of such waste management activities is no novelty as such cited projects have legally been controlled and approved by the district or regional public health authorities, within the scope of preventive supervision and best practices.

Whereas the initial phase of risk assessment, its identification or potential human exposure are of pure scientific character, the actual risk assessment increasingly assumes the arbitrary aspects (e.g. safety coefficients), risk communication, its control and management by way of psychological aspects; collective decision making then becomes a hotly debated political issue (Bencko, 2010). As illustrating examples we can use problems related to conflicting views concerning the health risk and associated effects of electromagnetic field and electronic microclimate (Goldsmith, 1996).

The present approach to quantitative risk assessment artificially separating physiologically based pharmacokinetic (PBPK) model and biologically based dose response (BBDR) model needs to be substantially improved. The modelling procedure must go beyond the current organ-tissue based PBPK model as well as the hard-to-modify two-stage BBDR model. It is clear that a model must be flexible and capable of incorporating information about pharmacokinetics and cell signalling response, among other transparent metrics that help to elucidate the situation (Bencko, 2010, Ricci and Sammis, 2012).

A limitation of the present approach to risk assessment is low dose extrapolation of cancer incidence data from both animal (experimental) and human (epidemiology) studies that are most frequently based on models that assume linearity at low doses and low exposures (Ricci and Sammis, 2012). There are situations in which this assumption could be considered unreasonable. However, because of the lack of data and no alternative methodology for risk extrapolation at present, the model of low - dose linearity continues being used despite existence of qualitative evidence evidencing the contrary. This is specifically relevant in the case of many non-genotoxic carcinogens modulating mitogenic stimulation or suppression of apoptosis - processes regulated by signalling through its impact on gene expression (Hernandez et al, 2009). Dioxins (TCDD) can serve as example of non-genotoxic carcinogen, endocrine disrupter acting through the Ah receptor. It is a general consensus that to resolve this problem, we need to develop a methodology incorporating biological data on mechanisms operating at the cellular or molecular level.

#### *Psychic infection and mass hysteria*

As every expert knows dealing with clients may sometimes bring about a number of both material and psychological problems. Besides, addressing a group of individuals, who, moreover, feel endangered is more complicated still, especially when these groups previously organized in harmony and through a certain hierarchy start to change into disintegrated ones where behaviour suggest the behaviour of masses or of the mob. The mass psychology may appear whenever a sufficient number of persons are gathering around one point of common interest.

The psychology of the group never makes a mere sum of the member's psychology but it has its own individual characteristics. The group as a whole, shows better quality than the most inferior members, but the worse judgement and lower IQ compared to the best individuals of the group, and it is prone to getting influenced by emotion rather than so by reality. Another characteristic is behaviour of the group as a mob (aggressive, panicking, etc.) whose activities are more often worse than those of an individual (Ali-Gombe et al.,1996, Bartholomew, 1993, Rotham and Weintraub, 1995, Burns and Slovic,2012).

The basic characteristic of mass dynamics is the "psychic infection" due to increased suggestibility responsible for the sensation of symptoms and subsequent chain reactions. A person in the mob then is

capable of acts they would otherwise never have committed as an individual on their own. The cases of mass psychoses are well known from many literary descriptions of "mass hysteria" in real or supposed exposure to toxic substances, or in health problems and symptoms connected with the indoor environment (sick building syndrome) found in air conditioned structures (Klein and Bencko, 1991, Klein, 1993, Ruhl et al. 1993, Chang et al.,1994, Holcátová and Bencko, 1997).

In such cases, it can be considered "objective", (i.e. the patient really suffers from them). They are reminded of such symptoms of acute distress but they are less intense and last for a longer period of time, (e.g. for many days, weeks, or months). The affected are aware of the overall stress and tension, fright, shyness, of sensations of oppressiveness and worries, when addressing other people, and vague stressing uncertainty for the future. All these symptoms are accompanied by chronic fatigue, headache, insomnia and other sub-acute vegetative disorders. As the syndrome is not fully debilitating, the patient feels chronically unwell in both his daily duties and his reaction towards other people. Often their capacity of cognition and making sense of daily activities becomes reduced as the result of chronic fatigue and impaired concentration.

The symptomatology fully corresponds to the term "somatization" introduced in the ICD-10 international classification. The point is that emotion - here a very strong one - finds its vegetative correlate occurring in the somatic sphere. An important role in further development plays the "interpretative model" of the patient being *xenochthonous* in our case (the cause of all trouble comes from outside) and the patient is aware of it (sick building, nearby radar station, TV tower, waste incineration plant etc). This mass reaction can manifest by two syndrome levels: one prevails the state of anxiety and the other prevails motoric symptoms (e.g. the medieval processions of flagellants praying for aversion of a pest).

The symptoms may appear separately or combined, or occur in turn in the patient. Mass hysteria afflicts men less frequently than women, especially those living in poorer socioeconomic conditions. Mass hysteria is closely connected with the problems of "sick indoor environment" illness. Important here is the firm conviction of outside noxia responsible for any kind of symptom, further tendency to hypochondria and stress and also hostile attitudes of the patient to anybody to blame for these conditions; in practice materialized by endless weary court trials. In a sense, also collective insistence on Unidentified flying Objects (UFOs) and other paranormal encounters belong to this category.

Yet, not all mass-occurring pathological symptoms are mass-hysteria-related. For example, the mass poisoning of school children in the school canteen in London can be mentioned, manifested by gastrointestinal troubles shortly after lunch. The complex microbiological, hygienic, and toxicological examination included a questionnaire for children, which showed a significant link between the symptoms and consumption of raw cucumber (relative risk 6.1). Microbiologically the cucumbers were safe but pesticide contaminated, as proved by toxicology tests. In the discussion, the authors warn against any overhasty diagnosis of mass hysteria.

Another example can be found with vaccination and concerns of a disproportionate amount of adverse side effects, including cognitive and development impairment. This new version of vaccine denialism has caused some eradicated disease such as measles, mumps and rubella to be once again found in the developed world due to significantly reduced herd immunity due to parents opting out of such otherwise required vaccines. Vaccine-preventable diseases have been a major cause of illness, death, and disability throughout human history. The advent of the modern vaccine era has changed this significantly. In more recent times, there has been much debate in the lay press regarding vaccine safety - namely what possible side-effects vaccines cause and whether these outweigh the risks of leaving a population without a vaccination program. Despite most of the hysteria, some key literature relating vaccines and childhood development have been completely rebuked and withdrawn from the literature. Present use vaccines provide disease coverage to populations, prevent illness and save lives.

Even when the concentration of toxicants fails to reach the risk values, other factors may be involved, e.g. ambient temperature, air humidity, etc., which have up to now not been included in our models but which

are able to objectively influence the clinical course, morbidity and mortality rate (Aldous et al.,1994). There even may occur combination of the actual infection and mass hysteria. In some people evident hypersensitivity to some substances exists: their pathophysiological reaction then is capable of psychogenic effects on the environment.

Nevertheless, we presume the psychosocial aspects may be of basic importance in understanding the potential health risks.

Furthermore, we can expect such problems when our knowledge of actual health effects of human exposure is incomplete or the intensity of exposure oscillates in levels raising doubts as to possible biological effects (Cikrt et al,1993, Bencko, 2010). Very serious problems, mostly in psychologically unstable patients, are neuro-psychic and psychosomatic symptoms resisting to treatment. Despite the difficulty in objectification, they represent suffering that should not be underrated considering the quality of patient's life.

#### *Challenges for prevention*

The prevention of such conditions can either be systematic: early educational or popularisation campaigns, specific health education orientated to the development of industrial, transportation, or other types of constructions, and integration of the local civic activities in the program. The purpose of this should not be a cheap belittling of the risk but reasonable explaining of its acceptable rate, and also the likely advantage to benefit from the realization of the structures. Any later efforts to inform the public about the true state of affairs is normally accepted with distrust and disbelief, in belief this information had been well-paid by the government, industry and market forces, the military or some other institution trying to camouflage the actual condition.

#### **Conclusion**

It is therefore recommended to carry out a relevant, competent epidemiological pilot study on potential incidence of some health problems (tumours, congenital malformations, etc.) still before starting the structures, to compare - using a set of reliable data, when the building had already been approved for use - the incident phenomenon with the previous conditions. Such a study, of course, is no alibi. In cases of positive findings the study could serve as basis for rational measures to minimize the health risk due to the operation of the particular facility. The concept of health risk minimization must be included as a theme in all stages of the design and realization, covering all potential risks for the environment and human health. In medicine, the Hippocrates' statement still holds: *Life is short, and Art is long; the occasion is fleeting, experience fallacious, and judgment difficult. The physician must not only be prepared to do what is right himself, but must also make the patient, the attendants, and externals to co-operate.* If we honour this in therapy, we should do so in prevention of environment related health risks twice as much (Bencko, 2011).

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## New challenges for health systems

### Health systems in post-communist countries - a progress or stagnancy?

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#### Abstract

The OECD's health report has attracted a wide attention in Poland, being extensively commented in media. Most of the comments focus on the poor performance of Polish health system, both in terms of the financing and its efficiency in securing population's health needs. The aim of this paper is to verify those opinions based on the analysis of the health system efficiency in Poland, compared to other countries. The paper concludes that the countries of Central and Eastern Europe note a systematic improvement of the epidemiological indicators, but with a few exceptions do not reduce the distance to the countries of Western Europe. Poland achieves average result, however clearly outlying downward from countries at the top the rate. Among the likely reasons of that are the issues of restructuring processes of the public providers, and the reduction of debt, as well as the increase in salaries of health professionals.

Keywords: health spendings, health system efficiency, health system transition, post-communist countries  
wydatki na zdrowie, efektywność systemu zdrowotnego, transformacja systemu zdrowotnego, państwa postkomunistyczne

#### The issue

Recently published OECD's health report (2012) has attracted a wide attention in Poland, being extensively commented in popular media. Most of the comments focus on the poor performance of Polish health system, both in terms of the financing and resources, as well as its efficiency in securing population's health needs, where the epidemiological data for Poland, is much worse, than in case of the „old” EU Member States.

While it is obviously true that health data for Poland is worse than in case of much wealthier Western Countries, it seems that comparing Poland to those countries to prove a thesis about the poor performance of Polish health system is a bit a misuse, that may misinform public about the real condition of the health sector. This picture may look radically different if to compare the commented data in their current values with the values at the beginning of the process of economic system transition, or even from before a decade. In this case we can observe a constant progress in each of the areas analysed: basic mortality indicators, life expectancy, as well as total and public health expenditure. For example life expectancy at birth in Poland between 2000 and 2010 (all data from: WHO Health for All Database) has increased by a 3,6%. Cardiovascular diseases mortality has decreased by a 24,5%. In case of cancer, the mortality rate has decreased by 9,5%. On this basis we should come to a conclusion that the opinions presented in media is not reflecting the reality. However, such a simple trend analysis still might be too much one-dimensional and would distort the real picture of the health system. Much more informative will be if we will try to investigate how the gap between Western reference countries, and Poland, and other CEE countries, has been changing throughout the years. On this basis we should be able to get closer to the answer, what is the actual effectiveness of the health reform processes in Poland, compared to other countries with similar socio-economic conditions.

A logical expectation seems to be that in terms of the basic epidemiological data, countries in transition, having achieved a basic economic stability, should be able to get much better improvement, than those with stabilized systems. This is because, as we can assume, the switch of the health system toward the efficiency-oriented model, should eliminate the basic scope of high mortality determinants, while after achieving the basic stability, any further improvement depends on investments in technology, the quality of care and prevention. We can also assume that there is a breaking point demonstrating the epidemiological indicators in their best possible values, where no further improvement is possible in a given conditions. After eliminating the basic mortality determinants, any further improvement towards this point requires much higher investment in the quality and accessibility of care. If so, a final hypothesis may be raised, that the improvement of the population's health is highly dependent on the financial issues, and that this process requires a constant increase of the health care spendings.

Based on the above-given assumptions we can try to make a basic analysis of the different health systems efficiency. Expected result is that countries with better economies will generally have better health indicators, but at the same time countries with worse, but rising, economies will have better results in reducing the mortality indicators, or extending the life expectancy. Finally we should expect that countries with higher health spendings have better results in terms of improving the health status of population, as well as that the higher increase of financing, results in better improvement.

#### *Comparing the efficiency of health systems: lessons learned*

In the group of 10 countries that has joined European Union in 2004 or 2007, between the years 2000 and 2010 each country has increased the engagement in health care financing related to GDP at the average level of 21,5%. Slovakia has the highest increase of 60%, and Poland has the second best result of 35,1%, as the level of financing has increased from 5,52% to 7,46% of GDP. The only exception in the general trend is Estonia, where the financing has been maintained at the constant level of 6,04% of GDP (however, with significant changes throughout the period, with a bottom at 5% in 2006).

In terms of the epidemiological factors, each country managed to extend the life expectancy at birth, with Estonia at the top (7,16% increase), and Lithuania at the bottom (1,88% increase). Poland's result was the 5th highest (3,6% increase). All the countries has good results in reducing cardiovascular diseases mortality, with Slovenia at the top (30,7% reduction), and Lithuania noting the worst result (3,97% decrease). Poland has the 4th result (24,5% mortality reduction). Cancer mortality has been decreased in 7 out of 10 countries. Czech Republic was the most efficient in this sphere (17,8% reduction), and Romania has the worst result (5,4% increase of the mortality rate). Poland was 3rd, with the result of 9,5% reduction of the mortality rate.

As we can see, Poland generally gets the average scores in terms of improving basic factors of population's health. They are not so much negative, as the popular media used to say, but at the same time they are not the best possible, nor the best in a group of post-communist countries. But to get the full picture we still need to make some deeper analyses. First, we should check out, whether the gap between health status of Poland, and other „new” EU Member States, and the „old” EU Member States is being reduced. Secondly, an important information might be the efficiency of resource allocation, based on the assumption that higher financing equals to better performance.

In relation to the first sphere the result will be, that in case of the life expectancy only Bulgaria and Lithuania did not manage to reduce the gap to „old” EU Member States. All the other countries were extending the life expectancy faster, but the difference is of negligible importance. In Poland the life expectancy in 2000 was at the level of 93,8% of the average for „old” EU Member States, and in 2010 it was just slightly higher, reaching the level of 94,3%. In case of cardiovascular diseases mortality only Slovenia notes the mortality reduction higher, than the average for „old” EU Member States. In case of all the remaining countries, the gap is increasing, not shrinking. In case of cancer, Czech Republic and Slovakia got the higher mortality reduction, the other countries were less efficient. What is particularly

concerning in case of Poland, is that this country has higher mortality rates, but significantly lower cancer fatality rates.

In relation to the second sphere, a multidimensional comparative analysis of data on the increase of financing combined with the change of epidemiological data normalized in accordance with the zeroed unitarization method, may give us a simple health system efficiency factor based on the formula:  $a/(b+1)$ , where "a" is a normalized epidemiological factor, and b is a dynamics of change in financing expressed in a decimal form.

Such a combination in relation to the data on life expectancy at birth will put Estonia on a first place, with the value of efficiency factor (EF) of 0,99. Except of this country, also Slovenia (EF=0,49), Latvia (EF=0,42), Romania (EF=0,31) and Hungary (EF=0,30) are achieving better result, than the average for „old” EU Member States (EF=0,27). Poland has the sixth result in this dimension, with the EF value of 0,24. It looks slightly different for cancer mortality reduction, where Czech Republic notes the highest efficiency factor (0,80), and Hungary is on a second place (0,62; we should note, however, much higher level of mortality at the starting point in this country). Those two countries and Estonia (EF=0,59) are the only, which managed to achieve better efficiency, than in case of the EU before 2004 Member States (EF=0,56). Poland (EF=0,48) is fifth, being worse also than Slovakia (EF=0,50). Finally, in case of the cardiovascular diseases, Estonia again notes the best result (EF=0,90). Except of Estonia, Slovenia (EF=0,88) is the only country having result better than in case of the „old” EU Member States (EF=0,82). Poland (EF=0,57) is fourth, being overtaken also by the Czech Republic (EF=0,65).

## **Conclusions**

The efficiency of health system is being determined by a number of factors, not only the three epidemiological data presented in this paper (see i.e. Joumard et al. 2010; Anderson and Frogner 2008; Murray and Evans 2003). Obviously we cannot therefore unambiguously conclude about the evaluation of the health systems, based on such a simple analysis. However, even at this stage we are able to do some observations, that is that some of the countries much more effectively use the financial resources earmarked for health care. What is also important, efficiency does not seem to be directly related to the level of economic development of the country, as well as to the level of health care financing as such. Financial factor, although important, does not seem to be the key, nor the sole determinant of population health improvement.

An important observation is also that the CEE countries, however note a systematic improvement of the epidemiological indicators, with a few exceptions, do not reduce the far distance to the reference countries of Western Europe. With even better mortality rates, as well as average life expectancy, the Western countries are still substantially more effective in their further improvement.

Finally, considering the Polish case, which was the starting point for the above considerations, we are forced to conclude that in terms of the efficiency of use of the resources allocated to health care, this country achieves average results, however, clearly outlying downward from the countries at the top the rate. Therefore, there is another research question arising of this conclusion: what does determine the disappointing result of the country, as well as what does absorb the resources appointed to health care. We can anticipate, that among the likely reasons are the issues such as the reduction of debt of public providers, as well as the increase of the funding of health services, which, however, is consumed by the increase in salaries of health professionals, not the services availability or quality as such.

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## **Exclusion from health system care in Poland**

### **Wykluczenie z systemu ochrony zdrowia w Polsce**

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#### **Abstract**

Among the EU members Poland belongs to the group of countries with a higher degree of risk of social exclusion. According to Eurostat, the number of people at risk of social exclusion amounted to 10,409 thousand people (27.8% of the population). It should be emphasized that since the accession to the EU, the percentage of population at risk of social exclusion decreased significantly. In 2005 its value exceeded 45%.

The aim of this study was to analyze the organizational and legal solutions within the Polish health care system, which are designed to ensure access to health care services for persons belonging to vulnerable groups at risk of exclusion.

Review of legal regulations indicates a relatively good legal protection benefits for all social groups. The problem, however, is the practical implementation of the provisions of laws, which causes restrictions on access to services for the homeless.

Number of studies indicate a significant impact of household incomes on decisions to purchase health care services.

Key words: Social exclusion, poverty, healthcare system

#### **Streszczenie**

Wśród państw Unii Europejskiej Polska zaliczana jest do grupy krajów o stosunkowo wysokim wskaźniku zagrożenia wykluczeniem społecznym. Zgodnie z szacunkami przedstawionymi przez EUROSTAT oceniono, iż w 2010 roku w Polsce populacja osób zagrożonych ubóstwem i wykluczeniem społecznym liczyła 10.409 tys. osób, co przekładało się na 27,8% populacji kraju. Należy podkreślić, iż odsetek ludności zagrożonej ubóstwem i wykluczeniem społecznym uległ wyraźnemu zmniejszeniu. W 2005 jego wartość wynosiła 45%.

Celem artykułu było dokonanie analizy rozwiązań organizacyjnych i prawnych w polskim systemie ochrony zdrowia, które mają zapewniać dostęp do usług zdrowotnych dla osób z grup narażonych na wykluczenie społeczne.

Przegląd rozwiązań prawnych wskazuje, iż zapewniony został względnie wysoki poziom ochrony zapewniony wszystkim grupom społecznym. Problemem pozostaje implementacja praktyczna rozwiązań prawnych, co powoduje ograniczenia w dostępie do świadczeń dla osób bezdomnych.

Liczne badania wskazują także na wyraźny wpływ sytuacji materialnej na dostęp do ochrony zdrowia.

Słowa kluczowe: Wykluczenie społeczne, ubóstwo, ochrona zdrowia

## **Issue**

If we look at Poland from the perspective of the past two decades it can be defined as a country of an economic and social success. According to statistical summaries prepared by the International Monetary Fund, Poland is ranked 23rd in the world in terms of gross domestic product, and on the 44th position in terms of gross domestic product per capita as measured by purchasing power standards (IMF, 2011). The improvement in the economic situation of the country contributes to social development and the improvement of the health of citizens. Reaching for one of the most popular synthetic measure of development - the Human Development Index (HDI) it should be noted that in recent years the rate has risen to a level that entitles you to position the Polish group of developed countries (0.889) (UNDP, 2010). However the process of stratification of the population leads to the often repeated in public discourse observation that not all social groups participate in this progress.

Poverty and social exclusion are now one of the key challenges both in the developed and developing world. Even more essential is, therefore, a proper understanding of the concepts being discussed. The concept of poverty gradually evolved with the development of modern societies and emerging distinct ideological assumptions that ultimately form two separate positions. According to the first one - the approach of absolute, poverty can be described as a situation in which the family is not able to secure the safety of the existence on basic biological level. The essence of this approach best summed up EJ Mishan, who notes that "(...) social Compassion should focus on the fact that one does not fall below a certain minimum standard of living (...) Just to assure that no one is starving (...)" (Mishan, 1986).

Clearly different is the view of the nature of poverty, its causes and ways to solve the problem presented by the proponents of the relative approach. In this concept poverty is described not only in the context of the needs of the individual, but rather in relation to the level of society in which the units operate. Poverty is therefore a situation in which the resources of individuals and families fall below the level of resources at the disposal of the average person or family in a given society (Lustig, 2000).

On the margins of discourse about poverty from the 70's of the last century gradually begins to develop the concept of social exclusion. In contrast to the nature of poverty, social exclusion cannot be expressed in measurable values, which makes this phenomenon is still little understood. In contrast to the poverty which is strongly conditioned materially, social exclusion is multidimensional. As noted by L. Dziewięcka - Bokun social exclusion puts emphasis on inequalities that appear in the horizontal plane societies, not in the vertical plane (Dziewięcka – Bokun, 2003). For the purposes of analysis has been adopted categorization of types of social exclusion, consisting of four basic types (Czapiński et al, 2005, 2009):

- Structural exclusion - the reasons for the exclusion are the place of residence (rural), low levels of education;
- Physical exclusion- including such reasons as age and disability;
- Normative exclusion- referring to such reasons as loneliness, addiction, trouble with the law, belonging to disadvantaged groups.
- Material exclusion- due to poverty and unemployment.

## **Description**

It is estimated that Poland belongs to the group of EU countries with increased risk of poverty [Fig. 1]. According to estimates provided by Eurostat in 2010 the population of people at risk of poverty and social exclusion in Poland was over 10,409 thousand people, which translates into a 27.8% of the population of the country. This high percentage may shock people, but it should be noted that it is significantly lower than the worst-off in this respect, Romania and Bulgaria (41%), while it does not differ from the rate recorded for the most vulnerable in this respect the "old" 15-particles, ie . Ireland (29.9%) and Greece (27.7%) (Eurostat, 2010). Change in global number of people at risk of poverty were reflected in similar

process for individual poverty lines - ie, the relative poverty lines, poverty line defined by law and absolute poverty threshold [Fig. 2] (GUS, 2011).

Figure 1. The percentage of people at risk of poverty in Poland and the European Union.

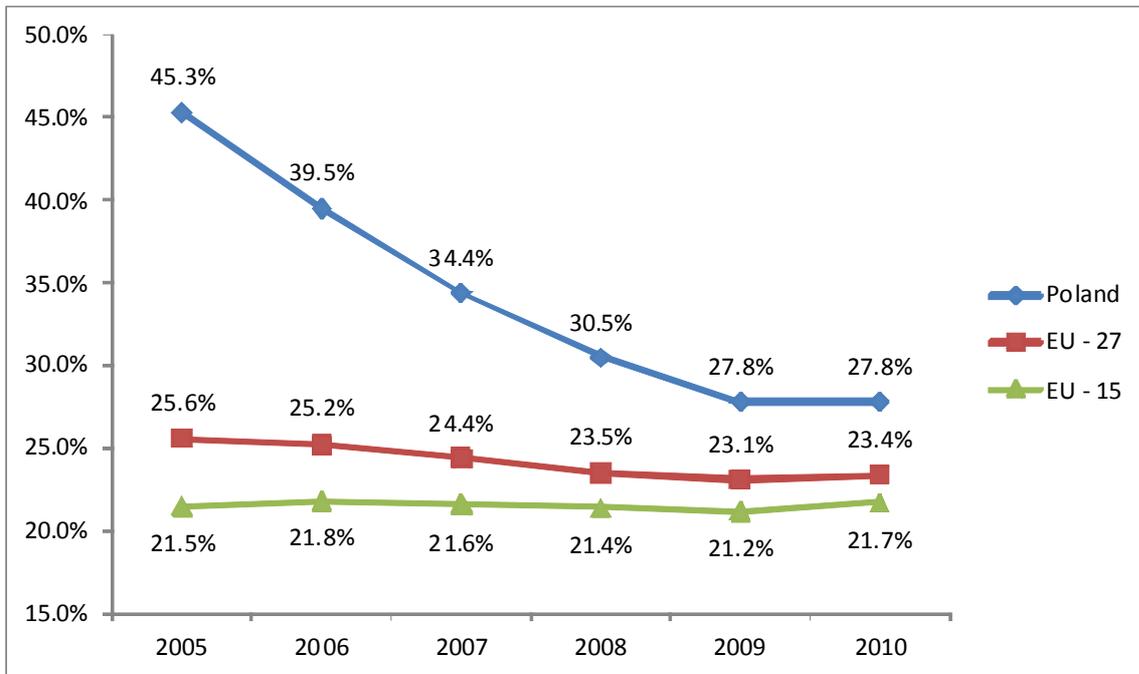
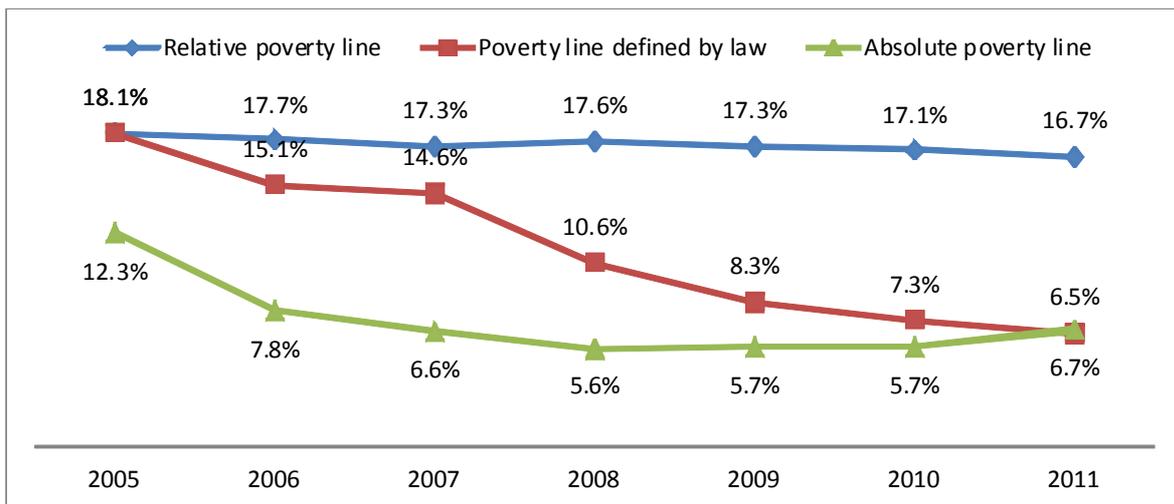


Figure 2. The proportion of the population at risk of poverty in Poland in 2005-2011 (in% by the year adopted the poverty level).



### *Lessons learned*

Poverty and exclusion are issues often discussed in the context of the functioning of the health care and health needs of the population, noting the relationship of these phenomena in a worse state of health of those affected. As noted in the Commission Communication "Solidarity in health: reducing health inequalities in the EU" in 2009 people with lower education, a lower occupational class or lower income tend to die at a younger age and more frequently. Also, groups that are socially disadvantaged and vulnerable to social exclusion experience particularly poor average levels of health suffer from the most common diseases. Among the groups whose health status differs significantly negatively from the rest of the population are residents of disadvantaged areas and those at risk of poverty, unemployed and employed illegal immigrants, the homeless, the disabled, mentally ill or chronically ill, the elderly, retired and single parents (European Commission, 2009). In principle, therefore, if we accept the previously described distribution of social exclusion on physical, structural, normative and material, you can draw the conclusion that the health consequences are relevant to each of these categories of exclusion.

In Poland, for the first time drew attention to this issue on the occasion of the construction of the National Strategy for Social Inclusion in 2004, where authors list three categories of recipients of health services (Narodowa Strategia Integracji Społecznej, 2004):

- bearing the costs of health system and using its services,
- not bearing the costs (due to socially justified reasons) and using health system services according to the principle of social solidarity
- people with limited use of health services, but not bearing the costs of health system.

The last of these categories were considered a group for which there is a high risk of exclusion from the health system.

The problem of access to health services and its impact on the health was upraised in National Health Program (NHP) for the period 2007 to 2015. Its strategic objective is to reduce social and territorial disparities in health status of the population. One of the courses of action taken in this regard should be "(...) to reduce inequalities in health in groups of a lower health status, materially deprived environments, with large scale unemployment in the regions and local centers with worse indicators of environmental quality in the regions and community centers with poor infrastructure, hindering access to health (...)"(NHP, 2007). It was considered that the implementation of this objective can be achieved by changing the current allocation of funds for health services and social in such a way as to be able to align the existing differences.

For operational purposes NHP includes references to the various factors that contribute to social exclusion, such as disability, age or addiction. And so, in the case of people with disabilities is assumed that it will seek to create conditions for the active life of people with disabilities by (NHP, 2007):

- Increase participation in society (mainly by improving accessibility for educational, cultural, health)
- Reduction of functional barriers hindering life for people with disabilities (for example, by changing the building regulations)
- an increase in professional and social activities.
- Similar sounding operational objective was adopted for the elderly.

Two operational objectives of the NHP referred to the addictions. Objective 2 is reduction and change in the structure of alcohol consumption and reducing harm caused by alcohol and Objective 5 is reduction of drug use and related harm.

It is assumed that by 2015, the result of the activities of government, local government and non-governmental organizations in the fight and alcoholism should be (NHP, 2007):

- limiting the use of alcohol to 6 liters per capita,
- limitation of the spirits in the consumption of alcohol to 30%
- reduction of intoxication while driving by 20%
- reducing the number of teenagers regularly drinking alcoholic beverages by 10%
- increase the number of trainings for people involved in alcohol prevention

Act on healthcare services financed from public funds for the three categories of persons entitled to the benefits of health. These are respectively:

1. persons covered by the common - mandatory and voluntary health insurance
2. other than the insured persons with Polish citizenship and having their residence on Polish territory that meet the income criterion for entitlement to social care
3. other than those referred previously, people with Polish citizenship and having their residence on Polish territory under the age of 18 years or over the period of pregnancy, childbirth and the postpartum period.

Despite those regulations special attention needs to be focused on one group of patients - those who are homeless. In light of the current Polish regulations for services granted to a homeless person account should regulate social welfare center (OPS). OPS is not obliged to issue a certificate which is the declaration of payment for the service, and the homeless does not have to have such a certificate. Experience shows, however, that providers fearing problems with enforcing the measures of OPS often refuse to provide services to a homeless person. (Włodarczyk, 2011).

For the majority of patients belonging to the group of the poor and/or at risk of social exclusion cost associated to health needs remains a huge issue. In particular it refers to the cost of medicines and the procurement of outpatient health care. Picture of the scale of the problem was included in Social Diagnosis. The best measure of barriers to access to health services in this area is likely to scale cancellation of benefits or products at the same time considered necessary. For the highest-scale health resignation was observed for the purchase of drugs and dental care. Cancellation of the purchase of those supplies were respectively 18.1% and 17.3% of households. In both cases, the highest proportions of resignation was recorded in households of pensioners and people living on unearned sources. In the latter group resignation of buying drugs reached almost 45%, nearly 40% of the respondents declared his resignation from the general medical services (Czapiński et al, 2011).

## **Conclusions**

- Legal regulations provide broad access to health services for all groups
- Policy of healthcare providers and financial situation of households significantly limits access to health care.

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## Euclidean distances in personal management of nurses

### Euklidovské distance v personálním řízení sester

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#### Abstract

A lack of financial funds in the health care system can affect on personal management in the hospital. The human resource managers will face new questions how to motivate general nurses, secure their job satisfaction and retain quality employees. The aim of the research was to determine the order and distances of working environment factors on a personal value ladder. The next goal was to determine the order and distances of the factors in personal values and their perceived saturation and a comparison between the two rankings.

On the principles of Herzberg's two-factors motivation theory a questionnaire sheet was designed. In 2011, the total of 2200 general nurses across hospitals in the Czech Republic were asked for an interview, 1992 of them agreed to sit for the interview.

According to Euclidian distances, the factors: salary/wage, care for the patients and job security have the highest value for the general nurses. Salary, job security and working climate at a workplace belong among the most divergent factors (listed by importance).

The investigation identified the factors of working environment which can be used for an effective motivation, job satisfaction and retention of general nurses and no additional financial funding will be necessary.

Keywords: Motivational factors, hygiene factors, hospital, nurse, Herzberg theory, Euclidian distances.

#### Abstrakt

Nedostatek finančních prostředků v systému zdravotnictví může mít vliv také, se může také projevit v personálním managementu nemocnic. Manažeři řízení lidských zdrojů budou čelit novým otázkám, jak motivovat a zajistit pracovní spokojenost a retenci kvalitních zaměstnanců. Cílem práce bylo zjištění pořadí a vzdálenosti faktorů pracovního prostředí v osobním hodnotovém žebříčku a zjištění pořadí a vzdálenosti faktorů žebříčku vnímané saturace tohoto osobního hodnotového žebříčku a jejich vzájemná komparace.

Na principech Herzbergovy dvoufaktorové motivační teorie byl vytvořen tazatelský arch. V roce 2011 bylo osloveno s žádostí o rozhovor 2200 všeobecných sester v nemocnicích ČR, z nichž 1992 rozhovor poskytlo.

U všeobecných sester má nejvyšší hodnotu faktory mzdy/plat, péče o pacienty a jistota pracovního místa. Mezi nejvíce divergující faktory patří mzda, jistota pracovního místa a pracovní klima na pracovišti (uvedeno dle důležitosti).

Šetření identifikovalo faktory pracovního prostředí, které lze využít k efektivní motivaci, pracovní spokojenosti a retenci všeobecných sester a nebudou vyžadovat dodatečné finanční prostředky.

Klíčová slova: motivational factors, hygiene factors, hospital, nurse, Herzberg theory, Euclidian distances

## **Introduction**

The nurses are the biggest group of health care workers. This means that nursing is one of the elementary parts of health care. It is estimated that in the European region of WHO there are 6 million nurses and midwives. (WHO, not dated) One of the priorities of any health care provider is to retain high quality human resources.

The reason for fluctuation nurses can be both a wage freeze due to financial crisis and a specific workload which is given by impact of numbers of risks factors. A continuous work at night, working on Sundays and holidays, psychological stress often connected with excessive physical stress are all negative factors (Ivanová, Nakládalová, Vévoda, 2012). The monetary and risks factors can cause an interaction. Therefore, it is in the interest of management of health care providers to create personal policy which will be increasing the job satisfaction and strengthen of motivation (nurses) without an increase in financial needs.

An outcome of the survey methodology was the assumption that every worker perceives not only his/her value ladder, but also its saturation by the employer. The comparison of personal values and preferences with their fulfilling by the employer makes it possible to find out their compliance or resistance which can help to make decisions whether an employee stays in a health institution or whether he/she wants to leave.

The aim of research was to specify:

1. Subjective list of personal preferences of working environment individual factors of nurses working in hospitals in the Czech Republic;
2. Subjectively perceived list of saturation of working environment individual factors of nurses by hospital management.

## **Material and Methods**

Work is generally characterised by various components and an individual can find job satisfaction in one aspect which others might find repulsive (Moyle et al., 2003). There are several factors contributing to motivation and job satisfaction and it is necessary to observe the levels from several perspectives, which is what the Herzberg two factor motivation theory does (Herzberg, Mausner, Snyderman, 2003). The Herzberg two-factor motivational theory defines the elements of a working environment as an individual factor in relation to motivation (motivators) and job satisfaction (hygiene factors). While the motivators are factors which when present cause satisfaction with work (related to personal self-realisation), hygiene factors are factors which when missing cause dissatisfaction at work (related to person working environment). The Herzberg theory was used abroad as a starting point for examination of nurses' job satisfaction (Sharp, 2008; Laephalala, Ehlers, Oosthuizen, 2008). The Herzberg theory, which became the methodological grounding for the research, had to be adjusted to current conditions of health care providers in the Czech republic because of the different environment and period in which it was had been created. Each factor of this theory was discussed in workshops attended by experts in the field of nursing (Hospital Prostějov, 2004). The following factors from the Herzberg theory have been included:

1. relationships with supervisors
2. relationships with peers
3. growth
4. status
5. salary/wage
6. recognition
7. job security

8. work itself
9. work conditions
10. work climate

After an agreement, the following factors have been added:

1. cooperation with other professions
2. chance to use modern technical and technological equipment
3. chance for further professional education
4. employee's image
5. information provided
6. non-monetary benefits – employer's/social benefits

The feasibility of these factors was verified in 2004 in Hospital Prostějov, p. o. and in 2006 in further 25 hospitals in the Czech Republic (Vévoda, Ivanová, Horvát, 2005; Vévoda et al. 2010).

The field research took place in 2011. Structured interview was the data collection technique. The interviewers approached in total 2223 nurses working in hospitals in the Czech Republic, out of which 1992 agreed to sit for an interview. These nurses composition in terms of region and age was constructed to match the structure of the basic (primary) sample of nurses in the Czech Republic. The sample of nurses was representative in the term of the number of nurses in each region (Institute of Health Information and Statistics, 2010) and of their age (Research Institute for Labour and Social Affairs – RILSA, 2009).

In a questionnaire form, the nurses were interviewed about their subjective order of factors from 1 to 16, where the 1 factor was the most important and the 16 the least important. The same way the respondents lined up the factors as they believed their employer saturated.

To describe the nurses' socio-demographic characteristics, the descriptive statistic was used. One-dimensional Euclidean distance model statistical test was used for other survey. The aim of the test is to find out not only the order, but also a distance between working environment factors. SPSS 19.0 Base and Excel 2007 were used for data processing.

## Results

Table 1. Names of working environment factors in questionnaire form and their coded abbreviation used in graphs:

Abbreviation in a graph	Personal priorities	Perceived saturation	Factor term in q questionnaire:
Image_	PP	PS	"Image" (respectability, reputation) of your medical facility in public.
WoCo_	PP	PS	Working conditions (safety and health protection at work, spatial resolution of workplace, labour).
TT_	PP	PS	Possibility of modern technique and technical, technological equipment and instrumentation using.
Education_	PP	PS	The possibility of further professional education (courses, seminars, other study).
Information_	PP	PS	Information (sufficient access to information and its providing).
Advancement_	PP	PS	Possibility of carrier advancement.
Superior_	PP	PS	Working relationship with senior staff.
Prestige_	PP	PS	Prestige of your job.
Cooperation_WOP_	PP	PS	Cooperation with other professions (physicians, paramedical staff, other professions...).
Recognition_	PP	PS	Non-monetary appreciation of your personal work results, for example praise, appreciation your work in front of colleagues).
Benefits_	PP	PS	Social benefits provided by employer (personal accounts, vitamins, meals etc.)
Care_	PP	PS	Care about patients (work itself).
Cooperation_ID_	PP	PS	Mutual working cooperation in your workplace.
WoClima_	PP	PS	Working climate (atmosphere in workplace).
Job_security_	PP	PS	Job security.
Pay_	PP	PS	Salary/wage.

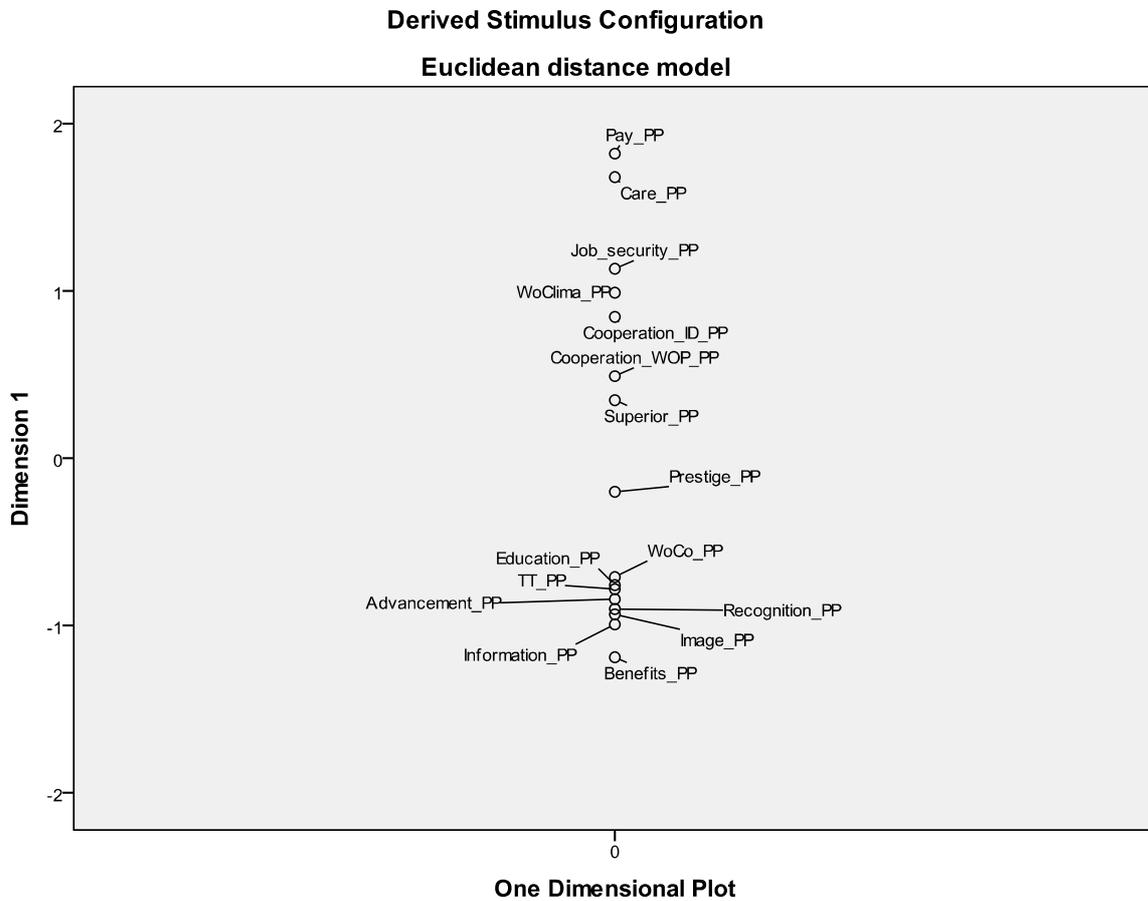
Table 1 shows the structure of the selected sample. Nursing care is a domain of women; the results of this survey prove that. The average age of the respondents was 42 years at the time of the survey. The average work experience in health care was 19 years, the mode was 20 years.

Table 2. Description of Sample:

	N	%
<b>Sex:</b>		
Female	1913	96,00 %
Male	79	4,00 %
<b>Age:</b>		
less than 30 y.o.a.	395	19,80 %
31 – 45 y.o.a.	823	41,30 %
46 – 60 y.o.a.	687	34,50 %
over 60 y.o.a.	87	4,40 %
<b>Work experience:</b>		
less than 5 years	288	14,50 %
from 6 to 15 years	533	26,80 %
more than 16 years	1171	58,80 %
<b>Highest education:</b>		
(Higher) school	Secondary	1022 51,30 %
PSS		486 24,40 %
Bachelor's degree		335 16,80 %
Master's degree		103 5,20 %
Doctoral degree		7 0,40 %
Others		39 2,00 %
<b>Department:</b>		
Outpatient (A)	344	17,30 %
Inpatient (L)	1295	65,00 %
Combination A and L	160	8,00 %
Operating theatres	109	5,50 %
Others	84	4,20 %
<b>Manager position:</b>		
Yes	361	18,00 %
No	1631	82,00 %
<b>Work in shifts:</b>		
Yes	1438	72,20 %
No	554	27,80 %
<b>Employment type:</b>		
Full time	1829	91,80 %
Part time, and work contracts	163	8,20 %

In the figure 1, factors of nurses' working environment are listed according to their personal preferences. Nurses prefer hygiene "Salary/Wage" factor the most (listed top-down). On the second place there is the motivator "Care about patient" and third the hygiene factor "Job security" again. "Benefits" provided by employers are subjectively the least important by nurses.

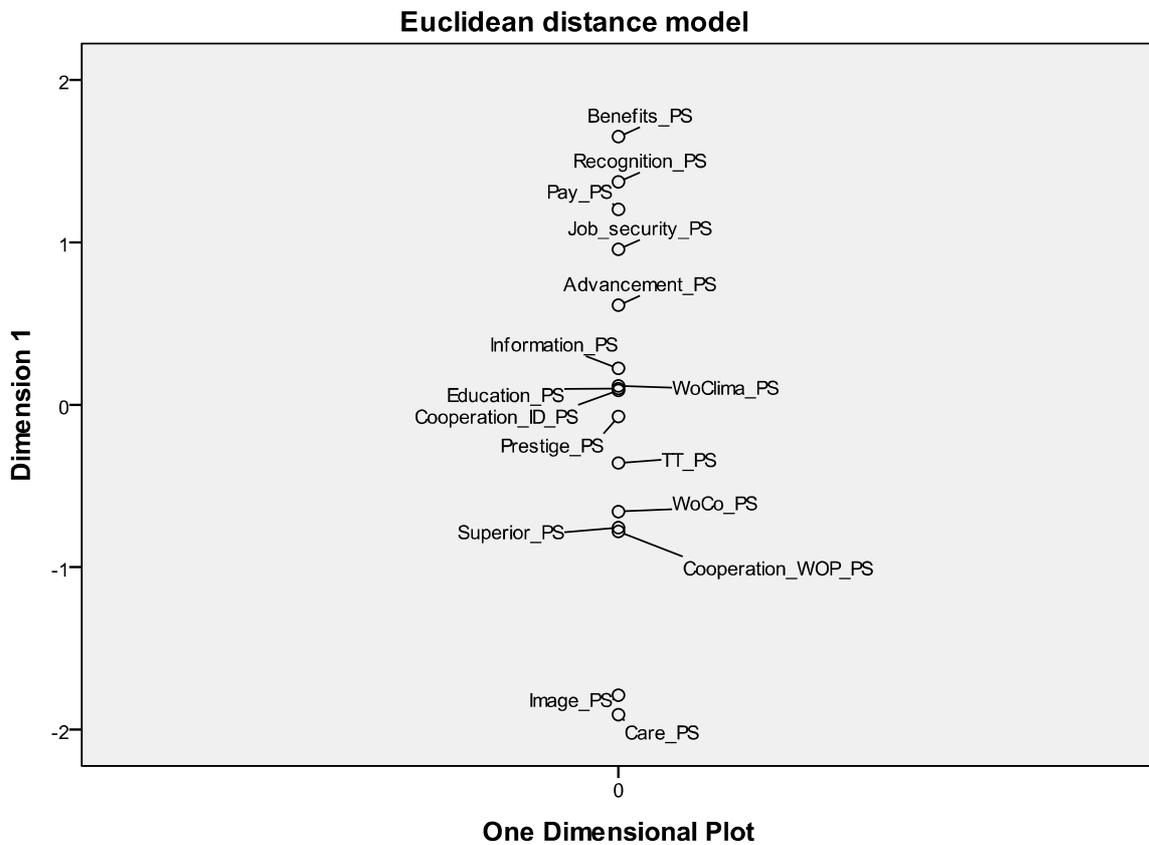
Figure 1. Nurses' personal priorities (PP) – Euclidean distance model (importance from top to bottom)



In the figure 2, the most saturated factor are placed conversely on the bottom part of the axis dimension – 2. It means the higher the factor is optically placed in the figure 2., the less it is saturated. In terms of subjectively perceived saturation of factors by employers, nurses consider the factor “Care about patients” the most saturated. The least saturated factor is “Benefits”.

Figure 2. Subjectively perceived saturation (nurses) of working environment factors – Euclidean distance model (importance from the bottom to the top).

### Derived Stimulus Configuration



### Discussion

The survey results indicate that key factors standing on the top of personal priorities are “Salary/Wage” (see figure 1. Pay\_PP,) and direct “Care about patients” (see figure 1. Care\_PP). Salary or wage appears in many surveys as the key factor. The salary is a typical hygiene factor which means its actual saturation fades in the time (Burian, 1992). However, dissatisfaction with the salary is listed as one of the possible factors causing fluctuation of Slovak nurses to seek job abroad (Gurková et al., 2012). Kebriaei and Moteghed (2009) found out that the salary and benefits are aspects which only 4.1 % of the respondents are satisfied with. In a Norwegian study (Bjørk et al., 2007), the salary belonged among three most important components of nurses’ job satisfaction. In our research, the factor “Salary/Wage” is perceived by nurses as the third least saturated factor (see figure 2. Pay\_PS).

The basic key factor is direct “Care about patients” as well; it means the work motivational factor itself. One of the reasons for the preference of this factor can be found when choosing a job (Mooney, Glacken, O’Brien, 2008). Kebriaei and Moteghed (2009) have noted in their survey that more than 70% of the medical staff is satisfied with care about patients as well. Also Amendolair (2012) found a statistically significant positive correlation between expression of caring behaviours and job satisfaction. Thus the care about patient is the biggest reason for satisfaction or dissatisfaction with the job (McNeese – Smith, 1999). Lack of time with patient, missing the opportunities to provide nursing care to patients negatively impacted on the nurses’ job satisfaction. (Kalisch et al 2011). This factor is simultaneously perceived by nurses as the most saturated (see figure 2. Care\_PS).

Low hygienic factor “Job security” perceived by nurses significantly correlates with a higher rate of medication error (32%), compared with 19% in GN’s with better job security (Wilkins, Shields, 2008). This factor is one of crucial factors preventing job dissatisfaction and intention to leave the profession (Wiener et al., 2009). The increased job security is one of other factors which make nurses more satisfied. (Bajwa at al., 2010) Job security will be particularly effective in regions with higher unemployment and older medical workers (Khelerová, 2010). In our research, the factor “Salary/Wage” is the third most important factor in the personal value ladder and at the same time it is perceived by nurses as the fourth least saturated factor (see figure 2. Pay\_PS).

Euclidean distance model proved unequivocally that the factors “Salary/wage” and “Care about patient” are on the first and second places with similar spacing distance on the preferential ladder. The factors “Care about patients” and “Image of medical facility” are the most saturated factors with a minimal distance on the saturation ladder.

## Conclusion

“Salary/wage” was the least saturated but the most personally important factor. It is a typical hygiene factor which, when saturated, can only have a temporary positive effect, and it is strongly linked with other circumstances. Key factors for personal management are those which were identified as the important ones by this research, but do not require financial means.

“Care about patients” is the basis of nursing care; the factor position in presented graphs indicates a big interest in the real nature of nurse profession. If the employer emphasizes direct care about patients, taking care about fulfilling the patients’ needs arising out of the nursing process, it is possible to suppose this stand will have a positive influence on nurses’ job satisfaction, nurses’ motivation and thereby their stabilization.

“Job security” is the second factor, which does not need additional financing. To work as a nurse means a relatively high job security compared to other professions (Toren, Zelker, Porat, 2012; Hollup, 2012). This corresponds with the worsening demographic situation connected with a higher life expectancy, which will mean higher demand for nursing professionals. If there really is a danger or reducing jobs, the management may e.g. use part-time jobs. The survey showed that part-time employment is only used in 8%. Part-time employment in the Czech republic is one of the lowest in Europe (Eurostat, 2010).

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## **The Occupational Health Services: Do they have a perspective?**

### **Pracovná zdravotná služba: Má budúcnosť?**

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#### **Abstract**

Occupational environment is a regular part of people's environment and one of the functions of public health is occupational health. The Occupational Health Service cannot be solely seen as a service which cares for people while at work. That should be accepted as an important part of settings based health promotion. Modern history of occupational health service in Slovakia began in 1996, but real changes happened in 2006 when the new occupational safety and health act was adopted. Since then the system of occupational health has changed many times. This article provides an analysis of these changes and lessons learned for health policy and practice.

Key words: The Occupational Health Service. Public health. Public's health. Costs and benefits.

#### **Abstrakt**

Pracovná zdravotná služba nie je v Slovenskej republike novým pojmom. Moderná história tejto služby sa začala písať v roku 1996, no k najvýraznejšej zmene došlo v roku 2004 kedy bol prijatý zákon č. 124/2006 Z. z. o bezpečnosti a ochrane zdravia pri práci a o zmene a doplnení niektorých zákonov v znení neskorších predpisov. Tento zákon umožnil reálne zavedenie pracovných zdravotných služieb do praxe. V priebehu rokov však došlo k výrazným zmenám, ktoré natrvalo zmenili chápanie pracovnej zdravotnej služby. Dnes sa už dokonca otvorene hovorí o potrebe, či naopak nadbytočnosti tejto služby pre zamestnancov. V predloženej článku opisujeme všetky významné zmeny, ktoré sa v oblasti pracovných zdravotných služieb udiali a to ako sa z týchto zmien môžeme poučiť pri riadení a organizovaní služieb verejného zdravotníctva.

Kľúčové slová: Pracovná zdravotná služba. Verejné zdravotníctvo. Verejné zdravie. Náklady a prínosy.

#### **Modern history**

The new era of occupational health services in Slovakia started in 2006. In this year the national parliament adopted a new act about occupational health and safety (no. 124/2006 Occupational Health and Safety Act). Its aim was to bring new approaches and standards into practice. Since then, the occupational health services have been judged and changed many times. A big part of the act comes from the Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety of workers at work and their health from 12<sup>th</sup> of June 1989. The most important for public health practice was the article no. 7 which describes and introduces the field of occupational services. This article describes protective and preventive services as an important responsibility of employees. Another source of information was the International Labour Organisation convention C 161 Occupational Health Services Convention adopted in 1985.

### **Health Policy view**

How is the current situation and the perspectives? Have the occupational health services been integrated in the public health in Slovakia?

In the policy level we can say that the problem is unbalanced between offers and demands. When we discuss offers and demands in the field of health services, the occupational health service is a very bad example. On one side, there is the occupational health service as a way to protect the employee's health. This has been supported since the half of last century. On the other hand, there is the employer's view. Current situation is not only a result of existence of occupational health services. That is a result of bad decision on the national level too.

When the national health authority was creating the system of occupational health services in Slovakia, they made a bad decision. The national health authority did not accept a conventional way of creating and planning the health services. They prepared rules, responsibilities and duties for employers and employees, but they did not create resources and financial limits for each function of the occupational health service. The highest and the lowest cost for each function of an occupational health service were not fixed.

The national health authority probably presumed that the market is going to set prices. Were they right? We must say they were not completely right because in everyday reality costs for services fluctuate. Costs settings are linked with legal changes which took place. The failure of offers and demands brought another problem - the problem of human resources. At the begging of the existence of the occupational health services, the criteria for health professionals who could work in the occupational health service were very strict. Only a medical doctor with specific post gradual education in the field of occupational health could be the head of the occupational health services. Next changes in laws brought changes to the field of personal resources. The level of education was changed and the criteria were extended. That caused changes on the market of the occupational health service. Some small providers left the business or were absorbed by bigger providers of occupational health service.

When describing consequential changes, we have to mention the changes in the field of occupational health risk assessment. Changes in laws affected the risk assessment and risk perception. The traditional system of risk assessment in the field of occupational health has divided occupational health risks into four groups. The health risks classified in the first and second group are acceptable health risks. Those classified in the third group are serious risk for workers' health. The risks classified in the fourth group are unacceptable for human health. At the beginning (in 2006), the occupational health service was a health service that had to be provided for each employer in each group of health risk.

Nowadays, the occupational health service is provided for employees working in the third or fourth group of risks only. That is not in accord with the article no. 5 from Council Directive 89/391/EEC which says: "The employer shall have a duty to ensure the safety and health of workers in every aspect related to the work. Pursuant to Article 7, when an employer enlists competent external services or persons, this one shall not discharge him from his responsibilities in this area". This article has not divided the occupational health and safety measurements for employer under the health risks which exist at workplace.

### **Employer's view**

This was the reality from the national authority's point of view, but we have to be fair and we must consider the situation from the employer's view. We have to accept the fact that each employer is economic establishment. The first and main goal of every employer is to produce profit. Employee's health or an occupational health service is not main goal of economic establishment. Employee's health is only one of many important issues which must be considered when you are managing and planning your business. However, the employee's health is not the priority no. 1. The priority no. 1 in each business is profit. We have to accept that fact as a reality for planning and managing the occupational health service.

When we plan resources for health services, we have to be realistic. Available resources are always limited and the utilization of resources depends only on the decision of the decision maker who owns these resources.

Since the occupational health services were established and laws came into force, employers have fought against those laws. An occupational health service is only economic and administrative weight for employer. They realize that as purpose-made “ballast”. That was one of the reasons that caused changes in the field of the occupational health service. Changes in providing occupational health services were caused by the pressure from employers on policymakers and lawmakers. These changes are not good lessons learned but they are real and we must accept the current situation.

### *Lessons learned*

We could see present situation as moving force which can help us to change and improve system of occupational health services and public health system in general. In these days for public health professionals is important to accept economic reality. We have to do economic evaluation and assess profit-cost ratio when we are going to plan and manage public health service. That is the key message from business to public health because public health could do its function only that when other component of society earns enough goods for health services. The economic way of thinking in public health can help to public health professionals when they going to prepare their health policy. Only when we will be able to make realistic assessment of resources and required investments we can prepare realistic health policy. Only that type of health policy can be successful. If we say “think realistic” and count your money well, and do it again and again it doesn’t mean “forget on people”. We are still public health professionals and our duty is to care and to protect public’s health. Economic rules are important, but for us it is only second criteria how to evaluate efficiency and feasibility of our plans. We must find good balance between health demand and available resources. That is the one of many arguments on the debate of necessity of occupational health service. Good working occupational health service has to produce and present important data about employee’s health and theirs economic costs. Good working occupational health service is an important part of settings based health promotion.

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## **Informatics as a tool for quality improvement in public health and epidemiology**

### **Informatika ako nástroj pre zlepšovanie kvality v oblasti zdravia verejnosti a epidemológie**

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#### **Abstract**

Enhancing public health surveillance was identified by CDC leadership as one of major concerns that must be addressed by the Public Health (PH) community. Information and communication technologies (ICT) possess potential to improve practice in PH. The aim of the contribution is to summarize the impact of PH informatics, especially on surveillance systems.

Several systems of e-surveillance are available internationally. The need for quality improvement and strict implementation of agreed guidelines is remarkable. Such effort and documents for global use come from the WHO, CDC and recently also from ECDC.

Systematic study demonstrated that notable differences in levels of utilization of surveillance and ICT among PH institutions and various countries exists. Systems of Real-Time Data collection, Electronic Health Records and Health Information Exchange are within emerging tools to be used. Health Data utilization is linked with Legal, Policy, Ethical, Regulatory, and Practical Issues, which are mostly underdeveloped. Optimal information management is not only about technologies, but requires a qualified PH workforce and the support of multidisciplinary informatics and epidemiology research.

One can conclude, that Public Health Informatics (PHI) represents a prospective tool to integrate up-to-date ICT, modern epidemiology and public health policies. However, there is an ultimate need for generally accepted quality criteria, continuous effort, adequate technology and human resources.

Key-words: Public Health Informatics, Epidemiology, e-Surveillance, Quality

informatika vo VZ, epidemiológia, e-surveillance, kvalita

#### **Background**

We live within a dynamic environment, which requires orienting and deciding in a proper pace, having information on what is new and what is worthwhile applying in practice. Strong and successful institutions as well as successful individuals are able to prosper only if they are innovative and have the courage to accept change. Those in practice include development of information technology, application of information and communication technologies (ICT) as well as impact of globalization.

Health informatics provides a platform for effective utilisation of health information with the aim to share appropriate information at appropriate time, to those who need them. Traditionally, the nature of applying ICT in healthcare was determined by requirements from researchers and experts from clinical practice (bioinformatics, medical and clinical informatics). Currently, the needs of all stakeholders including public health specialists and public are considered in addition. Increasing expectations from informatics in public health system led to formatting a distinct area labelled *public health informatics*.

Informatics, geographic information systems and sophisticated statistical approaches in epidemiology are gradually developing into an integral part of the work of specialists in public health, who are responsible

for health of population on regional, national even global levels. Significant role in this direction is attributed to surveillance systems.

The aim of the contribution is to summarize the development in public health informatics (PHI) and to discuss the impact of technology tools on the effectiveness and quality of modern surveillance systems.

#### *Public health informatics and surveillance systems*

Public health informatics (PHI) has been defined as “*systematic application of information and computer science and technology to public health practice, research, and learning*” (Yasnoff et al, 2000). Consequently, it is anticipated that PHI possesses a potential to enhance practice in epidemiology and disease surveillance. Public health surveillance could benefit from, and also pioneered informatics analyses and solutions. However, the field of informatics serves other facets of public health including emergency response, environmental health, health promotion, nursing, and administration. PHI needs to respond to high expectations from Electronic Health Records, e-Health, mobile-Health and social media. Recently the integration of systems and interoperability is actual requirement for meaningful use of communication and information technologies and health information exchange. Here stems a significant potential for surveillance systems of communicable or non-communicable diseases on local, national levels and even in global public health settings.

Public health surveillance is the pillar of modern epidemiology and public health practice. “*In public health, we can't do anything without surveillance. That's where public health begins.*” This declaration of David Satcher, MD, PhD, U.S. Surgeon General from the end of nineteen's together with the document “*The future of public health from committee of Institute of Medicine*” (IOM,1992) highlighted assessment as one of the three core functions of public health along with policy development and assurance. The committee recommended that every public health agency regularly and systematically collect, assemble, analyse, and make available information on the health of the community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems. Public health surveillance, often called the cornerstone of public health practice, is an essential element of the assessment function.

Then, definition of surveillance system is “*on-going, systematic collection, analysis, and interpretation of health data, essential to the planning, implementation and evaluation of public health practice, closely integrated with the dissemination of these data to those who need to know and linked to prevention and control*” (Thacker and Berkelman,1992). ICT play irreplaceable role in the collection and dissemination of data.

Collecting surveillance data (originally vital statistics, disease reporting, surveys) has many purposes, including monitoring disease trends, detecting outbreaks, providing information to plan public health interventions, and stimulating research. Some more specialized systems were developed recently as sentinel surveillance, zoonotic disease surveillance, adverse events surveillance, syndromic surveillance, disease registries, and laboratory surveillance. Especially in the latest mentioned the information technology is substantial.

Syndromic surveillance is relatively new approach uses clinical information about disease signs and symptoms, before a diagnosis is made. Often, syndromic surveillance systems use electronic data from hospital emergency rooms, hospital information systems, eventually from other available sources.

With advances in information sciences and technology, changes in methodology, data availability and data synthesis, and expanded health information needs, the questions arise about new public health surveillance perspectives.

#### *e-Surveillance/ Syndromic surveillance*

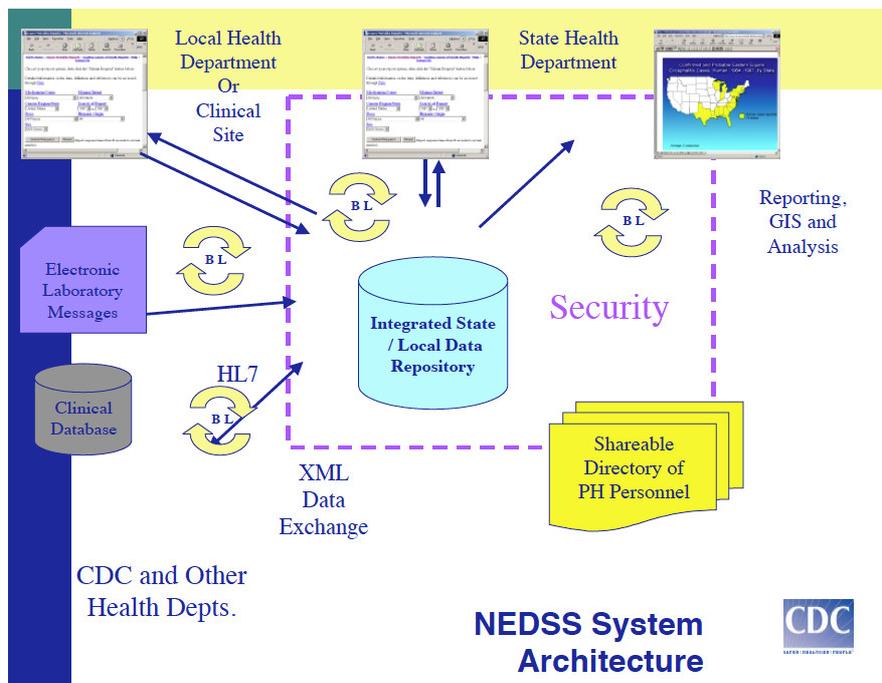
Public health surveillance namely in the United States has evolved from monitoring infectious diseases to tracking the occurrence of many non infectious conditions, such as injuries, birth defects, chronic

conditions, mental illness, illicit drug use, environmental, and occupational exposures to health risks. In 2001, the intentional dissemination of *Bacillus anthracis* spores and subsequent cases of anthrax in the United States provided an impetus for automating surveillance to enable early detection, rapid characterization, and timely continuous monitoring of urgent public health threats.

Spurred with the impending mass adoption of electronic health records, procedures for conducting surveillance are taking another turn, and new opportunities for strengthening surveillance capacities are emerging. Electronic health records offer an opportunity to improve links between health-care providers and public health departments, making surveillance more effective and timely, although fulfilling that promise poses substantial challenges.

In the United States the National Electronic Disease Surveillance System NEDSS was originally created as an initiative that promotes the use of data and information system standards to advance the development of efficient, integrated, and interoperable surveillance systems at federal, state and local levels (National Electronic Disease Surveillance System Working Group, 2001). NEDSS system architecture is depicted on Figure 1.

Figure1. NEDSS system architecture (Koo, 2001)



Lately, NEDSS was incorporated as a major component of the Public Health Information Network (PHIN) (CDCa, 2010). PHIN provides a standards-based, integrated approach to disease surveillance and connects public health surveillance to the burgeoning clinical information systems infrastructure. It is expected that NEDSS could improve the nation's ability to identify and track emerging infectious diseases (including potential bioterrorism attacks), investigate outbreaks, and monitor disease trends.

However, a number of other syndromic surveillance approaches have been proposed in USA and internationally. These systems, although sharing similar objectives, vary in system architecture, information processing and management techniques, and algorithms for anomaly detection, and have different geographic coverage and disease focuses.

The BioSense system, which is a nationwide “safety net” for early detection in major cities, initiated and administrated by the US CDC. BioSense represents a major effort on infra and national levels. During the wildfires in San Diego County in October 2007, the CDC BioSense system found a spike in respiratory illnesses that coincided with the wildfires in San Diego County. BioSense was set up to receive data from the emergency departments of six hospitals near the wildfire zones.

Real-time Outbreak and Disease Surveillance (RODS) is system, which has been also deployed across the nation. The RODS project is a collaborative effort between the University of Pittsburg and Carnegie Mellon University. It provides a computing platform for the implementation and evaluation of different analytic approaches for outbreak detection, among other data collection and reporting functions. The National Retail Data Monitor (NRDM) monitoring anonymous sales of over the counter (OTC) healthcare products is part of the RODS project assisting with disease outbreaks identification. Thousands of retail pharmacy, grocery have participated in the NRDM nationwide RODS and was implemented in Utah during the 2002 Winter Olympics.

ProMed mail- the Program for Monitoring Emerging Diseases provided by International Society for Infectious Diseases is an Internet-based reporting system dedicated to rapid global dissemination of information on outbreaks of infectious diseases and acute exposures to toxins that affect human health, including those in animals and in plants grown for food or animal feed. By providing early warning of outbreaks of emerging and re-emerging diseases, public health precautions at all levels can be taken in a timely manner to prevent epidemic transmission and to save live. ProMeD-mail currently reaches over 40,000 subscribers in at least 185 countries.

HealthMap is a freely accessible, automated real-time system that monitors, organizes, integrates, filters, visualizes, and disseminates online information about emerging diseases. The goal of HealthMap is to deliver real-time intelligence on a broad range of emerging infectious diseases for a diverse audience, from public health officials to international traveller. The system automatically classifies alerts by location and disease and then overlays them on an interactive geographic map. In April 2009, when a new strain of influenza known as H1N1 flu (swine flu) was first detected, HealthMap reported the detection of Swine Flu cases weeks before the news emerged in English-language resources.

Finally, it is important mentioning the MedISys (Medical Information System) – automated warning system for processing health-related messages in real time. Incidents are automatically extracted by PULS only - there is no human moderation. PULS - a "fact extraction" system at the University of Helsinki, Finland, Department of Computer Science processes more than 20,000 articles per day from more than 4,000 place, about 1600 media sources (journals, newsletters and health facilities) in 45 languages. System dynamically updates the statistics on all the news topics every 10 minutes. System automatically sends e-mails to participants in three different severity levels (low, medium and high) and is opened 24 hours a day, 365 days a year.

Next to above described systems and activities of CDC US, WHO also ECDC efforts in surveillance fostering are visible. The European Surveillance System (TESSy) (ECDC, 2013) is a highly flexible metadata-driven system for collection, validation, cleaning, analysis and dissemination of data. Its key aim is to provide the basis for high quality data analysis and interpretation to provide evidence for public health action. All EU Member States (28) and EEA countries (3) report data on communicable diseases as described in Decision No 2119/98/EC to the system. TESSy was launched in 2008 and apart from routine surveillance, it has incorporated all data collection systems that were in place for the Dedicated Surveillance Network (DSN) projects.

Example of the effort at national level closely connected to ECDC activities is EPIS –Epidemiological information system SR running from 2006.

### *Lessons learned*

Despite above described new trends and changes in scope and methods of e-surveillance, the fundamental premise of public health surveillance remains constant. It should provide information to the public health community regarding the health of the populations served.

Support for global surveillance systems should span the full spectrum of public health emergencies (i.e. infectious, chronic, injury, and environmental) specifically addressing events with a potential of effects beyond countries borders. But stewards of public health surveillance have a responsibility to ensure that the information is used to advance public health and to safeguard the confidentiality of persons who are represented in the data.

Success of Surveillance Systems is based on emerging technologies as Real-Time Data collection, Electronic Health Records and Health Information Exchange. But Health Data utilization is linked also with Legal, Policy, Ethical, Regulatory, and Practical problems (CDC, 2012).

The need for quality improvement and strict implementation of agreed guidelines is remarkable. Such effort and documents for global use come from the WHO (WHO, 2006), CDC (CDC, 2010b) and recently also from ECDC. Best practice criteria for surveillance as system acceptability, adequacy of case investigation, case definition, reporting completeness, representativeness, sensitivity, under (or over) reporting and timeliness of complete notification are equally important in all types of surveillance forms, including e-surveillance. Quality of primary information is ultimate criteria.

However, information management is not only about technologies, but requires a qualified PH personnel and multidisciplinary research. Differences in levels of utilization of ICT among PH institutions of various countries including V4 are remarkable, too.

### **Conclusions**

PHI represents prospective tool to integrate up-to-date ICT, modern epidemiology and public health policies. Several examples of systems are already available which could help PH authorities in addressing health problems in a holistic and synergistic manner for both, infectious and non-communicable diseases, focusing on countries disease priorities in coherent way. However, there exists an ultimate need for generally accepted quality criteria, continuous effort, adequate technology and human resources and the support of multidisciplinary PH informatics research.

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## Building public health capacities

### How to write a scientific paper (workshop)

### Ako písať a publikovať vedecký článok (workshop)

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#### Abstrakt

Seminár sa zameriava na tréning zručností pri písaní a publikovaní vedeckého článku v indexovanom SSCI časopise. Účastníci sa oboznámia s úlohami, ako vybrať vhodný časopis pre publikovanie, aká by mala byť štruktúra vedeckého článku, ako dosiahnuť, aby sa výsledky výskumu zaradili medzi ostatné významné zahraničné publikácie v danej vedeckej oblasti. Účastníci sa ďalej ujmú úlohy editorov, kde majú posúdiť nesprávne a správne vypracované a uverejnené vedecké články, príp. porovnať ich so svojimi skúsenosťami s písaním vlastných publikácií. V závere nasleduje diskusia, ako zvládnuť zamietnutie článku, ako ho následne vylepšiť a ako vedecky komunikovať s časopisom na elektronickej úrovni.

Kľúčové slová: SSCI časopis, štruktúra vedeckého článku, posudzovanie vedeckého článku

#### Abstract

This workshop is intended on practice skills in writing and publishing scientific paper in international SSCI journals. Participants will work on tasks such as how to choose an appropriate journal for publishing, how the structure of paper should be done, how to achieve the results to be a part of the international scientific community in their field of research. Then, the participants, in the role of editors, will exercise and evaluate chosen examples of badly and well written articles, and compare these findings with their own articles if they had any. At the end, they will discuss how to cope with the rejection of paper by editor, how to improve the paper, and how to communicate on scientific level with journals via letters and emails.

Key words: SSCI journal, structure of scientific paper, reviewing

#### Úvod

Písanie vedeckých článkov je zručnosť, ktorá sa dá učením zlepšovať. Cieľom tohto semináru je účastníkom poskytnúť informácie o výbere časopisu, štruktúre vedeckého článku, elektronickej publikácii, publikačnej etikete a posudzovaní rukopisu časopisom.

#### Popis

*Výber časopisu*

Výber témy článku býva prepojený s výberom časopisu a naopak. Téma musí byť pre čitateľov v zaujímavá.

Ak chceme byť vo vede úspešní a citovaní, je podstatné publikovať naše výsledky v uznávaných zahraničných časopisoch. Ideálne je, ak sú časopisy indexované v medzinárodných databázach. Tieto časopisy majú tzv. „impact factor“ (IF) alebo citačný index používaný v sociálnych vedách. Skratku IF používame na vyjadrenie dôležitosti časopisu, pričom IF môže byť absolútny alebo relatívny (Nagyová, 2008).

Okrem zameranosti časopisu je vhodné preskúmať obsah jeho posledných čísel, porovnať naše kľúčové slová s tými, ktoré sa už v danom časopise objavili a tak overiť, či už časopis publikoval práce podobného charakteru. Možno porovnať aj štatistické postupy s postupmi použitými v časopise. Toto všetko zvyšuje šancu na publikovanie výsledkov (Hall, 1998; Ashby, 2005).

#### *Štruktúra vedeckého článku*

Vedecké články s IF majú jednotnú štruktúru a presne vymedzené časti ako úvod, metódy, výsledky a diskusiu.

Titulná strana (Title) sa uvádza vždy na osobitnom papieri. Neobsahuje ani všeobecný, ani detailný nadpis. Za ním nasledujú mená autorov, spoluautorov a ich príslušnosť k pracovisku. Posledná pozícia je určená pre vedúceho pracoviska, či vedúceho výskumu. Titulná strana má mať skrátený nadpis, kontakt na autora, kľúčové slová v slovenskom a anglickom jazyku.

Abstrakt pri tvorbe rukopisu odporúčame písať ako poslednú časť vedeckého článku. Býva štruktúrovaný, obsahuje zvyčajne najviac 250 slov. Pozostáva z úvodu, metód, výsledkov a záveru. Odkazy na literatúru sa neuvádzajú. Text musí byť stručný, k veci a zrozumiteľný.

Úvod (Introduction) by mal mať rozsah 1-1,5 strany. V úvode práce hľadáme odpoveď na otázky „Čo sme skúmali, prečo sme to skúmali?“ V poslednej časti úvodu je nutné načrtnúť očakávania, jasne sformulovať hypotézy a ciele, ktoré musia byť totožné s cieľmi v abstrakte. V hypotéze presne definujeme vzťahy medzi premennými. Pri citovaní iných prác musí byť jasné, ktoré myšlienky sú naše a ktoré patria iným autorom (Nagyová, 2008).

V časti Metódy (Measures) odpovedáme na otázku „Ako sme riešili výskum?“ Časť o metódach odráža, do akej miery je možné výskum zopakovať inými autormi. V tejto časti sa popisuje dizajn výskumu, zahŕňa formálnu štruktúru experimentu, ktoré premenné sú závislé, nezávislé, aká bola manipulácia s premennými.

Skúmaný súbor zahŕňa detaily o osobách v experimentálnom aj kontrolnom súbore, ich rozsah, pôvod, či anonymitu údajov. V postupe sa uvádza, ako bol vykonaný zber údajov, kde prebiehal, kto ho robil a ako dlho trval. Patria sem začleňujúce a vylučujúce kritériá pre zaradenie do súboru. Dôležitý je „response rate“, percento zahrnutých osôb oproti oslovenému počtu osôb.

Publikačná etika predstavuje písomný súhlas respondentov s výskumom a súhlas etickej komisie pracoviska s realizáciou štúdie.

Metodiky (Methods) popisujú použité nástroje merania ako sú prístroje, testy a dotazníky. Táto časť obsahuje účel testov, počet položiek, kódovanie a skórovanie položiek, interpretáciu skóre a psychometrické parametre každej použitej metodiky.

Štatistické analýzy (Statistical analyses) popisujú všetky štatistické postupy a štatistický program, ktoré boli použité na spracovanie získaných údajov.

Výsledky (Results) odpovedajú na otázku „Aké sú naše zistenia?“. Výsledky v číselných zisteniach sa iba popisujú, neinterpretujú, interpretácia výsledkov je úlohou Diskusie. Prezentujú sa odpovede na výskumné otázky v takom poradí, ako boli zadané. Výsledky sa ilustrujú pomocou tabuliek, či grafov.

Diskusia (Discussion) vysvetľuje, čo znamenajú čísla v časti Výsledky v kontexte nastolených hypotéz. Máva zvyčajne 4 časti. V prvej sa krátko rekapituluje cieľ a hlavné zistenia. Ďalej sa uvádza, ako zistené výsledky zapadajú do kontextu predchádzajúcich štúdií. Ďalej nasleduje diskusia o prednostiach, či

obmedzeniach výskumu. Implikácia výsledkov v praxi poukazuje, aké je praktické využitie získaných poznatkov v oblasti, ktorú skúmame, čo by sme si priali zrealizovať v budúcom výskume. Diskusia musí byť priamo k téme, musí byť logicky organizovaná, informácie z úvodu sa nemajú opakovať v diskusii.

Niektoré časopisy vyžadujú krátky záver (Conclusion), kde je potrebné pár vetami uzavrieť, čo bolo v danom výskume zistené a čo to znamená pre skúmaný výber z populácie.

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Literárne odkazy (References) pomáhajú čitateľom získať prístup k pôvodným dokumentom, na ktoré sa odvolávame. Uvádzajú sa literárne zdroje podľa štýlu uvedeného v Inštrukciách pre autorov daného časopisu (Hall, 1998; Ashby, 2005; Nagyová, 2008).

#### *Elektronická publikácia alebo zaslanie rukopisu do časopisu*

V minulosti sa články zasielali do časopisu poštou na diskete. V súčasnosti sa publikuje elektronicky. Je nevyhnutné detailne si preštudovať a dodržať inštrukcie pre autorov. Uvádzajú zameranie časopisu, formát, v akom treba rukopis zaslať. Nájde ich na web stránke časopisu. Pred zasielaním článku do zahraničného časopisu je potrebné skontrolovať text anglickým lektorom (Nagyová, 2008).

#### *Publikačná etiketa alebo čo sa má a čo nemá v komunikácii s časopisom*

Pred zaslaním rukopisu pripravujeme Sprievodný list editorovi časopisu. Je to veľmi dôležitá súčasť procesu zasielania rukopisu, keďže je prvým textom, ktorý editor číta a preto je potrebné ho zaujať. List by nemal byť dlhý, mal by viesť k predaniu našich výsledkov.

Nikdy neposielame duplikáty, nebudú akceptovateľné. Ak už sme prezentovali náš výskum vo forme posteru na konferencii a výsledkom je abstrakt v zborníku, je potrebné informovať o tom editora časopisu (Nagyová, 2008).

#### *Posudzovanie rukopisu časopisom*

Po odpovedi z časopisu o prijatí rukopisu dostaneme recenzný posudok minimálne od dvoch recenzentov. Buď recenzenti odporučia článok zamietnuť alebo prepracovať na základe pripomienok, ktoré sú menšie alebo rozsiahlejšie. Na zapracovanie pripomienok a znovu zaslanie opraveného rukopisu býva zvyčajne vyhradený 1 mesiac. Spolu posielame 4 dokumenty: finálnu verziu, opravenú verziu s podčiarknutými zmenami, list s vysvetlenými opravami a ďalší sprievodný list editorovi. Časopis má opäť 3 mesiace na posúdenie nového rukopisu. Po zvážení recenzentmi dostaneme odpoveď o prijatí článku alebo zamietnutie i napriek vypracovaným opravám.

Po prijatí do tlače nasledujú formálne kroky ako napr. vyplnenie tlačív pre transfer autorských práv na časopis, kde zvyčajne všetci spoluautori takýto formulár podpisujú. Predposledným krokom je potvrdenie finálnej verzie rukopisu, ktorú zasiela časopis autorovi na posledné korektúry. Nasleduje tlač článku, pričom fyzické publikovanie, priradenie strán, zaradenie do konkrétneho čísla časopisu môže trvať ešte niekoľko mesiacov (Nagyová, 2008).

## **Záver**

V indexovaných zahraničných časopisoch je veľká konkurencia, asi 80% všetkých zaslaných rukopisov býva zamietnutá. Publikované sú iba tie najlepšie, najoriginálnejšie a najzaujímavejšie štúdie (Nagyová, 2008).

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Health Impact Assessment (HIA) is a policy-support instrument and approach that seeks to assess the health impacts of projects, programmes and policies on population health. The ultimate goal of HIA is to systematically assess health impacts and subsequently inform the intersectoral decision- and policy-making processes of these impacts. HIA is a growing field of practice and research and is currently in operation at local, regional and national levels across the world. HIA is a multi-disciplinary approach that is informed and influenced by many disciplines, such as public health, epidemiology, environmental health, spatial planning, and the political and social sciences. The growth of HIA practice and development differs across the globe; however the urgent need to assess projects, programmes and policies for their health effects, and inform the policy process with the derived evidence, is universal.

This is the first book that examines HIA solely with regard to its relationship with the policy process, from a global perspective. Drawing from experiences of HIA practice and research globally, this volume seeks to examine how the integration of HIA with the policy process can occur. *Integrating HIA with the Policy Process* includes a range of global experiences, presenting the creative and unique ways of integrating HIA with the policy process, as more often than not, HIA is not mandatorily required by governments. The lessons and experiences shared in this volume are presented in a context-specific manner albeit concluding with generic learning points. This book provides a practical and conceptually-grounded guide for practitioners and professionals, as well as policy-makers, decision-makers, policy advisors and planners at local, national and international levels. Academics, educators and students will find this a useful guide for teaching, training and learning with the presented range of global experience.

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